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Integrated Oral Presentation 1

Thursday, November 3, 2016
Dongkang Hall B, 3F, Avenue

Moderators:
Sang Geol Kim (Kyungpook National Univ.),
Sang-Jae Park (National Cancer Center)
IOP01-1

The Management of Fluid Collection after Laparoscopic Distal Pancreatectomy

Jaewoo Kwon, Song Cheol Kim*, Dae Wook Hwang, Ki Byung Song, Jae Hoon Lee, Sang Hyun Shin, Bong Jun Kwak, Seong-Ryong Kim, Chung Hyeun Ma, Seunghyun Hwang, Kwang-Min Park, Young-Joo Lee

(Purpose) Recently, laparoscopic distal pancreatectomy (LDP) became the standard procedure for resection of left sided pancreatic mass. Fluid collections (FC) at the resection margin of the pancreatic stump after LDP are the frequent radiological finding. However, no recommendations exist regarding its management. The aim for this study is to define FC incidence and suggest efficient treatment of FC after LDP.

(Methods) Data of 1227 patients who underwent LDP between March, 2005 and December, 2015 were collected. This data was analyzed, regarding follow-up CT scan findings of FC at the resection margin. FC was defined when the longest diameter on CT scan was >3 cm. We compared demographic data between FC positive and negative group. Within the positive group, we also compared its intervention and observation group. The basic characteristics of this intervention group consist of symptoms, laboratory findings, CT scan.

(Results) A follow-up with at least one CT image was available for 1217 patients. 812 patients showed FC (66.7%) in immediate postoperative CT or outpatient CT image. FC positive was more common in male patients and FC positive group show longer operative time, post operative hospital stay than FC negative group. 736 FC patients (90.6%) were observed without specific treatment. 76 FC patients (9.3%) need intervention treatment, almost of them complain nausea, vomiting or pain (67 patients / 88%). 61 patients of intervention group (80.3%) show the size of FC increase at follow up CT image. EUS guided stent insertion for gastrocystostomy was performed in 54 patients (71.1%) of intervention group.

(Conclusion) It was found that not all FC after LDP need the additional treatment despite the fact that is frequently found. Almost patients who treated with intervention have some symptom with FC increase at follow up CT image. We noticed that out of all drainage procedures, EUS guided gastrocystostomy was most useful for our experiment.

IOP01-2

Clinical Significance of Revised Microscopic Positive Resection Margin in Patients with Pancreatic Ductal Adenocarcinoma after Resection

Yung Hun You, Dong Wook Choi*, Seong Ho Choi, Jin Seok Heo, In Woong Han, Sunjong Han, Sanghyup Han

(Purpose) Recent studies suggested that microscopic positive ductal margin would be revised according to presence of tumor cell within 1mm to margin surface, even though absence of tumor cell on margin surface itself, after surgical resection in patients with pancreatic ductal adenocarcinoma (PDAC). However, clinical meaning of this revised microscopic positive (rR1) resection margin was still questionable. As a result, the purpose of this study was to compare short term survival and recurrence pattern of patients undergoing an rR1 resection with those undergoing classic R1.

(Methods) Data of 188 patients who underwent pancreaticoduodenectomy for PDCA were reviewed retrospectively in Samsung Medical Center. They were divided into three groups on margin status. Revised microscopic negative resection margin (rR0) means tumor exists more than 1mm from cut surface. Revised microscopic positive resection (rR1) margin means tumor is within less than 1mm from margin surface. Classic microscopic positive resection (cR1) margin means tumor is at surface of margin. 77 cases (40.6%) were classified as rR0. 99 cases (52.9%) were classified as rR1. 12 case (6.4%) were classified as cR1.

(Results) There was no significant difference in both overall survival rate and disease free survival between R0 and rR1 re-
section margin (23 months, 24 months, p=0.208; 22 months, 24 months p=0.146). However, the margin status correlated with the rate of local recurrence; 23.3% in R0, 28% in rR1, 57.9% in cR1 resections (P=0.012). The multivariate analysis revealed that poor differentiation (HR=2.462, 95% CI 1.640-3.695, p<0.001) were significantly independent risk factor for survival. (Conclusion) Revised microscopic positive resection margin affects local recurrence rate, but cannot affect survival. This serve to emphasize the importance of revised microscopic margin classification. This is a single center retrospective study so should future validation of these findings occur in a prospective protocol driven study.

Fig. 1. Survivla analysis

IOP01-3

Safe Bile Duct Division using Real-Time Indocyanine Green Near-Infrared Fluorescence Cholangiography During Laparoscopic Donor Hepatectomy

Department of Surgery, Seoul National University College of Medicine, Korea

Suk Kyun Hong, Kwang-Woong Lee*, Hyo-Sin Kim, Kyung Chul Yoon, Sung-Woo Ahn, Jin Yong Choi, Hyeyoung Kim, Nam-Joon Yi, Kyung-Suk Suh

(Purpose) Determining safe bile duct division points remains an important issue in living donor hepatectomy. Current methods, including intraoperative radiologic cholangiography, magnetic resonance cholangiopancreatography, and probing, are difficult and cumbersome in laparoscopic hepatectomy. The recent application of indocyanine green fluorescent imaging to hepatobiliary operations suggested that this technique may be applicable to laparoscopic donor hepatectomy. (Methods) In the present study, indocyanine green was injected intravenously into 10 consecutive donors 30-60 min before exposure of the hilar plate, with fluorescence monitored intraoperatively using a near-infrared camera system. (Results) Fluorescent cholangiography successfully delineated the right and left bile ducts, as well as aberrant ducts around the bifurcation, in all 10 patients, findings consistent with those of magnetic resonance cholangiopancreatography. (Conclusion) Fluorescent cholangiography enables real-time identification of bile duct division points during laparoscopic donor hepatectomy, suggesting its utility as a supplement to preoperative magnetic resonance cholangiopancreatography.

IOP01-4

The Optimal Surveillance Tools to Detect Postoperative HCC Recurrence

Division of Hepatobiliary Pancreatic Surgery, Department of Surgery, Yonsei University College of Medicine, Severance Hospital, Korea

Sung Hyun Kim, Myung Jae Jung, Sung Hoon Choi, Gi Hong Choi*, Kyung Sik Kim, Jin Sub Choi

(Purpose) Recurrence HCC after surgical resection is up to 70–80% at 5 years and it is a major problem after surgery. Therefore, close surveillance after curative treatment is important to may have the potential to prolong survival. In this study, we attempted to investigate the detection rate of recurrence HCC after curative treatment using our institution protocol. (Methods) From 2006 to 2010, 150 medical records of patients who underwent curative resection for HCC were reviewed retrospectively. Radiologists reviewed the CT images and diagnosed recurrence of HCC. Elevation of tumor marker that implied the recurrence of HCC was defined as more than 20 ng/mL of AFP or 40 mAU/mL of PIVKA-II.
Recurrence site of HCC were evaluated and detection rate of the recurrence at the time of the diagnosis were evaluated according to the surveillance tools. (Dynamic CT only group vs. Tumor marker only group vs. Dynamic CT + Tumor marker group)

**Results** Comparing the detection rate of recurred HCC according to the surveillance tools, dynamic CT + tumor marker group was superior to single surveillance tool groups. (Dynamic CT vs. Tumor markers vs. Both: 87.3% vs. 63.3% vs. 99.3%, p value <0.001) On subgroup analysis, there was also significant difference of detection rate in intrahepatic recurrence group. (Dynamic CT vs. Tumor markers vs. Both: 89.3% vs. 62.6% vs. 100.0%, p value <0.001)

In the extrahepatic recurrence group, although dynamic CT + tumor marker group was also superior to single surveillance tool groups, there was no significant difference. (Table) Among the extrahepatic recurrence patients, more than half (52.6%) the recurrence tumors were located at lung and most of sites (78.9%) were contained by dynamic CT image area. (Figure)

**Conclusion** Combining liver dynamic CT and tumor markers could be an enough surveillance modalities for HCC patients after curative resection.

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**IOP01-5**

**Predictors for Early Recurrence following Curative Resection of Carcinoma of the Ampulla of Vater**

Division of Hepatobiliary and Pancreatic Surgery, Department of Surgery, Ulsan University College of Medicine and Asan Medical Center, Korea

Chung Hyeun Ma, Song Cheol Kim*, Ki Byung Song, Dae Wook Hwang, Jae Hoon Lee, Sang Hyun Shin, Bong Jun Kwak, Seong-Ryong Kim, Jaewoo Kwon, Seunghyun Hwang, Kwang-Min Park, Young-Joo Lee

**Purpose** Among periampullary cancers, the Ampulla of Vater (AoV) cancer has relatively good prognosis. However, in advanced stage, recurrent rate is still high and most recurrence occur in early period. The aim of this study was to identify predictors for early recurrence following curative resection.

**Methods** Between January 2000 and August 2015, clinicopathological data from 511 consecutive patients undergoing resection for AoV cancer in a single institute were retrospectively reviewed. Overall survival and disease free survival were analysed according to clinicopathological factors. Early recurrence was defined as recurrence within the first year following resection.

**Results** Of the 511 patients men were 53.3% and mean aged 61.6(range 30-94). Four hundred fifty eight(89.6%) patients recieved pancreaticoduodenectomy(PD), 46(9%) a minimally invasive PD and 7(1.4%) a TDA. The 1-, 3-, 5-year overall survival rate of patients with AoV cancer is 94.6%, 72.7%, 61.9%, respectively, and disease free survival rate were 78.4%, 67.2%, 62.9%. Factor that significantly influenced recurrence before 1 year were preoperative drainage, T stage, N stage, Tumor differentiation, lymphovascular invasion(LVI), peroneural invasion(PNI), Resection margin, elevated CA19-9, elevated bilirubin, Lymphnode ratio (LNR) on univariate analysis. On multivariate analysis, both LVI(P=0.002) and LNR(P=0.036) were the independent determinants of recurrence before 1 year.

**Conclusion** Early recurrence of the AoV caner is definitely lethal, although AoV cancer has good prognosis. We demonstrated that LVI and LNR were powerful predictors.
for early recurrence. Therefore, intensive surveillance following curative resection should be considered for patients with these predictors.

**IOP01-6**

**A Modified Definition of POPF with Cost Validation for PPPD**

Division of Hepatobiliary Pancreatic Surgery, Department of Surgery, Yonsei University College of Medicine, Severance Hospital, Korea

Sung Hyun Kim, Ho Kyoung Hwang, Chang Moo Kang*, Woo Jung Lee

(Purpose) Postoperative pancreatic fistula (POPF) is still a major complication after pylorus preserving pancreaticoduodenectomy (PPPD), despite improvements of surgical technique and perioperative management. Therefore, clear definition of POPF after the surgery is important thing to surgeons. Although many surgeons use international study group of pancreatic fistula (ISGPF) POPF grade system, the grade system was ambiguous according to surgeons. Moreover, because, the definition was established more than a decade ago, sometimes the definition was not suitable for present medical environment. In this study, we suggested a modified definition of POPF and evaluated the suitability of the grade system for PPPD patients with cost validation comparing to ISFPG grade system. (Methods) From January 2010 to December 2014, 393 medical records of the patients who underwent PPPD were retrospectively reviewed. The patients were classified according to each POPF definition. (ISGPF and modified) A modified definition was as follow. (POPF was defined as greater peritoneal amylase level than three times of serum amylase level within POD#7; Grade A; No additional management except routine management and drain removal within POD #10; Grade B1; ISGPF Grade B except radiological intervention, Grade B2; radiological intervention, Grade C; hemodynamic instability or reoperation, Grade D; mortality.) After then postoperative day (POD) and admission cost was analyzed according to grading system. (Results) In POD analysis, the modified grading system more classified the patients than ISGPF grading system. (ISGPF; None vs. B: 19.4 day vs. 22.1 day, p=0.051; A vs. B: 16.4 day vs. 22.1 day, p=0.019); (Modified; None vs. B1: 18.1 day vs. 21.6 day, p<0.001; A vs. B1: 14.1 day vs. 21.6 day, p=0.003) In admission cost analysis, the modified grading system also more classified the patients than ISGPF grading system. (ISGPF; A vs. B: 6,280,000 won vs. 7,800,000 won, p=0.269); (Modified; A vs. B1: 5,150,000 won vs. 7,380,000 won p=0.021) (Figure) (Conclusion) The modified POPF grade system was more suitable than previous POPF grading system.

**Fig.** Postoperative day and admission cost analysis according to POPF grading system.
**IOP01-7**

### Bile Duct Segmental Resection Versus Pancreatoduodenectomy for Middle and Distal Common Bile Duct Cancer

Department of Surgery, Mokdong Hospital, Ewha Womans University School of Medicine Korea

Huisong Lee, Seog-Ki Min, Hyeon Kook Lee*

**Purpose** To compare survival outcomes between bile duct segmental resection (BDR) and pancreateoduodenectomy (PD) for the treatment of middle and distal bile duct cancer.  

**Methods** From 1997 to 2013, total 96 patients who underwent curative intent surgery for middle and distal bile duct cancer were identified. The patients were divided into two groups according to the type of operation; 20 patients of BDR group and 76 patients of PD group. We retrospectively reviewed the clinical outcomes.  

**Results** The number of lymph nodes were significantly greater in patients of PD group than BDR group. Total number of lymph nodes were 5.8±8.0 vs. 11.2±8.2 (p=0.002) and number of metastatic lymph nodes were 0.4±0.9 vs. 1.0±1.5 (p=0.080), respectively. After a median follow-up period 24 months (range, 4 to 169), the recurrence free survival of the PD group was superior than that of BDR group (p=0.035). In the patients with lymph node metastases, the patients underwent PD had significantly better survival than BDR group (P<0.001).  

**Conclusion** A surgeon should be careful to perform BDR for middle to distal common bile duct cancer. The PD is recommended if lymph node metastases are suspected.

**Fig. 1.** Kaplan Meier survival analysis according to the type of operation in patients with middle to distal common bile duct cancer. A. No lymph node metastases. B. Lymph node metastases

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**IOP01-8**

### Clinical outcome of Radiologic Intervention in Patients with Ruptured Pseudoaneurysm after Pancreatoduodenectomy

Department of Surgery, Samsung Medical Center, Sungkyunkwan University College of Medicine, Korea

Yung Hun You, Seong Ho Choi*, Dong Wook Choi, Jin Seok Heo, In Woong Han, Sunjong Han, Sanghyup Han

**Purpose** Although the mortality rate after pancreatic surgery has decreased markedly over the last several decades, morbidity rate still remains high. Postpancreatectomy hemorrhage (PPH) is one of the main complications after pancreatectoduodenectomy and showed considerable mortality rate. Especially, pseudoaneurysm after pancreatectoduodenectomy is a important cause of delayed PPH. The purpose of this retrospective study is to investigate the long term result of radiologic intervention for ruptured pseudoaneurysm in patient after pancreatectoduodenectomy.  

**Methods** From October 1994 to December 2015, the medical records of 2496 patients who underwent pancreatectoduodenectomy were reviewed in Samsung Medical Center. Of 2496 patients, 53 (2.1%) patients with pseudoaneurysm were included in this study. The clinical course, management strategy, and outcome of ruptured pseudoaneurysms cases were analyzed.  

**Results** Of 53 patients, 20 (37.7%) patients developed pseudoaneurysms on stump of gastroduodenal artery, 12 (22.6%) patients developed on common hepatic artery. Two patients underwent immediate re-laparotomy and 51 patients managed by radiologic intervention. Among these, 6 patients failed to be managed by initial radiologic intervention and 45 cases (88.2%) succeeded to initial hemostasis. Embolizations of pseudoaneurysm were performed in 34 patients. 6 (17.6%) cases of 34 embolizations had rebleeding and three patients had liver infarction eventually leading to liver failure. Two patients underwent immediate re-laparotomy and 51 patients managed by radiologic intervention. Among these, 6 patients failed to be managed by initial radiologic intervention and 45 cases (88.2%) succeeded to initial hemostasis. Embolizations of pseudoaneurysm were performed in 34 patients. 6 (17.6%) cases of 34 embolizations had rebleeding and three patients had liver infarction eventually leading to liver failure. Insertion of stent graft was performed in 18 patients. 4 (22.2%) patients had rebleeding and 4 (22.2%) patients had stent occlusions. After stent occlusion, two cases developed liver infarction leading to liver failure expired and one case developed small bowel infarction.  

**Conclusion**
Radiologic intervention is a best option for the management of pseudoaneurysm after pancreaticoduodenectomy. Stent graft is not superior to embolization to maintain arterial flow. Rebleeding and stent occlusions after stent insertion are still problematic. This is a single center retrospective study so should further validation of these findings occur in a prospective study.

IOP01-9

Laparoscopic Pancreatic Reconstruction Technique; 4 Layer Duct to Mucosa Method

Department of Surgery, Hallym Sacred Heart Hospital, Korea

Jung Woo Lee*, Joo Jung Il, Jung Ho Park, Dong Hyun Kim

(Purpose) With the advance of laparoscopic technique and experience, it is carefully regarded that laparoscopic pancreaticoduodenectomy (LPD) is feasible and safe in experienced surgeon or hepatobiliary-pancreatic unit. Here in, we present our experience with 4 layer duct to mucosa pancreaticojejunostomy method. (Methods) We retrospectively reviewed the records of 24 patients who underwent LPD at hallym sacred heart hospital, Korea between september 2015 and october 2016. After laparoscopic resection, in all cases, pancreaticojunostomy was observed that duct-to-mucosa (22 case) or dunking method (2 case) were used. (Results) There were 24 patients in this study. The mean age of the patients was 60.7±13.1 years. The mean hospital stay was 16.3±12.7 days. Postoperative pancreatic fistula grade B & C was 20.9% (grade B: 3 case and grade C: 2 case). (Conclusion) Our laparoscopic pancreaticojejunostomy method is carefully regarded as feasible and safe technique.
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Integrated Oral Presentation 2

Date. Thursday, November 3, 2016
Venue. Dongkang Hall B, 3F, Avenue

Moderators:
Gibong Chae (Kangwon National Univ.),
Sung Bum Kang (Seoul National Univ.)
**IOP02-1**

**Prediction of Radio-Responsiveness with Immune-Profilng in Patients with Rectal Cancer**

Da Kyeom Shin, In Ja Park*, Chang Sik Yu, Seung Mo Hong1, Seok-Byung Lim, Jong Lyul Lee, Chan Wook Kim, Yong Sik Yoon, Jin Cheon Kim

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(Purpose) We tried to evaluate whether the tumor immune infiltrate could be a useful for prediction of responsiveness to preoperative chemoradiotherapy (PCRT) in patients with rectal cancers. (Methods) The association of the immune infiltrate and responsiveness to PCRT which is evaluated by tumor regression grade (TRG) was investigated in patients treated with PCRT. Using Single formalin-fixed paraffin-embedded slides of pretreatment biopsies, co-stain for CD4, CD8, PDL-1, FoxP3, cytokeratin, and DAPI by Multiplexed immunofluorescence (Perkin Elmer Opal TM system) was performed. Multispectral imaging and digital analysis to visualize and quantify specific immune infiltrates were performed using the PerkinElmer VectraTM system. The density (number of cells per mm2) and proportion of total TILs and specific cell types in the stroma were calculated (Results) Patients were classified as group with total regression and group with residual disease (near total, moderate, and minimal regression). The proportion of CD4(+) lymphocytes (p=0.001) and PDL-1(+) cells (p=0.002) were different according to tumor regression (total vs. residual disease). The patients with total regression have lower CD4(+) lymphocyte and higher PDL-1(+) proportions than group with residual disease. The ratio between CD4, CD8, PDL1, FoxP3 was different between groups. Group with total regression showed lower CD4/CD8, CD4/PDL-1, CD8/PDL-1, and higher PDL-1/FoxP3 ratio than group with residual disease. (Conclusion) The determination of the immune infiltrate in biopsies before treatment could be a valuable information for the prediction of response to PCRT.

**Table.** Differences on proportion and ratio of immune infiltrate according to responsiveness to preoperative chemoradiotherapy

<table>
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<td>CD8</td>
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<td>36.63±4.94</td>
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<td>FoxP3</td>
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<td>3.29±0.68</td>
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<tr>
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<td>PDL1-FoxP3</td>
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<td>1.50±1.40</td>
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</table>

Each value was shown as mean ± standard error
Mann-Whitney test was used for analysis

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**IOP02-2**

**The Study for Reduced Dose Administration of Oxaliplatin Retaining Therapeutic Efficacy as An Adjuvant FOLFOX Chemotherapy for Colorectal Cancer**

Dawon Park, Se-Jin Baek, In-Soo Yang, Dong-Woo Kang, Jin Kim*, Seon-Hahn Kim

Department of Surgery, Korea University College of Medicine, Korea

(Purpose) Oxaliplatin-based FOLFOX chemotherapy is one of the most commonly used adjuvant chemotherapy regimen for patients with stage II/III colorectal cancer. Many patients experience dose reduction or early termination of the chemotherapy due to side effects such as bone marrow suppression or severe peripheral neuropathy. Although the reduced dose administration of oxaliplatin has brought concerns about negative impacts on tumor recurrence or survival, the study regarding this issue is lacking to date. We conducted this study to identify the clinical characteristics of patients who needed dose reduction of oxaliplatin and to verify the range of reduction with oncologic safety. (Methods) Patients with stage II/III colorectal can-
who received adjuvant FOLFOX chemotherapy postoperatively between September 2006 and December 2014 were enrolled in this study. Total amount of oxaliplatin administered per patient was calculated in percentile, based on 12 cycles of full dose FOLFOX as a standard. The cut-off values showing significant differences in disease-free survival (DFS) and overall survival (OS) were calculated, and patient groups classified according to this value were compared for clinicopathologic outcomes. (Results) 611 patients were included in this study. 365 patients were male and 246 patients were female. The mean age of the patients was 59.2 years and mean BMI was 24.8 kg/m². 107 patients were stage II and 504 patients were stage III. At 55% of standard dose of oxaliplatin, 5-year DFS showed significant difference with 67.2% in the reduced group and 75.5% in the control group (p=0.039). At the same point, there was no significance in 5-year OS with 62.3% in the reduced group and 82.3% in the control group (p=0.068). From with 40% of standard dose, significant difference was showed in 5-year OS between the groups (36.5 vs. 82.3%, p=0.030). When we compared the reduced group and the control group classified in 60% of standard dose of oxaliplatin, patients in the reduced group were older (62 vs. 58 years, p=0.003), with low BMI (23.1 vs. 24.0 kg/m², p=0.005), and exposed to neoadjuvant treatment more frequently (18.0 vs. 9.1%, p=0.003) than in the control group. With this dose, there was no statistical significance in 5-year DFS and 5-year OS between two groups (5-year DFS, 73.5 vs. 74.2%, p=0.519; 5-year OS, 71.9 vs. 81.5%, p=0.256, respectively). (Conclusion) Based on result with 60% of the standard dose of oxaliplatin, patients with old age, low BMI, highly exposed neoadjuvant treatment had low compliance of chemotherapy, but they still showed comparable oncologic outcome. Thus, at least, more than 60% of the standard dose of oxaliplatin should be administered to patients with stage II/III colorectal cancer as an adjuvant chemotherapy to achieve suitable oncological result.

IOP02-3

Adjuvant Chemotherapy in Colorectal Cancer Regarding Microsatellite Instability and KRAS Mutations

Department of Surgery, Colorectal Cancer Center, Konkuk University Medical Center, Konkuk University School of Medicine, Korea

Jin-Hee Paik, Eun-Joo Jung, Chun-Geun Ryu, Dae-Yong Hwang*

(Purpose) The prognostic value of microsatellite instability (MSI) status and KRAS mutations in patients who have undergone curative resection for colorectal cancer is controversial. This study was designed to investigate the prognostic effect of MSI status and KRAS mutations in patients with stage II or III colorectal cancer. (Methods) All data was extracted from prospectively collected colorectal cancer patients’ database between November 2013 and December 2015. Out of 264 patients who underwent curative resection for TNM stage II, III colorectal cancer, 155 patients were enrolled, who had result of MSI status and KRAS expression. (Results) In 155 patients, 80 males and 75 females were included and their mean age was 62 years old. The median follow up period was 17 months (range, 5-30). Seventy five patients were in TNM stage II and 80 patients in III. Primary tumor lesion included in 145 patients in the colon and in 10 patients in the rectum. One hundred thirty eight patients (89%) had microsatellite stable (MSS) or microsatellite-low (MSI-L) and 17 patients (11%) had microsatellite-high (MSI-H). Ninety nine patients (63.9%) had wild type KRAS tumor and 56 patients (36.1%) had mutant type KRAS tumor. There was no significant difference of patients’ clinicopathological characteristics between wild type and mutant type KRAS. The incidence of recurrence was 6.6% in stage II (5 cases) and 11.1% in stage III (9 cases) during the follow up period (median 17, 5-33 month). MSI status and KRAS mutation was not affected to disease-free survival (DFS) in univariate analysis (P=0.198, P=0.392). However, subgroup analysis revealed adjuvant chemotherapy was affected to DFS in MSS or MSI-L group (P=0.016) and KRAS mutant group (P=0.001).
The patients who received adjuvant chemotherapy showed better DFS rather than those not receiving adjuvant chemotherapy in MSS or MSI-L group (P=0.01) and KRAS mutant group (P=0.002). (Conclusion) MSI status and KRAS mutations have no prognostic value in patients with stage II, III colorectal cancer. Disease free survival of Patients with MSS or MSI-L and KRAS mutations improved according to adjuvant chemotherapy. Therefore, Adjuvant chemotherapy has benefit in patients with MSS or MSI-L and KRAS mutant tumor.

IOP02-4

Prognostic Implications of Over-Expression of Her-2 in Locally Advanced Rectal Cancer Treated with Neoadjuvant Chemoradiation

Department of Colorectal Surgery, 1Department of Pathology, 2Department of Internal Medicine, Hallym Hallym University College of Medicine, Hallym University Sacred Heart Hospital, Korea

Jung Ho Park, Mi Jung Kwon1, Jae Seung Soh2, Dong Hyun Kim, Hyoung-Chul Park, Jung Il Joo, Sang Woo Lim*

(Purpose) So many conflicting literatures were reported regarding clinicopathological value of human epidermal growth factor 2 (Her 2) overexpression in colorectal cancer, although, the significance of HER2 overexpression on locally advanced rectal cancer and impact on oncological outcomes including tumor responses to neoadjuvant chemoradiation and survival were not yet fully evaluated. The aim of the present study is to evaluate the relationship between Her 2 and clinicopathological variables of locally advanced rectal cancer patients after neoadjuvant chemoradiation including tumor response, and prognosis.

(Methods) Clinicopathologic data of 99 patients with locally advanced rectal adenocarcinoma performed radical operation after neoadjuvant chemoradiation were analyzed retrospectively. HER2 protein expression and HER2 gene copy number were determined by immunohistochemistry (IHC) and silver in situ hybridization (SISH), respectively. The tumor responses to chemoradiation were evaluated with TNM staging and tumor regression grading (TRG) systems. (Results) Twenty-five (25.3%) tissues showing IHC score 2+ or 3+ were determined as high HER2 protein expression and HER2 gene amplification by SISH were detected in 12 (12.6%). overall HER2 gene amplification by SISH was significantly correlated with HER2 expression by IHC, (P=0.004, Spearman’s coefficient=0.289). Both HER2 overexpression and amplification did not have correlations with clinicopathological parameters, tumor responses to neoadjuvant chemoradiation of downstaging (p=0.635, p=0.256, respectively) nor TRG grading (p=0.162, p=0.784, respectively), and survival of DFS (P=0.975) and OS (P=0.074). In comparison of HER2 expression in 68 pretreatment colonoscopic and post-operative specimens, The 61 cases (89.7%) showed the same results in both pre- and post- treatment specimens. The positive and negative predictive values were 80.0% and 93.0%. (kappa coefficient=0.730, P=<0.001) (Conclusion) In conclusion, HER2 over expression status was not associated with other clinicopathological data including tumor response to neoadjuvant chemoradiation of TRG nor downstaging in locally advanced rectal cancer as well as cancer related survival. The roles of Her 2 overexpression in rectal cancer and prognosis should be further evaluated.

Fig. (A-D) Representative images of HER2 protein expression by immunohistochemistry. (A) score 0, (B) score 1, (C) score 2, (D) score 3. (E-F) Representative images of HER2 gene copy number changes assessment by SISH. (E) Negative for HER2 gene amplification. Tumor cells (dotted arrow) display normal disomy with two black (HER2 probe) and two red (chromosome 17 probe) signals. (F) Positive for HER2 gene amplification. Tumor cells (black arrows) display HER2 gene amplification with 10-16 black (HER2 probe) signals and 3-7 red (chromosome 17 probe) signals. Magnifications: A-D (x200), E-F (x1000).
IOP02-5

The Validity of Preoperative Chemoradiotherapy for Upper/Mid Rectal Cancer

Department of Surgery, Yonsei University College of Medicine, Korea

Gyoung Tae Noh, Jeonghee Han, Min Soo Cho, Hyuk Hur, Byung Soh Min*, Kang Young Lee, Nam Kyu Kim

(Purpose) For the management of rectal cancer, the introduction of preoperative chemoradiotherapy (CRT) have led to a significant reduction of local recurrence and increased the chance for sphincter sparing surgery especially for low rectal cancer. According to the guideline of National Comprehensive Cancer Network (NCCN), preoperative CRT is recommended for all rectal cancers of clinical stage II and III, regardless of the location of tumor in rectum. However, despite of the proven benefits of preoperative CRT for low rectal cancer, the validity of routine administration of CRT in upper/mid rectal cancer is in debate due to high rate of radiation induced morbidity such as anastomotic leakage. Therefore, we analyzed the surgical and oncologic impact of CRT by comparing the prognosis of patients with and without preoperative CRT for upper/mid rectal cancer. (Methods) From January 2006 to December 2012, all patients diagnosed as clinical stage II and III upper/mid rectal cancer were enrolled. All patients underwent low anterior resection with TME under curative intention. We categorized patients into two groups according to the experience of preoperative CRT and compared patients’ surgical and oncologic outcomes. (Results) Of a total of 784 patients, 222 patients (28.3%) underwent preoperative CRT and 562 patients (71.7%) did not receive it. Investigating positivity of surgical resection margin, there were no significant difference between CRT (+) and CRT (-) group for all resection margins including circumferential margin. Diverting ileostomy was performed significantly frequently in CRT (+) group (46.4%) in comparison with CRT (-) group (19.9%). (p<0.001) Complication rate of anastomotic leakage was significantly higher in CRT (+) group (18.0%) than CRT (-) group (8.5%). (p<0.001) Remarkably, delayed occurrence of anastomotic leakage, which was diagnosed beyond 1 month after surgery, identified in 8.1% of CRT (+) group and 0.7% of CRT (-) group. (p<0.001) Investigating the oncologic outcomes, there was no significant difference in local and systemic recurrence rate between two groups. For DFS, patients in CRT (+) and CRT (-) group showed 74.9% and 74.2% of 5-year DFS, respectively. (p=0.825) For OS, CRT (+) group showed 92.9% of 5-year OS, which was superior to the result of 85.9% in CRT (-) group. However, in the multivariate analysis adjusting for potential confounding factors, the result was insignificant. (p=0.523) (Conclusion) In the context of oncologic outcome, there was no significant difference between patients with and without preoperative CRT. Additionally, comparing the status of resection margin, there was no significant difference. However, patients with preoperative CRT showed increased incidence of ileostomy formation and postoperative anastomotic leakage.

IOP02-6

The Influence of the Multidisciplinary Team Approach on the Management of Advanced and Recurred Colorectal Cancer

Division of Colon and Rectal Surgery, Department of Surgery, University of Ulsan College of Medicine and Asan Medical Center, Korea

Dakyum Shin, In Ja Park*, Chang Sik Yu, Jong Lyul Lee, Seok-Byung Lim, Chan Wook Kim, Yong Sik Yoon, Jin Cheon Kim

(Purpose) The purpose of this study was to evaluate the influence of the MDT for colorectal cancer on clinical decision making in a tertiary referral center. (Methods) We have 4 weekly MDT sessions for colorectal cancers in which a colorectal surgeon, medical oncologist, radiation oncologist, and radiologist participate. All process made by the MDT is digitally recorded in the prospectively designed medical case form. The initially proposed treatment plans were compared with the definitive treatment plans; “complete application” defined when defini-
tive treatment plans were same as proposed treatment plans and “partial application” when definitive treatment plans were included in the proposed treatment plans. “Partial alteration” means that alternative treatment plan was add to one of proposed plans and definitive treatment plans of “complete alteration” were included nothing of proposed plans. (Results) 1382 patients were discussed in MDT from 2011 to 2014. For most patients was presented to the panel by the medical oncologist (47.4%), followed by the colorectal surgeon (39.3%) and Gastroenterologist (9%). Among discussed patients, 549 case were newly diagnosed colorectal cancer and 833 (60.2%) had recurrent disease. In recurrent disease, most common site was liver (356, 42.7%), followed by lung (248, 29.7%), lymph node (130,15.6%), local recurrence (91,10.9%) and 129(15.5%) case shaw et her recurrence more than 2 sites. The cases of complete application were 950 (68.7%) and partial application was 254(18.4%). The MDT altered the proposed treatment for 179 (13%); partial alteration was 44 (3.2%) cases and complete alteration was 135 (9.8%). Among 179 cases which alternation occurred, 90 (50.2%) which planned to upfront resection was altered to palliative chemotherapy in 45 cases due to unresectable lesions and to neoadjuvant chemotherapy in 45 cases for the marginally resectable lesions. In 35 (19.6%), another treatment modality was decided to be added without changing the intent of treatment. In 43 (24%), the diagnosis of metastasis or recurrence was altered to benign lesion, so, diagnostic follow-up was decided upon. In 85 (47.5%), review of radiologist under clinical information effects on diagnosis and decision. Determination of disease extent was changed in 23/85 (29.4%) and new metastatic lesions were detected in 22/85 (25.9%) cases. (Conclusion) Discussing patients with colorectal cancer in the MDT session results in an changed clinical decision in more than 10% of cases. The present study demonstrates that the imperfection of decision made by individual physicians can be reduced by the process of multidisciplinary decision making.

IOP02-7

Single-Center Experience with Intraabdominal Liposarcoma: Optimal Minimum Duration for Postoperative Remnant Tumor Screening

Department of Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Department of Pathology, Samsung Medical Center, Sungkyunkwan University School of Medicine, Korea

Jinsoo Rhu, Chan-Woo Cho, Kyo-Won Lee, Hyoujn Park, Jae Berm Park, Yoon-La Choi, Sung Joo Kim

(Purpose) To analyze factors related to recurrence and survival of intraabdominal liposarcoma and find the optimal minimum duration for remnant tumor screening. (Methods) Patients who underwent surgery for intraabdominal liposarcoma were included. Cox analyses were used for analyzing factors related to recurrence and survival. To find the optimal minimum duration for remnant tumor screening, patients with recurrence after surgery despite gross complete resection were grouped by time of detection into 1, 3 or 6 months. Their survivals were compared to the gross incomplete resection group. (Results) Kaplan-Meier 5-year disease-free survival was 35.9% and overall survival was 66.5%. Multiplicity (HR=2.528, CI=1.585-4.033, p<0.001), organ invasion (HR=1.628, CI=1.020-2.598, p=0.041) and FNCLCC grades (G2, HR=1.730, CI=1.000-2.994; G3, HR=3.812, CI=2.112-6.880) were related to recurrence. Multiplicity (HR=2.131, CI=1.050-4.329, p=0.036), organ resection ≥3 (HR=2.857, CI=1.322-6.174, p=0.008), gross incomplete resection (HR=4.368, CI=1.890-10.097, p=0.001), positive margin (HR=2.766, CI=1.367-5.600, p=0.005), FNCLCC grade (G2, HR=2.044, CI=0.937-4.459; G3, HR=4.470, CI=1.893-10.557, p=0.003) and RT (HR=0.322, CI=0.160-0.648, p=0.001) were related to overall survival. Dividing patients into 1 month (p=0.097) and 3 months (p=0.063) did not yield significant differences in univariate analyses while 6 months showed significant difference (p=0.015) compared to gross incomplete resection group. Patients with a tumor detected within 6 months showed similar survival to the gross incomplete resection group (HR=0.552, CI=0.241-1.260, p=0.138) while patients with
detection after 6 months showed better survival (HR=0.325, CI=0.149-0.708, p=0.005). (Conclusion) A minimum duration of 6 months for remnant tumor screening using CT seems optimal.

Table 1. Demographic, clinical, and pathologic characteristics of the patients who underwent surgery for intraabdominal liposarcoma in Samsung medical center.

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Table 2. Multivariable Cox analysis of potential prognostic factors for disease-free survival.

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Table 3. Multivariable Cox analysis of potential prognostic factors for overall survival.

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<tr>
<td>No</td>
<td>91</td>
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<tr>
<td>Yes</td>
<td>60</td>
<td>2.044</td>
<td>1.346-3.139</td>
<td>0.001</td>
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</table>
Table 4. Tumor detection during postoperative screening for remnant tumor based on computed tomography (CT).

<table>
<thead>
<tr>
<th>Tumor detection during follow up CT</th>
<th>No.</th>
<th>% (Cum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 1 month*</td>
<td>27</td>
<td>28.4 (28.4)</td>
</tr>
<tr>
<td>1-3 months</td>
<td>7</td>
<td>7.4 (35.8)</td>
</tr>
<tr>
<td>3-6 months</td>
<td>14</td>
<td>14.7 (50.5)</td>
</tr>
<tr>
<td>6-12 months</td>
<td>12</td>
<td>12.6 (63.2)</td>
</tr>
<tr>
<td>After 12 months</td>
<td>35</td>
<td>36.8 (100.0)</td>
</tr>
<tr>
<td>Total</td>
<td>95</td>
<td></td>
</tr>
</tbody>
</table>

No recurrence: 73

* Among 19 cases that were described as gross incomplete resection in the operation record, 18 cases were confirmed to have a remnant tumor while one case never showed a recurrent tumor during follow up.

Table 5. Multivariable analysis of prognostic factors on overall survival in patients who had recurrence after operation.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Univariable HR</th>
<th>95% CI</th>
<th>P</th>
<th>Multivariable HR</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
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</tr>
<tr>
<td>Male</td>
<td>0.829</td>
<td>0.453-1.518</td>
<td>0.544</td>
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<td></td>
<td></td>
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<tr>
<td>Female</td>
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<td>Age (years)</td>
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<tr>
<td>≤60</td>
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<tr>
<td>&gt;60</td>
<td>1.594</td>
<td>0.898-2.423</td>
<td>0.111</td>
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<tr>
<td>Primary</td>
<td>0.961</td>
<td>0.530-1.788</td>
<td>0.895</td>
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<tr>
<td>Recur</td>
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<td>Multiplicity</td>
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<tr>
<td>32</td>
<td>1.112</td>
<td>0.681-2.165</td>
<td>0.728</td>
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<tr>
<td>Organ invasion</td>
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<tr>
<td>35</td>
<td>1.061</td>
<td>0.922-2.079</td>
<td>0.091</td>
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<tr>
<td>3 or more resected organs</td>
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<tr>
<td>20</td>
<td>1.184</td>
<td>0.925-2.742</td>
<td>0.084</td>
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<tr>
<td>Histologic margin</td>
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<tr>
<td>62</td>
<td>1.043</td>
<td>0.944-2.036</td>
<td>0.017</td>
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<tr>
<td>Positive</td>
<td>1.015</td>
<td>0.946-2.036</td>
<td>0.904</td>
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<td>Differentiation</td>
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<td>WDPLS</td>
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<tr>
<td>26</td>
<td>1.065</td>
<td>1.011-1.120</td>
<td>0.029</td>
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<tr>
<td>others</td>
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<tr>
<td>DMXCLCC Grade</td>
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<tr>
<td>Radiotherapy</td>
<td>0.851</td>
<td>0.280-2.765</td>
<td>0.016</td>
<td>0.439</td>
<td>0.275-0.710</td>
<td>0.013</td>
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<tr>
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<tr>
<td>Gross incomplete resection</td>
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<tr>
<td>Within 1 month</td>
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<td>After 1 month</td>
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<td>Gross incomplete resection</td>
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<td>Within 3 months</td>
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<td>Gross incomplete resection</td>
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<td>Within 6 months</td>
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<td>After 6 months</td>
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</table>

Fig. Survival curves of patients who had recurrence after surgery of intraabdominal liposarcoma shows that patients who were detected with a tumor within 6 month after surgery showed similar survival with patients with gross incomplete resection (HR=0.552, CI=0.241-1.260, p=0.158) while patients who were detected with a tumor after 6 month showed better survival compared to gross incomplete resection group (HR=0.325, CI=0.149-0.708, p=0.005).

IOP02-8

The Importance of Comprehensive Patient Selection to Improve the Rate of ypT0-1 after Local Excision after Chemoradiotherapy in Rectal Cancer Patients: A Single Center 10-year Experience

Division of Colon and Rectal Surgery, Department of Surgery, University of Ulsan College of Medicine and Asan Medical Center, Korea

Jun Ho Lee, Seok-Byung Lim*, Jong Lyul Lee, Chan Wook Kim, Yong Sik Yoon, In Ja Park, Chang Sik Yu, Jin Cheon Kim

(Purpose) Preoperative chemoradiotherapy (CRT) followed by local excision (LE) has been suggested as an alternative treatment option in patients with lower rectal cancer. However, in previous studies, the rates of ypT0-1 after LE have been reported less than 50%, because there are no established selection criteria for LE. Considering LE is promising treatment option for patients with favorable re-
achievement of satisfying rate of ypT0-1 are warranted. We aimed to investigate the rate of ypT0-1 after LE in highly selected patients using comprehensive methods and evaluate their oncologic outcomes. (Methods) Between January 2006 and December 2015, 129 patients were received LE after CRT in Asan Medical Center, Seoul, Korea. Preoperative patient selection for putative candidate of good response was conducted with physical exam with digital rectal exam, pelvic MRI, trans-rectal ultrasonography, and sigmoidoscopy. We retrospectively reviewed the clinicopathologic parameters and survival outcome of these patients. (Results) The mean age was 62.8±11.3 years and median follow up duration was 24.9 months (range, 14.2-54.4 months). The clinical T and N categories prior to CRT were as follows: cT1 6 (4.7%); cT2 71 (55.0%); cT3 50 (38.8%); cT4 2 (1.6%); cN0 59 (45.7%); and cN1 or 2 70 (54.3%). Of 129 patients, 84 patients (65.1%) and 45 patients (34.9%) underwent conventional transanal excision and transanal minimally invasive surgery, respectively. The pathologic ypT stage was as follows: No residual disease 69 (53.5%); ypTis 9 (7.0%); ypT1 24 (18.6%); ypT2 24 (18.6%); ypT3 3 (2.3%). We recommended radical surgery to 27 patients with ypT2-T3, only 4 patients (14.8%) underwent radical surgery. During the follow up period, 10 patients (8.0%) from 125 LE patients were experienced recurrence; local recurrence in 4 patients, systemic recurrence in 5 patients, and local and systemic recurrence in 1 patient. Of the 10 recurred patients, 7 patients underwent salvage operations, 2 patients received chemotherapy only, and 1 patient refused any treatment, respectively. Three years overall survival rate was 97.9%±2.1% and recurrence-free survival rate was 89.4±3.5%. (Conclusion) With comprehensive patient selection using clinical, endoscopic and imaging method, the 80% rates of ypT0-1 could be accomplished and the oncologic outcomes of this strategy were feasible. Establishment of optimal patient selection criteria for LE after CRT needs to be validated.

IOP02-9

High Preoperative Serum Carbohydrate Antigen 19-9 Levels Can Predict Poor Oncologic Outcomes in Colorectal Cancer Patients on Propensity Score Analysis

Department of Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, 1Department of Surgery, Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, Korea

Jung Kyong Shin, Hee Cheol Kim*, Woo Yong Lee, Seong Hyeon Yun, Yong Beom Cho, Jung Wook Huh, Yoon Ah Park, Ho Kyung Chun

(Purpose) Many studies support the role of carcinoembryonic antigen (CEA) as a strong indicator of the status of colorectal cancer patients, but evidence regarding carbohydrate antigen 19-9 (CA19-9)’s value in this regard is insufficient. The purpose of this study is to evaluate the prognostic value of preoperative serum CA19-9 levels in colorectal cancer patients. (Methods) Between 2008 and 2011, 4,794 consecutive patients who underwent curative resection for colorectal cancer at Samsung Medical Center were analyzed. These patients were classified into two groups according to preoperative CA19-9 (high CA19-9: >37ng/ml, n=440; normal CA19-9:<37 ng/ml, n=4,354). We used 1:20 propensity score matching to adjust for potential baseline confounders between groups including age, sex, tumor size, and pathologic T, N, and M categories. (Results) After propensity score matching, 424 patients (10.5%) among 4,021 patients with colorectal cancer showed a high pre-CA19-9 level (>37ng/ml). There were no significant differences between these two groups in age, sex, preoperative CEA level, or T, N, and M stage after propensity score matching. Of the 424 patients with high pre-CA19-9, 141 (33.3%) exhibited cancer recurrence more frequently than patients with normal preoperative CA19-9 (18.5%). Patients with an elevated preoperative CA19-9 level showed significantly poorer survival than those with normal levels. The 5-year overall survival rate was 87.9% in the high preoperative CA19-9 group and 91.9% in the normal preoperative CA19-9 group (p<0.001). The 5-year dis-
ease-free survival rate was 70.2% in the high preoperative CA19-9 group and 82.7% in the normal preoperative CA19-9 group (p<0.001). (**Conclusion**) Patients with an elevated preoperative CA19-9 level in colorectal cancer have a significantly poorer prognosis than those with normal levels of these markers. We therefore suggest preoperative CA19-9 level to be a strong prognostic indicator of poor outcomes in colorectal cancer.
Annual Congress of KSS 2016

68th Annual Congress of the Korean Surgical Society

Integrated Oral Presentation 3

Date. Thursday, November 3, 2016
Venue. Dongkang Hall B, 3F, Avenue

Moderators:
Koo Jeong Kang (Keimyung Univ.),
Kwang Woong Lee (Seoul National Univ.)
IOP03-1

Classification of Surgical Difficulty for Liver Resection to Predict Surgical outcome in Patient with Hepatocellular Carcinoma

Department of Surgery, Seoul National University Bundang Hospital, Seoul National University College of Medicine, Medical Research Collaborating Center, Seoul National University Bundang Hospital, Seoul National University College of Medicine, Korea

Jae Seong Jang, Jai Young Cho*, Soyeon Ahn1, Ho-Seong Han, Yoo-Seok Yoon, Youngrok Choi, Seong Uk Kwon, Sungho Kim, Jang Kyu Choi

(Purpose) A complexity classification according to complexity (low, medium, or high) for liver resection was recently proposed. We compared this new classification with the conventional major/minor classification. (Methods) We retrospectively reviewed 469 hepatocellular carcinoma patients who underwent liver resection between 1 January 2004 and 30 June 2015. We compared the groups with discordant classification and performance of both classifications for predicting power of perioperative outcomes using receiver operating characteristic curve analysis. (Results) Both classification effectively differentiated subgroups in terms of intraoperative findings and short-term outcomes like blood loss, transfusion rate, operation time, complication rate, postoperative hospital stay (P<0.001, respectively). There was discrepancy between the major/minor classification and the complexity classification. 149 patients (43%) were classified as medium complexity and 13 patients (4%) as high complexity within minor operation group. Within minor operation group, higher complexity groups showed longer operation time (206.7±111.5, 334.9±162.1, 434.7±197.5 min. for low, medium, and high complexity, respectively, P<0.001 between low and medium; P=0.038 between medium and high). Within the major operation group the high complexity group showed longer operation time than the medium complexity group (442.2±141.8, 331.9±114.6 min, respectively, P=0.001). However, within each groups according to the complexity classification, the differential patterns between the minor or major group were subtle. The complexity classification correlated with predicting blood loss (Area under the curve [AUC]=0.690 and 0.617, respectively; P=0.001) and operation time (AUC=0.727 and 0.619, respectively; P<0.001) better than the major/minor classification. (Conclusion) The new complexity classification provided additional surgical difficulty information beyond the conventional classification.

IOP03-2

Liver Transplantation in Highly Selected Hepatocellular Carcinoma Patients with Portal Vein Tumor Thrombosis Increases Survival

Department of Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Department of Surgery, Seoul National University Boramae Medical Center, Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine, Department of Surgery, Yonsei University College of Medicine, Division of HBP surgery and Liver Transplantation, Department of Surgery, Korea University Medical Center, Korea University Medical College, Center for Liver Cancer, National Cancer Center, Department of Surgery, Seoul National University College of Medicine, Korea

Jong Man Kim, Hae Won Lee1, Gi-Won Song2, Gi Hong Choi3, Dong Sik Kim4, Seoung Hoon Kim5, Kyung-Suk Suh6*, Jae-Won Joh

(Purpose) Hepatocellular carcinoma (HCC) with portal vein tumor thrombosis (PVTT) is considered as contraindication for liver transplantation (LT) because of high HCC recurrence in the recipients. The purpose of present study is to identify the disease-free survival (DFS) and overall survival (OS) after LT in those patients and evaluate the risk factors for HCC recurrence. (Methods) Ninety-nine patients had pathological HCC PVTT in the multicenter from 2000 to 2013. We collected the medical records in those patients. (Results) The 1-year, 2-year, and 3-year disease-free survival and overall survival were 46.3%, 32.2% and 27.3% and 63.5%, 46.6%, and
38.5%, respectively. The median disease-free survival and overall survival were 10.8 months and 20 months, respectively. Multivariate analysis showed that AFP >40 ng/dL, tumor size >5 cm, and tumor number >10 were predisposing factors for HCC recurrence after transplantation. The median DFS and OS in the patients with less than one risk factor were 24.7 months and 39.3 months, respectively. (Conclusion) Liver transplantation in highly selective HCC patients with PVTT increases patient survival. Present study suggests that HCC patients with PVTT, who have good prognostic factors, should be considered liver transplantation.

**IOP03-3**

Assessment of Hepatocellular Carcinoma Based on the Modified Union for International Cancer Control (mUICC or Liver Cancer Study Group of Japan (LCSGJ)) and the American Joint Committee on Cancer (AJCC)/UICC TNM Staging System

Department of Liver Transplantation and Hepatobiliary Surgery, Ajou University School of Medicine, Korea

In-Gyu Kim, Xugang Hu, Hee-Jung Wang*, Bong-Wan Kim, Sung Yeon Hong

(Purpose) Over the past 20 years, great progress has been made in the diagnosis and treatment of hepatocellular carcinoma (HCC). There is an increasing need for a staging system that can reflect the prognosis and permit the stratification of these patients for clinical practices. We have used mUICC and AJCC/UICC among several staging systems that have been proposed in staging HCC. Here, we present the result of mUICC and AJCC/UICC TNM staging and validate the two systems in patients with HCC at Ajou University Medical Center. (Methods) We collected data of 827 patients with HCC who underwent hepatic resection from April 1994 to Dec 2013. They were followed-up until Jun 2016, and mean follow-up period was 56.1 months. Survival curves and prognostic factors for survival were evaluated using the Kaplan-Meier method and Cox’s regression. (Results) In the multivariable Cox’s regression, microvascular invasion was the most significant factor for disease free survival (DFS), followed by hepatic vein invasion, and intrahepatic metastasis. For overall survival (OS), serum albumin had the greatest significance, followed by close margin (less than 1 cm), microvascular invasion, and intrahepatic metastasis. Based on mUICC, 5-year DFS of T1 was 58.4%, T2 was 48.7%, T3 was 34.9%, and T4 was 7.5% (P<0.01). For 5-year OS, T1 was 90.4%, T2 was 74.8%, T3 was 51.0%, and T4 was 19.9% (P<0.01). Based on AJCC/UICC, 5-year DFS of stage I was 49.7%, stage II was 32.9%, stage III was 12.6%, and stage IV was 25.7%. There was no significant difference of DFS between stage III and stage IV. For 5-year OS, stage I was 78.3%, stage II was 48.9%, stage III was 36.6%, and stage IV was 40.6%. No significant differences of OS appeared between stage III and stage IV. (Conclusion) We think our findings supports mUICC staging more than AJCC/UICC staging system. We believe that while both staging system allow for the clear stratification of patients into prognostic groups, the mUICC staging may be more appropriate for stratifying patients with advanced-stage HCC.

**Fig.** Kaplan-Meier survival analysis with patients based on modified UIICC (Union for International Cancer Control) stage system.
Long-Term Prognosis of Combined Hepatocellular Carcinoma-Cholangiocarcinoma following Liver Transplantation and Resection

Shin Hwang*, Dong-Hwan Jung, Gi-Won Song, Chul-Soo Ahn, Deok-Bog Moon, Ki-Hun Kim, Tae-Yong Ha, Gil-Chun Park, Wan-Jun Kim, Woo-Hyoung Kang, Seok-Hwan Kim, Sung-Gyu Lee

(Purpose) Combined hepatocellular carcinoma and cholangiocarcinoma (cHCC-CC) is a rare disease. We investigated the clinicopathological features of cHCC-CC and compared the long-term outcomes following liver transplantation (LT) and hepatic resection (HR).

(Methods) We identified 32 LT patients with cHCC-CC through an institutional database search. HR control group (n=100) was selected through propensity score-matching.

(Results) The incidence of cHCC-CC among all adult LT cases was 1.0%. Mean patient age was 53.4±6.7 years and 26 patients were male. Thirty patients had hepatitis B virus infection. All patients of cHCC-CC were diagnosed incidentally in the explanted livers. Mean tumor diameter was 2.5±1.3 cm and 28 patients had single tumors. Tumor stage was stage I in 23 and II tumors in 9. Concurrent HCC was detected in 12 patients with stage I in 5 and II in 7. Mean tumor diameter was 1.9±1.2 cm and 5 had single tumors. Tumor recurrence and survival rates were 15.6% and 84.4% at 1 year and 32.2% and 65.8% at 5 years, respectively. Patients with very early stage cHCC-CC (one or two tumors ≤2 cm) showed ≤13.3% tumor recurrence and 93.3% patient survival rates at 5 years, which were significantly improved than those with advanced tumors (p=0.002). Tumor recurrence and survival rates did not differ significantly between the LT and HR control groups (p=0.222 and p=0.912, respectively), however, post-recurrence patient survival did (p=0.016).

(Conclusion) cHCC-CC is rarely diagnosed following LT and one-third of such patients have concurrent HCC. The long-term post-transplant prognosis was similar following LT and HR. Very early cHCC-CC resulted in favorable post-transplant prognosis, thus this selection condition can be prudently considered for LT indication.

Hepatocellular Carcinoma (HCC) Recurrence within 1 Year after Liver Resection in Solitary HCC

Sung-Mi Jung, Jong Man Kim, Gyu-Seong Choi, Choon Hyuck David Kwon, Nam-Joon Yi1, Kwang-Woong Lee1, Kyung Suk Suh1, Jae-Won Joh*

(Purpose) Early recurrence after liver resection for HCC is most important factor for overall survival. Aims of this study are to compare the early and late recurrence group in hepatectomy patients with preoperative solitary HCC and identify the risk factors for early recurrence.

(Methods) A total of 1010 patients were identified to HCC recurrence after hepatic resection between 2009 and 2014 in Samsung Medical Center and Seoul National University Hospital. Inclusion criteria were preoperative solitary tumor Child-Pugh class A, and curative hepatectomy. Early recurrence group was defined as HCC recurrence <1 year after surgery.

(Results) 628 patients were identified. 302 were early and 326 were late recurrences groups. The overall survival curve of early recurrence group was lower than that in late recurrence group (P<0.001). Early recurrence group showed higher proportion of preoperative Milan criteria, microvascular invasion, and HCC grade 3 and 4 compared with late recurrence group. In addition, Early recurrence group was higher AFP, PIVKA-II, and tumor size than late recurrence group. Multivariate analysis showed that HCC grade 3 or 4, tumor size >3cm, microvascular
invasion were closely associated early recurrence after liver resection in solitary HCC. **(Conclusion)** Early and late recurrences have different risk factors and prognosis. Early detection of recurrence is necessary through active postoperative surveillance in hepatectomy patients with poor prognostic factors.

**IOP03-6**

**Different Prognostic Factors for Early and Late Recurrence after Adult Living Donor Liver Transplantation for Hepatocellular Carcinoma**

Department of Surgery, College of Medicine, Seoul National University, Korea

Suk Kyun Hong, Kyung-Suk Suh*, Hyo-Sin Kim, Sung-Woo Ahn, Kyung Chul Yoon, Hyeyoung Kim, Nam-Joon Yi, Kwang-Woong Lee

**(Purpose)** Recurrence after liver transplantation (LT) for hepatocellular carcinoma (HCC) remains unsatisfactory. However, some patients with HCC recurrence after LT show good long-term survival results. The aim of this study is to investigate prognostic factors affecting survival after recurrence mainly focusing on the period of recurrence. **(Methods)** Between January 2000 and December 2015, 532 patients underwent adult living donor liver transplantation (LDLT) for HCC. Among these, 92 patients (17.3%) who experienced recurrence were retrospectively reviewed. **(Results)** 1-, 3-, and 5-year survival rates after recurrence were 59.5%, 23.0%, and 11.9%, respectively. By multivariate analysis, PET positivity [hazard ratio (HR)=0.45] and multi-organ involvement at the time of primary recurrence [hazard ratio (HR)=5.98] were related to poorer survival after recurrence. Time to recurrence >6 months [hazard ratio (HR)=0.45] was related to longer survival after recurrence. We classified the patients into early (<6 months) and late (>6 months) recurrence group. In early recurrence group, only multi-organ involvement at the time of primary recurrence was related to poorer survival on multivariate analysis. In late recurrence group, multi-organ involvement [hazard ratio (HR)=2.76] and mTORi use after recurrence [hazard ratio (HR)=0.42] were significantly associated with prognosis on multivariate analysis. **(Conclusion)** In conclusion, different therapeutic approach is needed according to the period of recurrence after LT. Primary tumor factors should be more considered in early recurrence patients and using mTORi even after recurrence should be considered in late recurrence patients.

**IOP03-7**

**Clinical Experience and Feasibility of Totally Laparoscopic Living Donor Right Hepatectomy**

Department of Surgery, Kyungpook National University School of Medicine, Kyungpook National University Hospital, Korea

Heon Tak Ha, Jae Min Chun, Ho Ryun Gong, Sang Geol Kim, Hyung Jun Kwon, Yoon Jin Hwang, Young Seok Han*

**(Purpose)** Initial concerns regarding healthy donor’s safety and graft integrity, need for acquiring surgical expertise in both laparoscopic liver surgery and living donor transplantation (LDLT) have delayed the development of laparoscopic donor hepatectomy in adult-to-adult LDLT. However, decreased blood loss, less postoperative pain, shorter length of stay in hospital, and excellent cosmetic outcome have well been validated as the advantage of laparoscopic hepatectomy. Hence, the safety and feasibility for laparoscopic donor should be further investigated. **(Methods)** We report initial experiences for totally laparoscopic living donor right hepatectomyTotally laparoscopic living donor right hepatectomy in 4 cases were performed from May 2016 up to now. For this procedure, the donors with long segment right portal vein of more than 1 cm were preferentially included. The bile duct anomaly was preoperatively evaluated with magnetic resonance cholangiopancreatography (MRCP). **(Results)** In 2 cases, right posterior hepatic duct originated from left hepatic duct (Type 3b) was identified. Total operation time was within 6 hours and the warm ischemic time was within 15
minutes. During operation, there was no transfusion and the inflow control like Pringle maneuver was not used. V5 and V8 were reconstructed in 3 cases. All grafts were removed through the supra-pubic incision. The donors were discharged at 7 days after hepatectomy. We have not observed any complications in the early postoperative follow-up. (Conclusion) Conclusively, totally laparoscopic right donor hepatectomy in adult-to-adult LDLT can be initially attempted after enough experiences of laparoscopic hepatectomy and LDLT. However, the true benefits of totally laparoscopic living donor right hepatectomy should be fully assessed through various experiences from multi-institutes.

**IOP03-8**

Preoperative Prognostic Values of A-Fetoprotein (AFP) and Protein Induced by Vitamin K Absence or Antagonist-II (PIVKA-II) in Patients with Hepatocellular Carcinoma for Living Donor Liver Transplantation

Division of Liver Transplantation and Hepato-Biliary Surgery, Department of Surgery, University of Ulsan College of Medicine Asan Medical Center, Korea

Seok-Hwan Kim, Deok-Bog Moon*

**Purpose** Adult living donor liver transplantation (LDLT) is one of the best treatments for hepatocellular carcinoma (HCC). However, when recurrence of HCC after LDLT occurs, the prognosis is poor because of rapid progression. Preoperative level of α-fetoprotein (AFP) and protein Induced by Vitamin K Antagonist-II (PIVKA-II) reportedly correlate with recurrence of hepatocellular carcinoma (HCC) after LDLT. (Methods) We examined serum AFP and PIVKA-II as predictors of HCC recurrence in 461 patients who underwent LDLT using modified right lobe for HCC from May 2007 to December 2013. (Results) Among these, 77 patients (16.7%) who experienced recurrence were retrospectively reviewed. Multivariate analysis revealed tumor size >5 cm, AFP>150 ng/mL and PIVKA-II >100 mAU/mL as significant independent risk factors for recurrence. The median time to recurrence was 10 months. The median survival time after recurrence was 26 months, and the 1-, 3- and 5-year survival rates after recurrence were 80.5%, 58%, and 28.3% respectively. Preoperatively, not only morphology of the tumor but also AFP and PIVKA-II levels can offers important information for the recurrence after LDLT for HCC. (Conclusion) Thus, combination of tumor markers might be used for expansion of pre-existing strict selection criteria of liver transplantation for HCC.

**IOP03-9**

Re-Endotheliaization of Decellularized Porcine Liver Prevent Thrombosis

Department of Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Korea

Jong Man Kim, Nuri Lee, Chan-Woo Cho, Gyu-Seong Choi, Choon Hyuck David Kwon, Jae-Won Joh*

**Purpose** The shortage of liver graft is obstacle for expansion of liver transplantation. Thrombosis developed in decellularized graft after blood perfusion when decellularized graft was used, these resulted in graft failure. Aims of present study were to show that the re-endothelization of decellularized porcine liver graft using endothelial cells prevent thrombosis. (Methods) Pre-conditioning for vascularization was used chemical agents (1-ethyl-3-(3-dimethylaminopropyl)carboniimide and N-hydroxysuccinimide) for heparinization and mouse anti-CD31 for antibody conjugation in decellularized porcine liver graft. Thrombosis as end-point was evaluated after blood perfusion in vitro study. (Results) Decellularized porcine liver graft without re-endothelization developed thrombosis after blood perfusion. H & E and immunologic staining showed re-endothelization in portal vein and hepatic vein. In vitro study, re-endothelialized porcine liver did not show thrombosis in the major blood vessels such as portal vein, superior and inferior hepatic inferior vena cava. (Conclusion) Re-endothelization using endothelial cells prevents thrombosis after blood perfusion in the decellularized porcine liver graft.
Annual Congress of KSS 2016

68th Annual Congress of the Korean Surgical Society

Integrated Oral Presentation 4

Date. Thursday, November 3, 2016
Venue. Dongkang Hall B, 3F, Avenue

Moderators:
Soon Ok Choi (Keimyung Unive.),
Yeon Jun Jeong (Chonbuk National Univ.)
**IOP04-1**

**Risk Factors Analysis for Mortality of Congenital Diaphragmatic Hernia within First 1 Month**

Departments of Pediatric Surgery, Seoul National University Children’s Hospital, Korea

Chaeyoun Oh, Joong Kee Youn, Ji-Won Han, Hyun-Young Kim*, Sung-Eun Jung

**Purpose** The aim of this study was to investigate a risk factors of mortality for congenital diaphragmatic hernia (CDH) patients within first 1 month in a single institution. **Methods** We performed a retrospective study of diagnosed CDH from November 2000 to August 2016. All patients were admitted in birth date. Prenatal data reviewed included gestational age (GA) at diagnosed to CDH, lung-to-head ratio (LHR), observed/expected LHR (O/E LHR), quantitative lung index (QLI) and liver herniation. We analyzed Apgar score, oxygen index (OI), alveolar-arterial gradient (AaDo2), required extracorporeal membrane oxygenation (ECMO), echocardiography, pneumothorax, initial ventilator mode, associated anomalies and required patch closure postnatally. **Results** There were 61 males and 34 females. 83 cases (87.4%) were diagnosed at prenatally and the median GA at diagnosed to CDH was 24+4 weeks (16 ~ 38). Liver herniation was founded in 34 (35.8%). The mean gestational age was 38+6 weeks and the mean birth weight was 3085.5±533.8 grams. Left side CDH was 84 (88.4%) and right side was 11 (11.6%). 78 (82.1%) patients received surgical repair. 11 patients (11.6%) were applied ECMO. 10 patients (10.5%) occurred pneumothorax at preoperatively and 4 patients at postoperatively. 60 (63.2%) patients were survived at 1 month after birth. The median GA at diagnosed to CDH was significantly short in mortality group (29 Vs 21+6 weeks, p=0.001). The median LHR (2.1385 Vs 1.1787), O/E LHR (55.13 Vs 35.76) and QLI (0.8017 Vs 0.5384) were significantly higher in survivor group. **Conclusion** 90 neonates with CDH were managed at a single institution and overall survival rate within first 1 month was 63.2%. Risk factors for mortality include the GA at diagnosed to CDH, O/E LHR, QLI, liver herniation, Apgar score and OI.

**IOP04-2**

**Laparoscopic Nissen Fundoplication in Children with Neurological Impairment Versus Neurologically Normal Children**

Department of Pediatric Surgery, University of Ulsan College of Medicine, Asan Medical Center, Korea

Yohan Joo, Ju-Yuon Lee, Jung-Hyun Choi, Jung Man Namgung, Seong-Chul Kim, Dae Yeon Kim*

**Purpose** This study aimed to assess the long-term clinical outcome of laparoscopic Nissen fundoplication (LNF) in infants and children according to their neurologic status. **Methods** The study retrospectively analyzed the data of 82 children (62 neurologically impaired children and 20 neurologically normal children with primary gastroesophageal reflux disease (GERD)) who had undergone laparoscopic Nissen fundoplication between 2003 and 2012. The main outcome measures were the occurrence of Recurrence that required reoperation and post-procedure complications such as infections, pneumonia, and GI complications including ileus, dysphagia, and delayed gastric emptying. **Results** The mean age at the time of the LNF procedure was 41.1 months (1-192 months). Eight (12.9%) of the 62 neurologically impaired children had required redo surgery because of GERD recurrences, while 2 (10.0%) of the 20 neurologically normal children had experienced recurrences. In the neurologically impaired children, the long-term complications included pneumonia (n=1), wound infection (n=1), urinary tract infection (n=1), dysphagia (n=1), delayed gastric emptying (n=1), and ileus(n=2). All of these complications were not found in the neurologically normal group, except for only one case of infectious colitis. However, there was no statistically significant difference between the two groups.
in post-operative complications. **(Conclusion)** LNF is a procedure that provides long-term efficiency for the treatment of children with primary GERD. The outcomes of laparoscopic fundoplication were similar in the neurologically impaired children and in the neurologically normal children. Although the recurrence rate after surgery was slightly higher in the neurologically normal group than in the neurologically impaired group, this difference was not statistically significant.

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**IOP04-3**

Learning Curve Analysis using the Cumulative Sum (CUSUM) Method for Laparoscopic Fundoplication in Pediatric Patients

Department of Pediatric Surgery, Severance Children’s Hospital, Yonsei University College of Medicine, Korea

Eun Young Chang*, Kyong Ihn, In Geol Ho, Jung-Tak Oh, Seok Joo Han

**(Purpose)** The aim of the study was to evaluate the existence of a learning curve for operation of laparoscopic fundoplication (LF) in pediatric patients in terms of the cumulative sum (CUSUM).

**(Methods)** Between 2013, March and 2016, August, a series of 54 consecutive LF in pediatric gastro-esophageal reflux patients in Severance Children’s Hospital by single surgeon was reviewed retrospectively. Patients characteristics, operation time, complication rates were analyzed. Learning curve was evaluated using the CUSUM method for operation time. **(Results)** The mean operation time of LF was 155.1 min. The CUSUM analysis of operation time was revealed 15 cases as learning curve for LF ($R^2=0.8538$) (Fig. 1). According to the learning curve, the study period was divided into two groups. The mean operation time of pre-learning curve period was significantly longer than in post-learning curve period (201.9 min vs. 138.8 min, $p=0.004$, respectively). Complication rate of pre-learning curve period was significantly higher than in post-learning curve period (5 cases, 35.7% vs. 0 case, 0%, $p=0.001$, respectively). **(Conclusion)** Current study showed the learning curve for LF in pediatric patients using CUSUM analysis is achieved after 15 cases. CUSUM analysis can be used to determine the appropriate competency of pediatric laparoscopic surgery.

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**IOP04-4**

The Management of Ruptured Choledochal Cyst -Single Center Experience

Division of Pediatric Surgery, Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine, Korea

Juyeon Lee, Jung Hyun Choi, Jung Man Namgung, Dae Yeon Kim*, Sung Cheol Kim

**(Purpose)** If choledochal cyst is ruptured, the children could be in serious condition and have increased postoperative complications. We retrospectively reviewed the clinical courses of ruptured choledochal cyst in single center. **(Methods)** The medical records of all children who underwent operation due to cholecochal cyst at Asan Medical Center between January 2001 and May 2016 were reviewed. Among a total number of 275 choledochal cyst patients, 12 patients(4.36%) presented with ruptured choledochal cyst. The demographics, laboratory tests, operation findings, operation method, and the post-operative course were analyzed.
(Results) There were two boys and ten girls. The median age at operation was 18 months (range, 9 days~59 months) and the median body weight was 10.9 kg (range, 2.6 kg~15.8 kg). Four patients were diagnosed as choledochal cyst in fetal sonography, but ruptured while postponing the surgery. One patient was postnatally diagnosed but ruptured while performing preoperative workup. The extracorporeal drain procedures before performing excision of choledochal cyst were performed in three patients. Primary excisions of choledochal cyst were tried in the other nine patients. The median follow up period was 44 months. Six patients were readmitted due to intestinal obstruction (three patients), pancreatitis (two patients), and cholangitis (one patient). Out of three patients with intestinal obstruction, one patient was needed massive bowel resection due to bowel strangulation which lead to short bowel syndrome. The child died of sepsis on home TPN.

(Conclusion) To avoid serious complications such as cyst rupture, drain procedure or definite surgery should be performed as soon as possible when choledochal cyst is diagnosed. If bile peritonitis is too severe, drain procedure could be recommended, otherwise primary excision is also feasible.

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IOP04-5

A Periodic Comparison of Survival and Prognostic Factors after Kasai Portoenterostomy for Biliary Atresia: A Single-Surgeon Experience of 198 Cases

Department of Pediatric Surgery, Severance Children's Hospital, Yonsei University College of Medicine, 1Cheil General Hospital, DanKook University College of Medicine, Korea

Kyong Ihn, In Geol Ho, Eun Young Chang, Dongeun Lee, Chan Seok Yoon1, Seok Joo Han*

(Purpose) This study was designed to explore the chronologic change of prognostic factors and clinical outcomes of Kasai portoenterostomy (KPE) performed on patients with biliary atresia by single pediatric surgeon during 17 years. (Methods) A retrospective review of patients who underwent KPE were analyzed between 1997 and 2013. The study time was divided in two periods (1997-2003 and 2004-2013). 147 consecutive patients operated with KPE from 2004 to 2013 (the late group) were identified. They were compared with 51 patients received KPE from 1997 to 2003 (the early group). Clinical outcomes and prognostic factors for native liver survival (NLS) from the late group were compared to the data from the early group. Primary endpoints were jaundice clearance rate (JCR, serum total bilirubin less than 2.0 mg/dL within postoperative 6th month) and 5-year NLS rate. For the statistical analysis, Kaplan-Meier method, Log-rank test and Cox regression analysis were used. (Results) The JCR was increased by 19.2% (52.9% vs. 72.1%). Five-year NLS rate was improved by 9.1% (59.0% vs. 68.1%). The serum levels of total bilirubin (TB) at 6 months after KPE was the only significant predictor for 5-year NLS (odds ratio 1.086 for the early group and 1.334 for the late group, P<0.05). There was no significant difference of NLS to operative age in both groups. The maximum bile duct size of fibrous portal mass in the late group was not statistically associated with NLS (p >0.05), although the duct size in the early group was significantly associated with NLS (P<0.05). (Conclusion) There was an improvement in the rate of jaundice clearance and native liver survival in a single surgeon’s practice during the years 1997-2013. The clearance of jaundice is the most significant and consistent prognostic factor of native liver survival after KPE.

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IOP04-6

Biliary Atresia with Extrahepatic Cystic Degeneration

Department of Pediatric Surgery, Severance Children’s Hospital, Yonsei University College of Medicine, Korea

Kyong Ihn, In Geol Ho, Eun Young Chang, Dongeun Lee, Seok Joo Han*

(Purpose) This study aimed to retrospectively evaluate the clinical characteristics and outcomes between biliary atresia with extrahepatic cystic degeneration (cystic group) and biliary atresia without extrahepatic biliary cyst (non-cystic group). (Methods)
Integrated Oral Presentation 4

Single-center retrospective review of infants with biliary atresia over 15-year period (January 2002 to August 2016) was done. The cystic group was confirmed in 12 of 173 cases (6.4%) by operative cholangiography. We compared the cystic group with 161 infants who were diagnosed as non-cystic group for clinical features and outcomes following Kasai portoenterostomy (KPE). Data are quoted as mean (standard variation). A P value ≤ 0.05 was regarded as significant. (Results) Of 173 patients reviewed, the mean operative age was lower in the cystic group (41.2 vs. 64.9 days, P<0.05). A KPE was performed for all non-cystic group. However, cystic group patients were treated by KPE (n=9) or hepaticojejunostomy (n=3). Jaundice clearance rate (serum total bilirubin less than 2.0 mg/dL within postoperative 6th month) was higher in the cystic group (100% vs. 73.9%, P<0.05). Five-year native liver survival rate was better in the cystic group (100% vs. 67.1%, P<0.05). Three of 12 patients in the cystic group were misdiagnosed as choledochal cyst, which led to excision of cyst without dissection of porta hepatis. (Conclusion) The cystic group had a better clinical outcome with an improved clearance of jaundice and native liver survival rate than non-cystic group. Despite its better prognosis and early detection with early operative age, antenatally detected cystic lesions could be misdiagnosed as choledochal cyst. It is important to consider the possibility of biliary atresia with extrahepatic cystic degeneration in the presence of hepatobiliary cystic lesions on antenatal ultrasonography.

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IOP04-7

Efficacy of Laparoscopic Intracorporeal High Ligation with Distal Hernia Sac Resection and Synchronous Contralateral Patent Processus Vaginalis Ligation

Division of Pediatric Surgery, Pediatric Specialized Center, Hallym University Sacred Heart Hospital, Korea

Tae Ah Kim, Won Me Kang¹, Soo Min Ahn²*

(Purpose) Although recurrence after laparoscopic high ligation for inguinal hernia does not seem to be significantly higher, it is mostly procedure dependent. By the way, appropriate measures on prevention of metachronous contralateral inguinal hernia are still debatable. We sought to evaluate efficacy of total resection of distal hernia sac and synchronous ligation of contralateral patent processus vaginalis (CPPV) during laparoscopic high ligation. (Methods) Patients with inguinal hernia aged less than 11 years were consecutively submitted to laparoscopic high ligation as a day-case procedure. Distal hernia sac was completely dissected out followed by suture ligation of peritoneum on internal ring. Purse string suture was applied on to contralateral PPV after meticulous inspection. Perioperative outcomes, ipsilateral recurrence and contralateral metachronous occurrence were evaluated during the follow up period. (Results) In 2 years, 150 patients who were subjected to surgery, aged 3.6±2.5 years (ranged from 1 month to 11 years), were included. In total, 98 were male and 52 were female. All procedures were performed in a day-hospital setting. There were 126 unilateral hernias (Left : Right, 55 : 71), and 24 bilateral hernias (13 preoperative- and 11 intraoperative-diagnosed cases). PPV was confirmed in 11.9% (n=15/126) among patients with unilateral inguinal hernia. The following up last from 1 to 31 months (median 14 months, mean 16 months) and there was no recurrence and contralateral metachronous hernia at all. Operative time was 47.9±14.8 min for unilateral hernia, 62.7±15.1 min for bilateral hernia and 56.1±14.3 min for simultaneous contralateral PPV ligation. There was one case presenting cord elements damage. None of the cases presented scrotal hematoma or seroma. (Conclusion) Laparoscopic high ligation without remaining distal hernia sac in children is a safe and effective day-case procedure. It could effectively prevent ipsilateral recurrence and metachronous contralateral inguinal hernia.
Laparoscopic Repair for Inguinal Hernia in Infants Under Corrected Age 3 Months

Yu Jeong Cho, Ju Yeon Lee, Jeong Hyeon Choi, Jeong Man Namgung, Dae Yeon Kim*, Seong Cheol Kim

(Purpose) Inguinal hernia is a challenging surgical conditions during in early infant period. We retrospectively reviewed experience undergoing laparoscopic hernia repair (LH), and compared LH with open hernia repair (OH).

(Methods) Medical records were retrospectively reviewed in 232 pediatric patients under corrected age 3 months underwent inguinal hernia repair from January 1, 2013 to December 31, 2015 at Asan Medical Center. The chi-squared or Fisher's exact test was used to analyze the results of the study.

(Results) As for operative time, in unilateral/bilateral inguinal hernia repair, OH is faster than LH (P<0.05/P=.06). But operation time gap is smaller in bilateral hernia than unilateral hernia. As for operation site, the rate of bilateral inguinal hernia case was performed at LH more than OH (P<0.05). As for the recurrence rate, no significant difference was observed between the two techniques (P=.5), whereas the relative risk of recurrence was higher for OH compared with LH (OR=1.56).

(Conclusion) LH is also safe procedure as OH for experienced pediatric surgeons. However, randomizes control studies are needed.

Laparoscopic Needle-Assisted Repair of Inguinal Hernia in 149 Children

Myoung Won Son, Sang Hyun Park, Hyun Jung Kim, Young Gil Kim, Moon Soo Lee*

(Purpose) Minimally invasive surgery for inguinal hernia repair in children has been a controversial topic for pediatric surgeons. We describe our technique and clinical outcomes of the laparoscopic needle-assisted repair in children.

(Methods) From January 2014 to May 2016, 149 children received this procedure by single surgeon at Soonchunhyang University Cheonan Hospital. We reviewed our prospectively collected database of patients receiving laparoscopic needle-assisted repair. Hernia repair is performed with a 3-mm sized single-port and needle-assisted technique. After identification of a patent processus vaginalis, the internal ring is encircled in an extraperitoneal plane using a 21G spinal needle for placement of a purse-string suture with 2-0 Prolene, tied extracorporeally, and a knot was buried beneath the skin. The operative time, length of postoperative hospital stay, complications, evidence of recurrence, and time to follow-up were analyzed.

(Results) One hundred twenty inguinal hernias were laparoscopically repaired in 149 patients (97 boys and 52 girls) age range 1 to 185 months (mean 50.8±42.7 months). Mean weight of children was 18.3kg, range 3.8 to 71.0kg. One hundred seventeen patients were received unilateral repair (68 right hernias and 49 left hernias) and 32 children had bilateral repair. In 18.2% (26/143) of patients with the preoperative diagnosis of unilateral inguinal hernia, contralateral patent processus vaginalis was confirmed during the laparoscopic surgery and subsequent repair was performed. Mean operating time for unilateral was 15.3 minutes (range 6-43 minutes), and bilateral was 21.1 minutes (range 13-43 minutes). Except 2 superficial wound infections of umbilical trocar insertion site, there was no complication. There was 1 recurrence in third case among 149 children who received this procedure. By August 2016, the mean follow-up pe-
period was 3.1 months (range 1-18 months). Postoperative data show our technique is safe with a 1.1% rate of minor complication and 0.6% of recurrence. **(Conclusion)** Although one recurrence occurred in early experience case, laparoscopic needle-assisted repair procedure showed a relatively low complication rate. Furthermore, laparoscopic approach allows identification of asymptomatic or occult contralateral defect easily, and the repair of defect on the other side is possible simultaneously. In order to establish the validity of this procedure, studies with a large number of patients and long-term follow-up periods will be needed.
Annual Congress of KSS 2016

68th Annual Congress of the Korean Surgical Society

Integrated Oral Presentation 5

Date. Friday, November 4, 2016
Venue. Dongkang Hall B, 3F, Avenue

Moderators:
Jun Won Um (Korea Univ.),
Kwang Wook Suh (Ajou Univ.)
Risk Factors for Postoperative Recurrence after Primary Bowel Resection in Patients with Crohn’s Disease

Division of Colon and Rectal Surgery, Department of Surgery, University of Ulsan College of Medicine, Asan Medical Center, Korea

Kwan Mo Yang, Chang Sik Yu*, Jong Lyul Lee, Chan Wook Kim, Yong Sik Yoon, In Ja Park, Seok-Byung Lim, Jin Cheon Kim

(Purpose) To evaluate risk factors for postoperative recurrence of Crohn’s disease (CD). (Methods) This study included 266 patients who underwent primary surgery for CD between January 2000 and December 2010 at Asan Medical Center. The median follow-up period was 95 months. (Results) At 1, 5 and 10 years after the first operation, the cumulative rate of surgical recurrence was 1.1%, 9.2% and 36.4% and clinical recurrence occurred in 1.9%, 24.2% and 68.3%, respectively. In multivariate analysis, a shorter period between the first operation and clinical recurrence (≤36 months), postoperative perianal disease after the first operation and undergoing first resection as an emergency operation were a significant risk factor for surgical recurrence-free survival (SRFS). The postoperative use of anti-TNF agents reduced SRFS risk. (Conclusion) These findings indicate that affected patients with CD may benefit from close postoperative surveillance and probably from the early administration of anti-TNF agents.

Fig. 1. Cumulative rate of clinical and surgical recurrence.

Fig. 2. Surgical recurrence-free survival (SRFS) after the first intestinal resection for Crohn’s Disease (CD). (a) SRFS according to the interval between the first intestinal resection and clinical recurrence. (b) SRFS according to the presence of perianal disease after the first intestinal resection. (c) SRFS according to the type of operation. (d) SRFS according to the postoperative use of anti-tumour necrosis factor (TNF) agents.
The Fluorescence Enhancing Pattern of ICG Angiography as Predictive Factor for Anastomotic Complications During Laparoscopic Colorectal Surgery

Department of Surgery, Pusan National University College of Medicine, Pusan National University Yangsan Hospital, Korea

Gyung Mo Son*, Myeong Sook Kwon, Seung Wha Kim, Byung Soo Park, Hyun Sung Kim

(Purpose) This study is to evaluate the fluorescence enhancing pattern of indocyanine green (ICG) as predictive factor for anastomotic complications using intraoperative ICG angiography during laparoscopic colorectal cancer surgery. (Methods) Fluorescence imaging system, IMAGE1 SPIES™ (Karl Storz, Germany) was applied to colorectal cancer patients (n=23) from July, 2015 to June, 2016. Consecutive static images were obtained with 10 seconds interval from operation video of laparoscopic surgery. Fluorescence intensity of ICG enhancement was measured using Images J 1.49v (Wayne Rasband, National institutes of Health, USA). Time to half of maximal intensity (T1/2max) was calculated from fluorescence intensity plots of colonic artery. ICG enhancing patterns were categorized using T1/2max. Anastomatic complications and clinicopathologic data were analyzed using Mann-Whitney U test and logistic regression model. (Results) Mean age was 67.8 years and male to female ratio was 15:8. Operations were Low anterior

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**Table 1. Demographic and Clinical Characteristics**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number of patients (n=266)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEX</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>190 (71.4%)</td>
</tr>
<tr>
<td>Female</td>
<td>76 (28.6%)</td>
</tr>
<tr>
<td>Follow-up period, month</td>
<td>95 (36.1%)</td>
</tr>
<tr>
<td>Age at diagnosis</td>
<td>23 (27.4%)</td>
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<tr>
<td>Age at 1st operation</td>
<td>28 (10.6%)</td>
</tr>
<tr>
<td>Age at 2nd operation</td>
<td>34 (12.9%)</td>
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<tr>
<td>Montreal classification</td>
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</tr>
<tr>
<td>Age at diagnosis</td>
<td></td>
</tr>
<tr>
<td>A1 (15-19 yr)</td>
<td>25 (9.4%)</td>
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<tr>
<td>A2 (20-49 yr)</td>
<td>221 (83.1%)</td>
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<td>A3 (50-74 yr)</td>
<td>20 (7.5%)</td>
</tr>
<tr>
<td>Location</td>
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<tr>
<td>L1 (Terminal ileum)</td>
<td>112 (42.2%)</td>
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<tr>
<td>L2 (Colon)</td>
<td>39 (14.7%)</td>
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<tr>
<td>L3 (Descending)</td>
<td>110 (41.4%)</td>
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<tr>
<td>L4 (Iliac inferior)</td>
<td>2 (0.8%)</td>
</tr>
<tr>
<td>Behavior</td>
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<tr>
<td>IB1 (Inflammatory)</td>
<td>6 (2.2%)</td>
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<tr>
<td>IB2 (Stricturing)</td>
<td>82 (30.8%)</td>
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<tr>
<td>IB3 (Penetrating)</td>
<td>178 (66.9%)</td>
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<tr>
<td>Family history (Father's disease)</td>
<td>7 (7.6%)</td>
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<tr>
<td>Presence of Extraintestinal manifestation</td>
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<td>Perianal disease after 1st operation</td>
<td>64 (24.1%)</td>
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<td>History of smoking</td>
<td>73 (27.4%)</td>
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<td>Current smoker</td>
<td>12 (4.5%)</td>
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<td>Ex-smoker</td>
<td>61 (22.9%)</td>
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<td>Non-smoker</td>
<td>193 (72.6%)</td>
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<td>Preoperative use of medication</td>
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<tr>
<td>Anti-TNF</td>
<td>27 (10.2%)</td>
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<tr>
<td>5-ASA</td>
<td>229 (86.1%)</td>
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<tr>
<td>Steroid</td>
<td>152 (57.3%)</td>
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<tr>
<td>Immunomodulator*</td>
<td>131 (49.2%)</td>
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<tr>
<td>Malignancy</td>
<td></td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>3 (1.1%)</td>
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<tr>
<td>Small bowel cancer/LARC cancer</td>
<td>210 (81.0%)</td>
</tr>
</tbody>
</table>

* Use of azathioprine/6-mercaptopurine or methotrexate

**Table 2. Operative details and outcomes**

<table>
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<th>Variables</th>
<th>Number of patients (n=266)</th>
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<td>Operative approach</td>
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<tr>
<td>Open</td>
<td>220 (82.7%)</td>
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<tr>
<td>Laparoscopy</td>
<td>46 (17.3%)</td>
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<td>Type of operation</td>
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<tr>
<td>Elective</td>
<td>214 (80.5%)</td>
</tr>
<tr>
<td>Emergcy</td>
<td>52 (19.5%)</td>
</tr>
<tr>
<td>Indication for 1st operation</td>
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<tr>
<td>Performing</td>
<td>171 (64.3%)</td>
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<tr>
<td>Non-performing</td>
<td>93 (35.7%)</td>
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<td>OP name</td>
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<tr>
<td>ICR</td>
<td>87 (32.7%)</td>
</tr>
<tr>
<td>RIC</td>
<td>74 (27.8%)</td>
</tr>
<tr>
<td>SB R&amp;A</td>
<td>50 (18.8%)</td>
</tr>
<tr>
<td>TC/STC</td>
<td>32 (12.0%)</td>
</tr>
<tr>
<td>TPC/APR</td>
<td>19 (7.1%)</td>
</tr>
<tr>
<td>Others</td>
<td>4 (1.5%)</td>
</tr>
<tr>
<td>Type of anastomosis</td>
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</tr>
<tr>
<td>Handstapled</td>
<td>6 (2.3%)</td>
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<tr>
<td>Stapled</td>
<td>230 (88.5%)</td>
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<tr>
<td>Permanent stoma</td>
<td>30 (11.2%)</td>
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<tr>
<td>Postoperative use of medication</td>
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<tr>
<td>Anti-TNF</td>
<td>96 (36.1%)</td>
</tr>
<tr>
<td>5-ASA</td>
<td>247 (92.9%)</td>
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<tr>
<td>Steroid</td>
<td>84 (31.6%)</td>
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<tr>
<td>Immunomodulator*</td>
<td>222 (85.5%)</td>
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<td>Postoperative complications</td>
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<tr>
<td>Wound infection</td>
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<tr>
<td>Anastomotic leakage</td>
<td>13 (4.9%)</td>
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<tr>
<td>Intra-abdominal abscess</td>
<td>11 (4.1%)</td>
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<tr>
<td>Enteric-cutaneous fistula</td>
<td>8 (3.0%)</td>
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<tr>
<td>Bleeding</td>
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<td>Ileal</td>
<td>3 (1.1%)</td>
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<tr>
<td>Others</td>
<td>4 (1.5%)</td>
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<tr>
<td>Time to clinical recurrence, month</td>
<td>65.5 ± 30.4</td>
</tr>
<tr>
<td>Time to surgical recurrence, month</td>
<td>67.6 ± 32.3</td>
</tr>
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</table>

*ICR = ileocolic resection, RIC = right hemicolectomy, SB R&A = small bowel resection and anastomosis, TC = total colectomy, STC = subtotal colectomy, TPC = total proctocolectomy, Others = Segmental resection of colon
resection (11 cases), anterior resection (8 cases), and right hemicolecotomy (4 cases). Incidence of anastomotic complications was 21.7% including mildstenosis (n=2), anastomotic leak (n=2), and colonicnecrosis (n=1). Reoperations for anastomotic leak and colonic necrosis were needed for 3 cases (13.0%). T1/2max values of complication groupwere significantly prolonged (58.8±8.3 vs. 37.2±1.5,respectively, p<0.001). Reoperations were also associated with T1/2max (p=0.001). When ICG enhancingpatterns were categorized using T1/2max to fast (20-45,n=18), moderate (46-60, n=4), slow (>60, n=1) group,anastomotic complication rates were 5.6% (1 case), 75% (3 cases) and 100% (1 case),respectively. On univariate analysis, anastomotic complications were related with low anterior resection,anastomosis level within 5cm from anal verge, and ICG enhancing patterns (T1/2max>45 seconds). On logistic regression model, ICG enhancingpattern was analyzed as the independent factor for anastomotic complications (p=0.005, CI; 3.46-1336.3). ROC curve of T1/2max was analyzed for cut-off value as 43.8 (AUC=0.978, p=0.001).

(Conclusion) The fluorescence enhancing pattern ofICG angiography could be applied as predictivefactor for anastomotic complications during laparo-
scopic colorectal surgery.

IOP05-3

Nomogram for Prediction of Pathologic Complete Remission using Morphometric Change and Biomarker Expression in Rectal Cancer after Preoperative Chemoradiotherapy

Division of Colon and Rectal Surgery, Department of Surgery, Yonsei University College of Medicine, Severance Hospital, Korea

Hyuk Hur, Min Soo Cho, Yoon Dae Han, Jeonhyun Kang, Byung Soh Min, Seung Hyuk Baik, Kang Young Lee, Nam Kyu Kim*

(Purpose) The aim of this study is to develop and validate a nomogram to predict pathologic complete remission (pCR) after preoperative chemo-
radiotherapy (CRT) by analyzing relevant bi-
markers and endoscopic findings with logistic regression method. (Methods) Using reverse trans-
scriptase polymerase chain reaction (RT-PCR) analy-
sis, mRNA expression levels of seven biomarkers(p53, p21, Ki-67, VEGF, CD133, CD24, CD44) were evaluated from fresh tumor samples of 120 patients before CRT. The expression of mRNA was indicated with ΔCt by correction according to the expression of GAPDH (target Ct - GAPDH Ct). The relative quantity of mRNA in pCR tissue to that in non-pCR tissue was calculated from the relative ratios of 2−ΔCt between two conditions. Lower ΔCt and Higher 2−ΔCt mean higher expression of mRNA. Clinical complete remission criteria based on endoscopic finding was no visualization of tu-
mor, white scar, and red scar. Univariate and mul-
tivariate logistic regression analysis with clinical and biologic variables were used to make a pre-
dictive model for pCR. Nomogram was developed in a training set (n=80) and validated in external validation set (n=40). Both discrimination and cali-
bration were measured by ROC curve and calibration plot, respectively (Results) The mRNA expres-
sion levels of four biomarkers (p53, p21, Ki67, CD133) significantly correlated with pCR in train-
ing set. Tumor location showed a higher pCR rate at lower tumor location showed a higher pCR rate than middle tumor [19 (38.8%) vs. 5(16.1%)]. By univariate and multivariate logistic re-
gression analysis, tumor location, endoscopic find-
ing after preCRT and for biomarkers were sig-
nificantly correlated with pCR. Based on the multi-
variate prediction model with these variables, a nomogram were drawn for prediction for pCR, and which showed good discrimination ability in train-
ing set (AUC=0.945) and validation set (AUC=0.922). The calibration plot demonstrated good agreement between actual and predicted pCR in both patient set. (Conclusion) The developed prediction nomogram for pCR is accurate and ex-
ternally validated, and which may be useful in treatment decisions for complete responders.
Fig. Nomogram predicting the probability of pathologic complete remission (pCR) after preoperative chemoradiotherapy in rectal cancer. The nomogram is used by totaling the points identified on the top scale for each independent six variables. The total points projected to the bottom scale indicate the% probability of pCR.

IOP05-4

Sphincter-Sparing Procedures for the Deep Postanal Abscesses and Fistulas: A Paramedian Approach

Gangnam Colon and Rectal Surgery, Korea

Seong Yeop Ryu*

(Purpose) Sufficient drainage of fistulous abscesses is prerequisite for subsequent sphincter-sparing procedures. The posterior midline incision for the deep postanal space (DPS) abscess or fistula often heals prematurely with retained pockets of infection (RPI). The author learned that the paramedian elliptical incision can provide wider window to the DPS for prolonged drainage than the posterior midline incision. This study evaluated the success rate of the sphincter-sparing procedures via a paramedian approach in patients with the DPS abscess or fistulas. (Methods) This study was conducted as a retrospective review of all patients with the DPS abscess or fistula of cryptoglandular origin from April 2005 to December 2013. The DPS fistula without RPI was primarily repaired after core fistulectomy via a paramedian approach (one-stage procedure). DPS abscesses and fistulas with RPI were initially drained via unilateral or bilateral paramedian incision(s) along with removal of the primary opening. A paramedian loose seton (nylon 3-0) was placed through the primary opening. Counter-incisions with lateral draining setons were placed. A minimum of 7 weeks later, the fibrous tract surrounding the paramedian seton was cored out and the resultant defect within muscle layers was closed by through-and-through full thickness su- tures (two-stage procedure). All procedures were performed by a single surgeon. The main outcome measures were the time interval between the staged procedures, presence of RPI at the time of the second procedure, and success rate. (Results) A total of 32 patients (M/F 26/6) were included. Median age was 35 years. Follow-up data were available in 97% with a median follow-up of 47 weeks. Two patients each had 1 failed previous attempt at repair. Seven fistula patients without RPI (7/32, 22%) underwent one-stage core fistulectomy and primary closure with a success rate of 86% (6 of 7). Four DPS fistula patients with RPI and 21 patients with DPS abscesses (25/32, 78%) underwent two-stage sphincter-sparing procedures. Median time interval to the second procedure was 9 weeks (range, 7-47 weeks). At the second procedures, three patients (3/25, 12%) were found to have RPI, the presence of which was a significant factor for failures (Fisher’s exact test, p=0.002). Successful closure occurred in 21 patients (84%) of 25. A total of 5 failed cases (16%) were managed by staged fistulotomies at a median of 2 procedures (range, 2-4). Three patients who underwent staged fistulotomies reported gas incontinence during convalescent period, one of whom till 2 year postoperatively. (Conclusion) A paramedian approach with elliptical incisions provides wide window to the DPS, clears the DPS effectively, and enables one-stage or two-stage sphincter-sparing procedures for the DPS fistulas or abscesses.
### IOP05-5

**Functional Outcomes after Ileal Pouch Anal Anastomosis in Patients with UC**

Se Heon Oh, Yong Sik Yoon*, Chang Sik Yu, Sung Woo Jung, Seung-Seop Yeom, Jun Ho Lee, Byung Chul Lee, Kwan Mo Yang, Jong Lyul Lee, In Ja Park, Seok-Byung Lim, Jin Cheon Kim

(Purpose) Restorative proctocolectomy using ileal pouch anal anastomosis (IPAA) is a standard surgery to treat patients with ulcerative colitis (UC). Despite the development of drug therapy, surgical treatment has been necessary in a relevant proportion of patients with UC throughout lifetime. The aim of this study is to evaluate the functional changes of anal sphincter and defecation using anal manometry before and after IPAA in UC patients (Methods) Clinical data of 192 UC patients who underwent abdominal surgery from 1994 to 2013 were reviewed surgery and 46 patients whose pre/post-operative manometry was not evaluated, were excluded from the study. Also 19 patients out of the remaining 146 were excluded because they received end ileostomy or IPAA was not performed. Thus, a final of 127 patients were enrolled. Parameters of anal manometry and daily stool frequency were compared according to periodic groups of preoperative period, postoperative 6 months, postoperative 12 months, postoperative 18 months and postoperative 24 months. (Results) The preoperative maximum squeezing pressure (MSP) initially decreased from 156.3 mmHg to 142.4 mmHg within postoperative 6 months and increased to 162.9 mmHg in 12 months period. MRP decreases from preoperative 62.8 mmHg to 55.7 mmHg in 12 months and increases afterwards. Preoperative maximum tolerable volume (MTV) was 91.5 cc preoperatively which decreased to 82.2 cc at 6 months postoperatively but subsequently showed some improvement and recorded 131.5 cc, 135.7 cc, and 149.9 cc at 12, 18 and 24 months respectively and was higher than the preoperative value. Twenty four hours postoperative bowel motility steadily decreased to 8.35 times at 6 months, 6.47 times at 12 months, 6.19 times at 18 months and 4.30 at 24 months. (Conclusion) The functional injury inflicted upon the sphincter during the operation made a gradual recovery. MSP and MTV increases 6 months after performing TPC with IPAA, whereas MRP increases 12 months after the surgery. Twenty four hours postoperative bowel motility was significantly decreased in each interval.

### IOP05-6

**Long-Term Oncologic Outcomes of Self-Expandable Metallic Stent Insertion Comparing with Emergency Surgery for Malignant Colonic Obstruction: A Systematic Review and Meta-Analysis**

Gi Won Ha, Ji Hyun Jung, Jong Hun Kim, Min Ro Lee*

(Purpose) Although self-expandable metallic stent (SEMS) insertion for malignant colonic obstruction (MCO) enables patients to avoid emergency surgery and provides reduced risk of postoperative morbidity and mortality, its long-term oncologic outcomes are still unclear. The aim of this meta-analysis was to evaluate the oncologic outcomes of colonic stent insertion as a bridge to surgery (BS) for MCO. (Methods) Multiple comprehensive databases, including PubMed, EMBASE, Cochrane Library were searched for studies assessing the long-term oncologic outcomes between BS and emergency surgery (ES) for MCO. Main outcomes included 5-year overall survival (OS), local recurrence (LR) and distant recurrence (DR). Outcome data were pooled, and overall effect size was calculated using random effect models. (Results) Four randomized clinical trials (RCTs) and 17 non-randomized studies (NRSs) involving 1,863 patients met the inclusion criteria. Meta-analysis of 4 RCTs showed no difference in analyses of 5-year OS, LR, and DR between two groups, with a RR of 0.92 (95% CI 0.57-1.48, I2=35%), 2.69 (95% CI 0.81-8.90, I2=0%), 1.57 (95% CI 0.81-3.05, I2=0%), respectively. Meta-analysis of 17 NRSs also showed no difference in analyses of 5-year OS, LR, and DR between two groups, with a
RR of 1.07 (95% CI 0.87-1.31, I²=33%), 1.29 (95% CI 0.73-2.31, I²=0%), 0.87 (95% CI 0.68-1.12, I²=0%), respectively. **Conclusion** Colonic stent insertion as a bridge to surgery may be a reasonable therapeutic option for MCO, with comparable long-term oncologic outcomes to those of emergency surgery.

5yr OS in RCTs

<table>
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<tr>
<th>Study</th>
<th>Stent</th>
<th>Events</th>
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<th>Emergency</th>
<th>Total</th>
<th>RR Ratio</th>
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<tr>
<td>Alcancea et al.</td>
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5yr OS in NRSs

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Recurrence in RCTs

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Recurrence in NRSs

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**IOP05-7**

Macroscopic Serosal Invasion and Small Tumor Size as Independent Prognostic Factors in Stage IIA Colon Cancer

Department of Surgery, Chonnam National University Hwasun Hospital and Medical School, Korea

Soo Young Lee, Chang Hyun Kim, Young Jin Kim, Hyeong Rok Kim*

**Purpose** It is important to identify stage IIA colon cancer patients who are at high risk of recurrence. In clinical practice, surgical and pathologic stages of tumor depth often shows discrepancy, and macroscopic serosal invasion has recently been suggested as a prognostic factor in colorectal cancer. The aim of this study was to explore the prognostic factors, including macroscopic serosal invasion, in patients with stage IIA colon cancer. **Methods** We retrospectively reviewed primary colon cancer patients who underwent curative resection between January 2004 and December 2011, and included 375 patients who were classified as postoperative pathologic stage IIA (T3N0M0). Macroscopic serosal invasion was defined as tumor nodules or colloid changes protruding the surface of serosa, which was determined by attending surgeons after the removal of the specimen. Clinicopathologic characteristics were analyzed to identify independent prognostic factors. **Results** Among the patients included, 263 (70.1%) were determined to have macroscopic serosal invasion. Clinicopathologic factors were generally similar between the patients with macroscopic serosal invasion and those without macroscopic serosal invasion, except that patients with macroscopic serosal invasion showed larger tumor size and high preoperative carcinoembryonic antigen level. After the median follow-up of 47 months (range 1-90 months), 3-year disease-free survival (DFS) was 93.4%, and 5-year overall survival was 96.4%. On multivariable survival analysis, macroscopic serosal invasion (adjusted hazard ratio [HR]=2.851, 95% confidence interval [CI] 1.201-6.767), tumor size <5cm (adjusted HR=3.272, 95% CI 1.467-7.298), perineural invasion (adjusted HR 4.560, 95% CI 1.837-11.319), retrieved lymph node <12 (adjusted...
HR=4.560, 95% CI 1.326-15.853), and localized perforation (adjusted HR=7.692, 95% CI 1.719-34.425) were independent risk factors for recurrence. 

**Conclusion** Macrosopic serosal invasion and small tumor (<5cm) were independent prognostic factors for DFS. Further studies are needed to evaluate the benefit from adjuvant chemotherapy in patients with those prognostic factors.

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**IOP05-8**

Size-Related Clinicopathologic Characteristics of T1 Colorectal Cancer

Center for Colorectal Cancer, Research Institute and Hospital, National Cancer Center, Korea

Seonok Oh, Kyung Su Han*, Jong Hee Hyun, Sang Jae Lee, Bun Kim, Chang Won Hong, Byung Chang Kim, Dae Kyung Sohn, Hee Jin Chang, Min Jung Kim, Sung Chan Park, Jae Hwan Oh

**Purpose** T1 colorectal cancer (CRC) has a wide range of size, from a minute polyp to a large tumor. This study evaluated the clinicopathologic characteristics of T1 CRC according to size. 

**Methods** This study involved 845 patients with T1 CRC treated by endoscopic or surgical resection between October 2001 and December 2015. Excluding 70 patients with double primary cancer, the 775 patients were classified into four groups by tumor size; minute group (≤5 mm), small group (6-10 mm), medium group (11-20 mm), and large group (>21 mm). Details regarding age, gender, tumor location, endoscopic type, histologic grade, depth of submucosal (SM) invasion, angiolymphatic invasion, background adenoma (BGA), and budding were evaluated with respect to tumor size. In surgically resected cases (n=589), the incidence of lymph node metastasis (LNM) was also evaluated with respect to tumor size. 

**Results** There were 15 cases of minute group (1.9%), 162 small (20.9%), 381 medium (49.2%), and 217 large (28.0%). Endoscopic type, tumor location, status of BGA and LNM were significantly different between the four groups. The incidences of flat type were 20.0% of minute group, 9.3% small, 6.0% medium, and 18.4% large (p<0.001). The incidences of right-sided tumor location were 33.3% minute, 14.2% small, 15.5% medium, and 14.3% large (p=0.001). The incidences of tumors without BGA were 53.3% minute, 40.1% small, 32.8% medium, and 17.5% large (p<0.001). The incidences of LNM were 33.3% minute, 17.4% small, 15.6% medium, and 8.8% large (p=0.043). No significant differences were observed with regards to age, gender, histologic grade, tumor budding and deep SM invasion between the four groups. 

**Conclusion** The present study showed that minute T1 CRCs had high incidence of flat type, right-sided location, LNM and absence of BGA. These results suggest that minute T1 CRC may have more aggressive behavior than larger T1 CRC and endoscopists should pay special attention not to miss the minute flat lesion, especially in right colon.

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**IOP05-9**

Pain Control with Botulinum Toxin after Hemorrhoidectomy

Wellness Hospital, 1DongEui University, Korea

Gyong Suk Kang*, Byong Soo Kim, Ji Hyun Kim, Kyung Tae Chung1, Dong Wan Kang

**Purpose** Although hemorrhoidectomy is a relatively easy operation, it causes pain. Many patients fear the operation and recovery from the operation also requires a long period. Therefore, pain control is an issue as crucial as the operation itself. One of the main reasons behind pain after Hemorrhoidectomy has been known to be spasm of the internal anal sphincter and inflammation of surgical wound. Normally anti-inflammatory drugs are used to control inflammatory pain, but there is no effective method of reducing spasms. The research focused on finding a suitable method for pain control after the hemorrhoidectomy. 

**Methods** A double blind study was carried out with 32 patients underwent hemorrhoidectomy. A group (botulinum group) of 16 patients was treated with internal sphincter injection of 20 U botulinum toxin and the other group (saline group) of 16 patients was treated with normal saline in hemorrhoidectomy. All of patients were managed according to standardized post-
operative analgesics and laxative regimens in case of needs. Pain was assessed using visual analog scores during 14 postoperative days. In order to analyze relationship between postoperative pain and anal spasm, the manometer was recorded on preoperative day and 1, 3, 4, 7, 14 postoperative days. **(Results)** Daily average pain scores of the botulinum group were lower than those of the saline group. There was no significant difference on the day of surgery, however, the difference of average pain scores between two groups occurred statistically on the first, second and third postoperative day (P<0.05). The manometer values of the botulinum group showed also lower throughout the study period when compared with those of the saline group. There was no significant difference on the first postoperative day but from the third postoperative day the average manometer value showed significant difference (P<0.01) between two groups during the rest of the study period. **(Conclusion)** The comparison of the two groups indicated that botulinum toxin injection decreased the sphincter tone and pain score, suggesting that botulinum toxin injection in hemorrhoidectomy is an effective method on reducing pain caused by spasms.
Annual Congress of KSS 2016
68th Annual Congress of the Korean Surgical Society

Integrated Oral Presentation 6

Date. Friday, November 4, 2016
Venue. Dongkang Hall B, 3F, Avenue

Moderators:
Jeong Hwan Yook (Univ. of Ulsan),
Young don Min (Chosun Univ.)
(Purpose) To investigate the effect of spleen preserving after total gastrectomy in patients with advanced gastric cancer. The survival benefit of splenectomy for prophylactic lymphadenectomy is controversial in advanced proximal gastric cancer. A randomized controlled trial (JCOG) to evaluate the effect of spleen preserving in total gastrectomy in proximal gastric cancer patients showed that spleen preserving total gastrectomy provides similar oncologic outcomes with lower morbidity compared to splenectomy group. However, its effects on patients with Borrmann type IV gastric cancer and cancer located in greater curvature did not address in the trial because of exclusion criteria. (Methods) Between January 1990 and December 2010, 1776 patients who underwent curative total gastrectomy for advanced gastric cancer at Yonsei University Sevance Hospital, Seoul, Korea were evaluated retrospectively. The patients with non-curative resection, preoperative chemotherapy, co-malignancy, under 15 retrieved lymph nodes and non-adenoarcinoma were excluded. The short term outcomes and disease free survival were compared between splenectomy total gastrectomy and spleen preserving total gastrectomy for advanced gastric cancer. (Results) Spleen preserving was associated with lower morbidity. Also, in spleen preserving group, the estimated blood loss, incidence of peri-operative transfusion, operation time, and hospital stay was less than splenectomy. The 5-year disease free survival rates of the splenectomy and spleen preservation group were 30.7%(95% CI 17.4-24.5) and 54.9%(95% CI 76.6-131.3) (p<0.001), respectively. The hazard ratio of spleen preservation to splenectomy was 0.72 (95% CI 0.62-0.83). There was significant difference between the two groups in disease free survival or overall survival rate when adjusted according to cancer stage, the application of adjuvant chemotherapy, sex and age. The prognosis of spleen preserving total gastrectomy was better than splenectomy. This results was also applied to Borrmann type IV gastric cancer and cancer located in greater curvature. (Conclusion) Splenectomy for prophylactic lymph node dissection should be avoided as there is no survival benefit in both Borrmann type IV cancer and cancer located in the greater curvature.
was used more cartridge than Delta shaped Billroth-I anastomosis (6.9±1.2 vs. 6.2±1.0, p<0.001). However there was no significant differences in operation time, estimate blood loss, number of retrieved lymph node and postoperative course between reconstruction methods. Postoperative complications more than Clavien-Dindo grade IIIa occurred in 22 cases (4.8%) of postoperative early complications and 14 cases (3.1%) of late complications. The endoscopic findings showed excellent short and long-term outcomes in terms of very low incidence of bile reflux and reflux-induced remnant gastritis in uncut Roux-en-Y compared with Delta shaped Billroth-I anastomosis. 

(Conclusion) Uncut Roux-en-Y gastrojejunostomy was a useful reconstruction method with totally laparoscopic distal gastrectomy for cancer, especially for diverting enteral contents from the remnant stomach and preventing remnant gastritis. Therefore, it is recommended for young patients with early stage disease who have a long time to live after distal gastrectomy for cancer.

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**IOP06-3**

**Impact of Body Mass Index on Quality of Life after Total Gastrectomy for Gastric Cancer**

Gastric Cancer Center, Kyungpook National University Medical Center, 'Department of Surgery, Kyungpook National University Hospital, Korea

Ki Bum Park, Ji Yeon Park, Seung Soo Lee¹, Oh Kyoung Kwon, Ho Young Chung¹, Wansik Yu*

(Purpose) Body mass index (BMI) may have an influence on quality of life (QoL). We evaluated the impact of postoperative shifts in BMI on QoL following total gastrectomy in patients with gastric cancer. **(Methods)** QoL data from the European Organization for Research and Treatment of Cancer (EORTC) QLQ-C30 and QLQ-STO22 questionnaires were obtained from 417 patients preoperatively and one year after surgery. Patients were divided into two groups based on changes in BMI: Group 1, patients whose BMI range decreased compared to their preoperative BMI range, and Group 2, patients who maintained or experienced an increase in BMI range compared to their preoperative BMI range. **(Results)** There were 276 patients in Group 1 and 141 in Group 2. With respect to global health status and functional scales, changes in QoL one year after surgery were not significantly different between the two groups. One year after surgery, there were significantly greater decreases in QoL due to gastrointestinal symptoms, such as nausea and vomiting (P=0.008), appetite loss (P=0.001), and constipation (P=0.038), in Group 1 than in Group 2. Of QLQ-STO22 items, dysphagia (P=0.013), pain (P=0.012), reflux symptoms (P=0.017), eating restrictions (P=0.007), taste (P=0.009), and body image (P=0.009) were associated with significantly worse QoL in Group 1 than in Group 2 at one year after surgery. **(Conclusion)** Patients have significantly different QoL depending on the BMI shift after total gastrectomy. Efforts to reduce the gap in QoL associated with changes in BMI after total gastrectomy should include intensive nutritional support and restoration of dietary behaviors. Appropriate clinical and institutional approaches and active medical interventions are required for maintaining BMI after surgery.

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**IOP06-4**

**Splenectomy in Total Gastrectomy is Unnecessary to Conduct Prophylactic Lymph Node Dissection for Advanced Gastric Cancer**

Department of Surgery, Yonsei University College of Medicine, Korea

You Na Kim, Yoon Young, Choi Taeil Son, Hyung-Il Kim, Jae-Ho Cheong, Woo Jin Hyung, Sung Hoon Noh*

(Purpose) To investigate the effect of spleen preserving after total gastrectomy in patients with advanced gastric cancer. The survival benefit of splenectomy for prophylactic lymphadenectomy is controversial in advanced proximal gastric cancer. A randomized controlled trial (JCOG) to evaluate the effect of spleen preserving in total gastrectomy in
proximal gastric cancer patients showed that spleen preserving total gastrectomy provides similar oncologic outcomes with lower morbidity compared to splenectomy group. However, its effects on patients with Borrmann type IV gastric cancer and cancer located in greater curvature did not addressed in the trial because of exclusion criteria. (Methods) Between January 1990 and December 2010, 1776 patients who underwent curative total gastrectomy for advanced gastric cancer at Yonsei University Severance Hospital, Seoul, Korea were evaluated retrospectively. The patients with non-curative resection, preoperative chemotherapy, co-malignancy, under 15 retrieved lymph nodes and non-adenocarcinoma were excluded. The short term outcomes and disease free survival were compared between splenectomy total gastrectomy and spleen preserving total gastrectomy for advanced gastric cancer. (Results) Spleen preserving was associated with lower morbidity. Also, in spleen preserving group, the estimated blood loss, incidence of peri-operative transfusion, operation time, and hospital stay was less than splenectomy. The 5-year disease free survival rates of the splenectomy and spleen preservation group were 30.7%(95% CI 17.4-24.5) and 54.9%(95%CI 76.6-131.3) (p<0.001), respectively. The hazard ratio of spleen preservation to splenectomy was 0.72 (95%CI 0.62-0.83). There was significant difference between the two group in disease free survival or overall survival rate when adjusted according to cancer stage, the application of adjuvant chemotherapy, sex and age. The prognosis of spleen preserving total gastrectomy was better than splenectomy. This results was also applied to Borrmann type IV gastric cancer and cancer located in greater curvature. (Conclusion) Spleenectomy for prophylactic lymph node dissection should be avoided as there is no survival benefit in both Borrmann type IV cancer and cancer located in the greater curvature.

IOP06-5

Radical Gastrectomy after Chemotherapy for Stage IV Gastric Cancer: A New Treatment Paradigm for Improvement of Survival

Division of Gastrointestinal Surgery, Department of Surgery, College of Medicine, The Catholic University of Korea, Korea

Ho Seok Seo, Kyo Young Song, Yoon Ju Jung, Seung Man Park, Hae Myung Jeon, Hyung Min Chin, Sung Keun Kim, Jung Koo Kim, Jun Hyun Lee, Dong Jin Kim, Cho Hyun Park*

(Purpose) Recently, radical gastrectomy after chemotherapy which is called conversion surgery or adjuvant surgery was introduced. However there have been several controversies over proper time and indication of the surgery. This study aimed to identify the effectiveness and the possible indication of the conversion surgery. (Methods) In total, 419 patients who were diagnosed stage IV gastric cancer from 2010 to 2015 in eight Catholic Medical Center affiliated hospitals were divided into four subgroups; 212 for chemotherapy only group (G1), 124 for chemotherapy after primary gastrectomy group (G2), 23 for gastrectomy after chemotherapy group (G3), and 60 for best supportive care group (G4). The survival rate of the subgroups were analyzed. To compensate chemotherapy effects, cases of complete remission, partial response, and stable disease were selectively analyzed. To identify the factors that affected survival rate, the result of surgery and the intent of surgery of the G3 were analyzed. (Results) Three-year survival rate of the G3 was significantly higher than that of the G1 (42.8% vs 12.0%, p=0.001). In case of the patients with a response to chemotherapy, three-year survival rate showed similar result (G3 vs G1, 46.1% vs 18.4%, p=0.011). In the G3, R0 resection showed better three-year survival rate (R0 vs R1 or R2, 61.1% vs 16.2%, p=0.003), and curative resection also showed better three-year survival rate (curative vs palliative, 62.3% vs 23.8%, p=0.031). (Conclusion) The present study showed that radical gastrectomy after chemotherapy might improve the survival rate for the pa-
Patients with stage IV gastric cancer, especially who could undergo R0 resection. Thus, radical gastrectomy after chemotherapy could be another option for the patients who have a response to chemotherapy.

**IOP06-6**

Implications of D2 Lymph Node Dissection on Loco-Regional Control of Gastric Cancer

Department of Surgery, Samsung Medical Centre, Sungkyunkwan University School of Medicine, Korea

Man Ho Ha, Min-Gew Choi*, Tae Sung Sohn, Jae Moon Bae, Sung Kim

**Purpose** The aim of this study was to clarify whether supra-pancreatic lymph nodes (SPLNs) metastasis is loco-regional disease or not, and to elucidate the clinical significance of D2 lymph node dissection. **Methods** This study enrolled patients with node positive gastric cancer, who underwent curative surgery with D2 lymph node dissection, at the Department of Surgery, Samsung Medical Centre from 2007 to 2009. The survival outcomes of patients with and without metastatic SPLNs were analyzed. **Results** The total number of patients was 1086, and 377 (34.7%) patients had metastatic SPLNs. SPLN positivity was associated with a more advanced tumor status and the 5-year survival rate of the SPLN positive group was significantly lower than that of the SPLN negative group (59.5% vs. 81.2%, p<0.001). However, the survival rates were not significantly different between the two groups when the same stages were compared. Cox multivariate analysis revealed that SPLN metastasis was not an independent prognostic factor. Simulated D1 staging, excluding SPLN information, showed stage migration phenomenon in 7.7% of the patients and calculated survival outcomes were reversed between the patients with stage IIB and IIIA diseases (85.4% vs. 85.9%). **Conclusion** SPLNs were not different from perigastric lymph nodes in terms of prognostic significance and D2 dissection is strongly recommended for loco-regional disease control of advanced gastric cancer. D2 dissection may help to increase survival outcome and also enable more accurate staging and prognosis prediction.
Table 1. Clinicopathological Characteristics of the Patients With and Without Metastatic Suprapancreatic Lymph Nodes

<table>
<thead>
<tr>
<th></th>
<th>Suprapancreatic LN positive (n = 227)</th>
<th>Suprapancreatic LN negative (n = 709)</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>57.4 (51.1-63.9)</td>
<td>56.2 (51.3-63.8)</td>
<td>0.112</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td>0.791</td>
</tr>
<tr>
<td>Male</td>
<td>248 (84.2%)</td>
<td>468 (66.3%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>150 (55.8%)</td>
<td>360 (53.7%)</td>
<td></td>
</tr>
<tr>
<td>Extent of resection</td>
<td></td>
<td></td>
<td>0.009</td>
</tr>
<tr>
<td>Total</td>
<td>136 (37.3%)</td>
<td>390 (55.0%)</td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td>243 (33.9%)</td>
<td>507 (71.8%)</td>
<td></td>
</tr>
<tr>
<td>Tumor location</td>
<td></td>
<td></td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Upper third</td>
<td>3 (8.1%)</td>
<td>12 (1.7%)</td>
<td></td>
</tr>
<tr>
<td>Middle third</td>
<td>86 (25.3%)</td>
<td>283 (40.4%)</td>
<td></td>
</tr>
<tr>
<td>Lower third</td>
<td>186 (55.3%)</td>
<td>320 (45.1%)</td>
<td></td>
</tr>
<tr>
<td>Whole</td>
<td>275 (75.7%)</td>
<td>559 (79.3%)</td>
<td></td>
</tr>
<tr>
<td>Tumor size</td>
<td></td>
<td></td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>&gt;6 cm</td>
<td>205 (64.4%)</td>
<td>408 (64.8%)</td>
<td></td>
</tr>
<tr>
<td>&gt;6 cm</td>
<td>172 (56.8%)</td>
<td>243 (34.9%)</td>
<td></td>
</tr>
<tr>
<td>Histologic type</td>
<td></td>
<td></td>
<td>0.056</td>
</tr>
<tr>
<td>Differentiated</td>
<td>93 (24.7%)</td>
<td>213 (30.3%)</td>
<td></td>
</tr>
<tr>
<td>Undifferentiated</td>
<td>154 (44.3%)</td>
<td>432 (61.7%)</td>
<td></td>
</tr>
<tr>
<td>Depth of invasion</td>
<td></td>
<td></td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>T1</td>
<td>3 (38.8%)</td>
<td>24 (28.5%)</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>101 (15.5%)</td>
<td>246 (35.0%)</td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>120 (32.3%)</td>
<td>256 (35.7%)</td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td>143 (37.3%)</td>
<td>240 (33.5%)</td>
<td></td>
</tr>
<tr>
<td>LN metastasis</td>
<td></td>
<td></td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>N1</td>
<td>349 (40.0%)</td>
<td>359 (50.6%)</td>
<td></td>
</tr>
<tr>
<td>N2</td>
<td>79 (21.0%)</td>
<td>207 (29.2%)</td>
<td></td>
</tr>
<tr>
<td>N3</td>
<td>264 (30.1%)</td>
<td>134 (18.2%)</td>
<td></td>
</tr>
<tr>
<td>Pathologic stage*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>m</td>
<td>96 (21.4%)</td>
<td>103 (29.4%)</td>
<td></td>
</tr>
<tr>
<td>IA</td>
<td>127 (27.3%)</td>
<td>143 (25.5%)</td>
<td></td>
</tr>
<tr>
<td>IB</td>
<td>40 (8.9%)</td>
<td>18 (2.6%)</td>
<td></td>
</tr>
<tr>
<td>IIA</td>
<td>90 (22.8%)</td>
<td>133 (21.8%)</td>
<td></td>
</tr>
<tr>
<td>IIB</td>
<td>119 (28.3%)</td>
<td>333 (52.4%)</td>
<td></td>
</tr>
<tr>
<td>IIC</td>
<td>126 (24.8%)</td>
<td>69 (10.6%)</td>
<td></td>
</tr>
<tr>
<td>Lymphatic invasion</td>
<td></td>
<td></td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Absent</td>
<td>145 (21.9%)</td>
<td>279 (23.2%)</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>173 (40.3%)</td>
<td>437 (56.7%)</td>
<td></td>
</tr>
<tr>
<td>Vascular invasion</td>
<td></td>
<td></td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Absent</td>
<td>208 (76.4%)</td>
<td>613 (80.2%)</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>62 (23.6%)</td>
<td>157 (19.8%)</td>
<td></td>
</tr>
<tr>
<td>Pancreatic invasion</td>
<td></td>
<td></td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Absent</td>
<td>162 (52.6%)</td>
<td>405 (50.3%)</td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>135 (47.4%)</td>
<td>404 (49.7%)</td>
<td></td>
</tr>
</tbody>
</table>

Values in parentheses are percentages. LN indicates lymph node.

Table 2. Univariate and Multivariate Logistic Regression Analysis of Prognostic Factors

<table>
<thead>
<tr>
<th>Prognostic Factor</th>
<th>Univariate OR (95% CI)</th>
<th>P-value*</th>
<th>Multivariate OR (95% CI)</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>1</td>
<td>1</td>
<td>0.909 (0.893-0.926)</td>
<td>0.000</td>
</tr>
<tr>
<td>Tumor location</td>
<td>Subtotal</td>
<td>0.000</td>
<td>Subtotal</td>
<td>0.000</td>
</tr>
<tr>
<td>Upper third</td>
<td>1</td>
<td>1</td>
<td>0.840 (0.608-1.162)</td>
<td>0.262</td>
</tr>
<tr>
<td>Middle third</td>
<td>1</td>
<td>1</td>
<td>0.860 (0.653-1.139)</td>
<td>0.284</td>
</tr>
<tr>
<td>Lower third</td>
<td>1</td>
<td>1</td>
<td>0.880 (0.659-1.162)</td>
<td>0.358</td>
</tr>
<tr>
<td>Whole</td>
<td>1</td>
<td>1</td>
<td>0.900 (0.892-0.907)</td>
<td>&lt;0.000</td>
</tr>
</tbody>
</table>

Values in parentheses are 95% confidence intervals. *Log-rank test.

Table 3. Comparison of 5-year survival rates between the groups with and without metastatic suprapancreatic lymph nodes according to each T and N stage.

<table>
<thead>
<tr>
<th>T and N Stage</th>
<th>5-Year Survival Rates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Suprapancreatic LN positive (n = 227)</td>
</tr>
<tr>
<td>T1 N1</td>
<td>87.5 (8)</td>
</tr>
<tr>
<td>N2</td>
<td>100 (100)</td>
</tr>
<tr>
<td>N3</td>
<td>95.0 (112)</td>
</tr>
<tr>
<td>T2 N1</td>
<td>92.0 (103)</td>
</tr>
<tr>
<td>N2</td>
<td>100 (103)</td>
</tr>
<tr>
<td>N3</td>
<td>95.4 (102)</td>
</tr>
<tr>
<td>T3 N1</td>
<td>72.7 (111)</td>
</tr>
<tr>
<td>N2</td>
<td>84.0 (103)</td>
</tr>
<tr>
<td>N3</td>
<td>78.0 (104)</td>
</tr>
<tr>
<td>T4 N1</td>
<td>60.2 (62)</td>
</tr>
<tr>
<td>N2</td>
<td>57.5 (54)</td>
</tr>
<tr>
<td>N3</td>
<td>50.0 (57)</td>
</tr>
</tbody>
</table>

Values in parentheses are percentages. *Log-rank test.

Table 4. Effect of simulated D1 dissection on stage migration and stage-specific survival rates

<table>
<thead>
<tr>
<th>Simulated D1</th>
<th>T1 (n = 227)</th>
<th>T2 (n = 709)</th>
<th>T3 (n = 709)</th>
<th>T4 (n = 709)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage</td>
<td>IB (94)</td>
<td>IB (204)</td>
<td>IB (204)</td>
<td>IB (204)</td>
</tr>
<tr>
<td>5-Year</td>
<td>95.2</td>
<td>88.3</td>
<td>87.3</td>
<td>84.3</td>
</tr>
<tr>
<td>Survival</td>
<td>100</td>
<td>95.7</td>
<td>95.7</td>
<td>95.7</td>
</tr>
<tr>
<td>5-Year</td>
<td>95.2</td>
<td>88.3</td>
<td>87.3</td>
<td>84.3</td>
</tr>
<tr>
<td>5-Year</td>
<td>95.2</td>
<td>88.3</td>
<td>87.3</td>
<td>84.3</td>
</tr>
<tr>
<td>Survival</td>
<td>100</td>
<td>95.7</td>
<td>95.7</td>
<td>95.7</td>
</tr>
<tr>
<td>5-Year</td>
<td>95.2</td>
<td>88.3</td>
<td>87.3</td>
<td>84.3</td>
</tr>
</tbody>
</table>

Values in parentheses are number of patients. *Log-rank test.
**IOP06-7**

Change of Renal Function and Body Composition after Gastrectomy for Gastric Cancer

Department of Surgery, Hanyang University College of Medicine, Korea

**Jong Oh Lee, Tae Kyung Ha**

(Purpose) Gastrectomy is associated with change of body composition and renal function. Change of body composition and renal function after bariatric surgery was studied many times before. However, the change after gastrectomy for the gastric cancer patients and difference of changes between normal BMI group and abnormal BMI group was not studied a lot. The purpose of this study is to evaluate changes in body composition and renal function and difference between normal BMI group and abnormal BMI group after gastrectomy for gastric cancer patients. (Methods) A retrospective study was conducted in 30 patients with gastric cancer. Patients were divided into two groups: a group with normal BMI (20<BMI<25), and abnormal BMI (BMI<20 or 25<BMI). Cystatin C, eGFR, body composition (Bone mineral contents(BMC), Fat, Lean body mass (LBM)) were evaluated preoperatively and 6 months after surgery. (Results) There were no significant difference between normal BMI group and abnormal BMI group. All of BMC, fat, LBM were decreased 6 months after gastrectomy in abnormal BMI group. But in normal BMI group MBC, fat were decreased and LBM was increased after gastrectomy. Cystatin C increased after gastrectomy. (Conclusion) All of body composition decreased in abnormal BMI group, but LBM was increased in normal BMI group. Decreased renal function was seen in both BMI groups. Further evaluation is needed for change of body composition and renal function and further research and follow-up observation for them are needed.

**IOP06-8**

Prognostic Value of Preoperative Lymphocyte to Monocyte Ratio in Patients for Gastric Cancer

Department of Surgery, Incheon St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Korea

**Chang Hyun Kim, Seung-Man Park, Jin-Jo Kim**

(Purpose) Several inflammatory response materials could be used for prediction of prognosis of cancer patients. The lymphocyte to monocyte ratio (LMR) have been introduced for prognostic factor in various cancers. The aim of this study was to investigate the impact of preoperative lymphocyte to monocyte ratio on long term outcomes in the patients with gastric cancer. (Methods) The study population consisted of 930 gastric cancer patients from January 2001 to December 2016. The lymphocyte to monocyte ratio (LMR) was calculated from lymphocyte and neutrophil counts on routine blood tests taken before surgery. The patients were classified into two groups according to lymphocyte to monocyte ratio; Group A: LMR <3, Group B: LMR ≥ 3. Survival analyses were generated according to the Kaplan-Meier method. Univariate and multivariate analyses were carried out by the Cox proportional hazard model. (Results) The median follow-up time for surviving patients was 18 months. There was no significant difference between groups in disease free survival (log-rank p=0.064). Whereas, the survival of Group A was significantly worse than that of the patients in Group B (log-rank p<0.001). Five-year overall survival of the Group A and Group B were 75.2% and 86.2%, respectively. Age (p=0.019, HR 1.021, 95% CI 1.003-1.038), stage (p<0.001, HR 10.608 95% CI 5.214-21.583) and LMR (p=0.011, HR 0.597 95% CI 0.401-0.890) was and independent poor prognostic factor. (Conclusion) The lymphocyte to monocyte ratio (LMR) in gastric cancer patients are independent prognostic factor for overall survival. LMR might be used to select the patients who expected poor prognosis and need a more aggressive follow-up and chemotherapeutic treatment.
Remnant Stomach Volume and Diet Volume Study using CT Volumetry

Department of Surgery, 1Department of Radiology Postgraduate School of Medicine, Gyeongsang National University, 1Gyeongnam Regional Cancer Center, 1Institute of Health Sciences, Gyeongsang National University, Korea

Sang-Ho Jeong*, Kyungsoo Bae1, Ji Eun Kim1, Ji-Ho Park, Sang-Kyung Choi, Soon-Chan Hong, Eun-Jung Jung, Young-Tae Ju, Chi-Young Jeong, Young-Joon Lee, Woo-Song Ha*

(Purpose) Previous study, we found that the mechanism underlying diet recovery after gastrectomy may be the increment of small bowel motility rather than distension of the remnant stomach using the following barium upper gastrointestinal and small bowel series. The aim of this study is to investigate the association of remnant gastric volume and diet volume. (Methods) We prospectively collected clinical data from 29 consecutive patients with gastric cancer who underwent radical subtotal gastrectomy along with Billroth II reconstruction at Gyeongsang National University Hospital between September 2009 and February 2012. We calculated the remnant gastric volume using the following CT volumetry.(fig 1) (Results) In the CT volumetry, the mean gastric volumes of gastric cancer patients is 670 ml. After the subtotal gastrectomy, the mean volumes of the remnant stomach decreased to 130 ml in postop 6 month, to 84.2ml in postop 12 month, to 83.6ml in postop 24 month. We compared diet volume between remnant gastric volume lesser than 90cc and more than 90cc. We found that there is no significantly different of diet volume between remnant gastric volume lesser than 90cc (74% than before the operation) and more than 90cc two groups (75% than before the operation, p=0.88). (Conclusion) We found that patients who underwent subtotal gastrectomy reached the 80% of diet intake than before the operation in post-operative 1 year. It is concluded there is no significantly different between diet volume and remnant gastric volume.

Fig. 1. We calculated remnant gastric volume using CT volumetry

Fig. 2. Change of remnant stomach volume after surgery
Annual Congress of KSS 2016
68th Annual Congress of the Korean Surgical Society

Integrated Oral Presentation 7

Date. Saturday, November 5, 2016
Venue. Dongkang Hall A, 3F, Avenue

Moderators:
Yang Won Nah (Univ. of Ulsan),
Hwon Kyum Park (Hanyang Univ.)
The Efficacy of Laparoscopic Cholecystectomy Without Discontinuation in Patients on Antithrombotic Therapy

Department of Surgery, Soonchunhyang University Cheonan Hospital, Korea

Hyong Uk Lee, Hae Il Jung, Young Joo Kim, Moo Jun Baek Sang Ho Bae*

(Purpose) Laparoscopic cholecystectomy (LC) is one of the most commonly performed surgeries in the world today. It is well known that performing early LC in patients with acute cholecystitis has good results, but there is no established conclusion regarding whether LC can be performed in patients on antithrombotic therapy. The objective of our study was to describe post-operative outcomes of patients who underwent emergent LC without interruption to antithrombotic therapy. (Methods) We performed a retrospective review of patients at our institution who underwent LC while on antithrombotic therapy from 2010 to 2015. Patients were divided into two groups as underwent emergent LC and underwent elective LC. (Results) A total of 67 patients (Emergent group: 22, Elective group: 45) were included in the analysis. There was no significant difference in age, intraoperative blood loss, mean operation time, open conversion rate, rate of in-hospital complication between the two groups. Elective group had significantly longer duration between operation and admission (8.67±3.71 vs. 2.91±3.02 days, P<0.001) and longer duration of antithrombotic drugs discontinuation (6.22±1.68 vs. 1.77±2.14 days, P<0.001). Emergent group had significantly more postoperative anemia (6 vs 0 patients, p=.001) and 3 of 6 patients received packed RBC transfusion in postoperative period. However there was no significant difference in length of postoperative stay, or ICU length of stay and mortality rates. (Conclusion) Emergent laparoscopic cholecystectomy without interruption to antithrombotic therapy was relatively safe and useful. It will be needed well designed multicenter study to confirm the safety and efficacy of LC without suspension of antithrombotic therapy and to provide a simple guideline.

Table 1. Baseline characteristics per group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Elective surgery</th>
<th>Emergent surgery</th>
<th>Total</th>
<th>Comparison (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>71.1 ± 9.97</td>
<td>72.4 ± 11.00</td>
<td>71.96 ± 10.24</td>
<td>0.783</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td>0.106</td>
</tr>
<tr>
<td>Male</td>
<td>33 (73.33%)</td>
<td>11 (50.00%)</td>
<td>44 (58.67%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>12 (26.67%)</td>
<td>11 (50.00%)</td>
<td>23 (41.33%)</td>
<td></td>
</tr>
<tr>
<td>Underlying disease</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>34 (75.56%)</td>
<td>13 (59.09%)</td>
<td>47 (70.15%)</td>
<td>0.277</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>20 (44.44%)</td>
<td>6 (27.27%)</td>
<td>26 (38.81%)</td>
<td>0.277</td>
</tr>
<tr>
<td>Cardiogenic disease</td>
<td>24 (53.33%)</td>
<td>9 (40.91%)</td>
<td>33 (49.25%)</td>
<td>0.487</td>
</tr>
<tr>
<td>PUD</td>
<td>9 (20.00%)</td>
<td>11 (50.00%)</td>
<td>20 (29.85%)</td>
<td>0.025</td>
</tr>
<tr>
<td>COPD/CHF</td>
<td>3 (6.67%)</td>
<td>3 (13.64%)</td>
<td>6 (8.50%)</td>
<td>0.628</td>
</tr>
<tr>
<td>PTGBO</td>
<td>17 (37.78%)</td>
<td>2 (9.09%)</td>
<td>19 (28.56%)</td>
<td>0.031</td>
</tr>
<tr>
<td>Previous operation history</td>
<td>6 (13.33%)</td>
<td>4 (17.86%)</td>
<td>10 (14.49%)</td>
<td>0.497</td>
</tr>
<tr>
<td>CBD stone</td>
<td>8 (17.78%)</td>
<td>0 (0.00%)</td>
<td>8 (11.54%)</td>
<td>0.080</td>
</tr>
<tr>
<td>Time to operation (day)</td>
<td>8.67 ± 3.71</td>
<td>2.91 ± 3.02</td>
<td>6.78 ± 4.41</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Duration of stopping ASA (day)</td>
<td>6.22 ± 1.48</td>
<td>1.77 ± 2.14</td>
<td>4.76 ± 2.79</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Laboratory factor</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hemoglobin (g/dL)</td>
<td>12.10 ± 1.52</td>
<td>11.92 ± 1.89</td>
<td>12.04 ± 1.64</td>
<td>0.073</td>
</tr>
<tr>
<td>WBC (mm³)</td>
<td>10.85±3.39</td>
<td>12.10±5.99</td>
<td>11.43±4.39</td>
<td>0.524</td>
</tr>
<tr>
<td>Platelet (x10³)</td>
<td>243888.99</td>
<td>2239.99</td>
<td>237328.16</td>
<td>0.378</td>
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<tr>
<td>INR</td>
<td>1.15 ± 0.17</td>
<td>1.21 ± 0.36</td>
<td>1.16 ± 0.25</td>
<td>0.294</td>
</tr>
<tr>
<td>CRP (mg/dL)</td>
<td>111.78 ± 107.03</td>
<td>125.00 ± 121.13</td>
<td>124.99 ± 109.54</td>
<td>0.188</td>
</tr>
<tr>
<td>T-Bil (mg/dL)</td>
<td>2.13 ± 1.47</td>
<td>1.17 ± 0.60</td>
<td>1.81 ± 1.73</td>
<td>0.258</td>
</tr>
<tr>
<td>BUN (mg/dL)</td>
<td>13.0 ± 1.15</td>
<td>13.6 ± 1.69</td>
<td>13.10 ± 1.19</td>
<td>0.248</td>
</tr>
<tr>
<td>AST (U/L)</td>
<td>117.53 ± 170.09</td>
<td>43.82 ± 52.14</td>
<td>93.33 ± 146.18</td>
<td>0.167</td>
</tr>
<tr>
<td>ALT (U/L)</td>
<td>118.13 ± 159.35</td>
<td>20.93 ± 22.38</td>
<td>87.72 ± 106.09</td>
<td>0.043</td>
</tr>
<tr>
<td>Alkaline phosphatase (U/L)</td>
<td>194.38 ± 462.87</td>
<td>61.71 ± 45.01</td>
<td>104.89 ± 343.37</td>
<td>0.292</td>
</tr>
<tr>
<td>Lipase (U/L)</td>
<td>164.51 ± 598.36</td>
<td>27.92 ± 12.20</td>
<td>127.38 ± 492.02</td>
<td>0.522</td>
</tr>
</tbody>
</table>

Table 2. Comparison of outcome between two groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Elective surgery</th>
<th>Emergent surgery</th>
<th>Total</th>
<th>Comparison (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood loss</td>
<td>10 (22.22%)</td>
<td>3 (13.64%)</td>
<td>13 (19.49%)</td>
<td>0.611</td>
</tr>
<tr>
<td>Transfusion</td>
<td>0 (0.00%)</td>
<td>5 (45.45%)</td>
<td>5 (7.69%)</td>
<td>0.715</td>
</tr>
<tr>
<td>Operation time (min)</td>
<td>63.11 ± 44.38</td>
<td>76.62 ± 23.43</td>
<td>79.78 ± 38.62</td>
<td>0.478</td>
</tr>
<tr>
<td>Anemia</td>
<td>0 (0.00%)</td>
<td>6 (27.27%)</td>
<td>6 (9.66%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Transfusion</td>
<td>0 (0.00%)</td>
<td>3 (15.84%)</td>
<td>3 (4.48%)</td>
<td>0.597</td>
</tr>
<tr>
<td>Open conversion</td>
<td>4 (8.08%)</td>
<td>0 (0.00%)</td>
<td>4 (5.79%)</td>
<td>0.372</td>
</tr>
<tr>
<td>Any complication</td>
<td>8 (37.78%)</td>
<td>4 (18.18%)</td>
<td>12 (17.51%)</td>
<td>1.000</td>
</tr>
<tr>
<td>Length of stay (day)</td>
<td>8.00 ± 6.39</td>
<td>7.53 ± 3.75</td>
<td>7.78 ± 5.05</td>
<td>0.567</td>
</tr>
<tr>
<td>ICU stay (day)</td>
<td>0.07 ± 0.45</td>
<td>0.86 ± 3.32</td>
<td>0.31 ± 1.89</td>
<td>0.069</td>
</tr>
<tr>
<td>Mortality within 30 days</td>
<td>1 (2.22%)</td>
<td>1 (4.55%)</td>
<td>2 (2.99%)</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Data was presented as mean±SD (standard deviation) for continuous variables and frequency (percentage) for categorical variables.
Robotic Cholecystectomy using the Newly-Developed Korean Robotic Surgical System (Revo-I Model MSR-5000): Intermediate Report of Clinical Trial

Department of Hepatobiliary and Pancreatic Surgery, Gangnam Severance Hospital, Yonsei University College of Medicine, 1Department of Hepatobiliary and Pancreatic Surgery, Severance Hospital, Yonsei University College of Medicine, 2Meere company Inc, Pangyo Techno Valley, Korea

Jin Hong Lim, Woo Jung Lee1, Dong Won Park2, Chang Moo Kang1,*

(Purpose) Robot-assisted laparoscopic surgery facilitates easy adaptation of laparoscopic procedures. But inflated prices and higher costs for patients become a hindrance to the usage of robotic system and the continued evolution of technology. In Korea, a new Korean robotic surgical system, Revo-I, has been developed and approved by Ministry of Health and welfare of Korea. The aim of this study is to evaluate the feasibility and safety of Revo-I by performing robotic cholecystectomy in human. (Methods) Upon approval by the institutional review board of Yonsei university health system, we planned fifteen cases of cholecystectomy to evaluate the feasibility and safety of Revo-I. so far, cholecystectomy was performed in seven patients using the Revo-I robotic surgical system. Operative time and perioperative complications were recorded, and all patients were observed for postoperative complications for 4 weeks after surgery. (Results) Robotic cholecystectomy was completed successfully and without gallbladder perforation in all cases. The mean operative time was 119.29±23.17 min, the mean docking time was 10.86±2.79 min, the mean console time was 60.85±13.32 min and the mean actual dissection time was 38.14±6.07 min. There were no perioperative complications and none of the in vivo models exhibited abnormal behavior during the postoperative observation period. (Conclusion) In seven cases, there were no complication and Revo-I robotic surgical system showed available performance. These clinical trial will result verify the safety and efficacy of robotic cholecystectomy using the Revo-I robotic surgical system, facilitating KFDA approval for future clinical application.

Predictive Factors for Long Operative Duration in Patients Undergoing Laparoscopic Cholecystectomy after Endoscopic Retrograde Cholangiography for Combined Choledochocystolithiasis

Department of Surgery, Kyungpook National University School of Medicine, 1Department of Internal Medicine, Kyungpook National University School of Medicine, Korea

Ryukyung Lee, Heontak Ha, Young Seok Han, Min Kyu Jung1, Jae Min Chun*

(Purpose) Choledochocystolithiasis and its associated complications such as cholangitis and pancreatitis are managed by endoscopic retrograde cholangiography (ERC), with endoscopic stone extraction followed by laparoscopic cholecystectomy (LC). However, affected patients present with complex conditions linked to operative difficulties in performing LC. The aim of this study was to elucidate the predictive factors for a prolonged LC procedure following ERC for treating patients with choledochocystolithiasis. (Methods) The medical records of 109 patients who underwent LC after ERC for choledochocystolithiasis from September 2012 to August 2014 were evaluated retrospectively. The cases were divided into long and short operative duration groups using a cutoff operative time of 90 min. We used univariate and multivariate analyses to investigate predictive factors associated with long operative duration according to clinical variables such as patient characteristics, presence of acute cholecystitis, placement of percutaneous transhepatic gallbladder drainage (PTGBD), ERC-related factors, and peak serum levels of laboratory test values between the initial presentation and LC (intervening period). Results are presented as the hazard ratio (HR) and 95% confidence interval (CI). (Results) Seventeen patients needed more than 90 min to complete LC, including three who were converted to open cholecystectomy. The presence of
acute cholecystitis, placement of PTGBD, higher peak serum white blood cell count and levels of C-reactive protein (CRP), and lower peak serum levels of lipase during the intervening period were associated with prolonged operative duration. Multivariate analysis showed that the independent predictive factors for long operative duration were the presence of acute cholecystitis (HR 5.418; 95% CI 1.374-21.366; P=0.016) and higher peak levels of CRP (HR 1.077; 95% CI 1.011-1.147; P=0.022). (Conclusion) When patients with choledochocystolithiasis are scheduled for LC after ERC, the presence of acute choledocholithiasis was significantly associated with longer operative times.

Fig. 1. Flow diagram of the laparoscopic cholecystectomy procedure for patients with combined choledochocystolithiasis at our institute.

Fig. 2. The results of the receiver-operating characteristic curve analysis of the C-reactive protein levels.

IOP07-4

Proposal of Protocol of Surgical Quality Improvement Program and Reporting Template of Primary Study for Cholecystectomy

Department of Surgery, Mokdong Hospital, Ewha Womans University School of Medicine, 1Department of Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, 2Department of Surgery, Seoul National University Bundang Hospital, Seoul National University College of Medicine, 3Department of Knowledge Transfer Team, National Evidence-based Healthcare Collaborating Agency, Korea

Huisong Lee, Hyeon Kook Lee*, In Woong Han1, Jaiyoung Cho2, Ji Eum Choi3

(Purpose) Since 2004, the American College of Surgeons National Surgical Quality Improvement Program® (ACS NSQIP®) was launched and applied in United States. It has been so effective that a hospital has the opportunity to prevent 250-500 complications, save 12-36 lives, and reduce costs by millions of dollars each year on average. Japanese also had developed a web-based national clinical database (NCD) in 2011. However, there is no nationally validated, risk-adjusted, outcomes-based program to measure and improve the quality of surgical care in Korea. (Methods) The members of the planning committee of Korean Association of HBP Surgery established the protocol of Korean Surgical Quality Improvement Program (KSQIP) with verifying variables of ACS-NSQIP and NCD; demographics, preoperative information, laboratory values, operation finding, general occurrences, postoperative occurrences, and follow-up data. (Results) The 44 surgeons from 20 hospitals have decided to participated in the primary prospective study to apply KSQIP to cholecystectomy. We developed web-based database system (http://www.ksqip.org/gb) and surgical clinical reviewer of each hospital will fill out the reporting template. Finally, we will provide a risk-adjusted surgical risk calculator and feedback system for reducing complication. (Conclusion) We would like to introduce the study protocol, clinical report form, web-based database system, and hope to be helpful for reducing postoperative complication.
Survival outcome and Prognostic Factors of 308 Patients Undergone Surgery with Hepatic Resection in Perihilar Cholangiocarcinoma

Division of Hepatobiliary and Pancreatic Surgery, Department of Surgery, Ulsan University College of Medicine and Asan Medical Center, Korea

Seong-Ryong Kim, Kwang-Min Park*, Dae Wook Hwang, Ki Byung Song, Jae Hoon Lee, Sang Hyun Shin, Bong Jun Kwak, Jaewoo Kwon, Chung Hyeun Ma, Seunghyun Hwang, Song Cheol Kim, Young-Joo Lee

(Purpose) Although survival outcome and prognostic factors of perihilar cholangiocarcinoma (PC) have reported through the various studies, only few studies reported survival outcome and prognostic factors analyzing over three hundred patients who underwent surgery with hepatic resection in PC. This study was designed to figure out survival outcome and prognostic factors of PC after surgery with hepatic resection. (Methods) Methods: Between January 2000 and December 2013, 477 patients with PC underwent surgery with curative intent. Among them, 308 patients underwent surgery with hepatic resection for treating PC in the division of Hepatobiliary and pancreatic surgery, Asan Medical Center. Prognostic factors were analyzed with Cox proportional hazard models. (Results) Results: The mean age of patients was 62.0 ± (8.63) and 205 patients were male (66.6%). According to AJCC 7th, patients distributed to stages I (10 patients (3.2%)), II (33 patients (10.7%)), III-A (103 patients (33.4%)), III-B (145 patients (47.1%)) and IV (9 patients (2.9%)), respectively. Right hepatectomy with caudate lobectomy was performed in 156 patients (50.6%) and Left hepatectomy with caudate lobectomy was performed in 69 patients (22.4%). R0 resection performed 197 patients (64%) and R1 resection performed 111 patients (36%). Combined portal vein resection was carried out in 28 patients (9.1%) and hepatic artery resection was carried out in 3 patients. Adjuvant chemotherapy was performed in 138 patients (44.8%) and among them, 69 patients underwent concurrent chemoradiation therapy (CCRT). There were 5 mortality cases (1.0%) due to bleeding or liver failure after surgery. The overall 1-, 3-, and 5-year survival rates were 84.6, 43.4 and 29.3% in the R0 group and 82.9, 43.1 and 28% in the R1 group, respectively. There were no significant difference in overall survival rates between R0 group and R1 group. (p=0.732). The five year survival rates of stage I + II were 41.2% and stage III-A were 29.5%, stage III-B were 13.1%. Multivariate analysis showed lymph node metastasis (p<0.001), lympho-vascular invasion (p=0.011) and histologic differentiation were independent prognostic predictors of patient survival. (Conclusion) Conclusion: The surgery with hepatic resection including major hepatectomy in PC was feasible and showed acceptable survival outcomes. Patients who had lymph node metastasis and/or poorly differentiated histology, more aggressive adjuvant therapy should be considered.

Effects of Intraperitoneal CO2 Concentration on Postoperative Pain after Laparoscopic Cholecystectomy

Department of Surgery, Soonchunhyang University Cheonan Hospital, Department of Anesthesiology and pain Medicine, Soonchunhyang University Cheonan Hospital, Korea

Hae Il Jung, Hyoung Uk Lee, Hyunjung Kim, Ji Won Chung*, Sang Ho Bae

(Purpose) It has been reported that referred pains such as shoulder pains are improved with normal saline washing during laparoscopic cholecystectomy. In addition, the correlations between the pains and an intraperitoneal CO2 concentration were reported. So we measured the postoperative intraperitoneal CO2 concentrations by CO2 concentration measuring instrument as groups of control, normal saline 1L washing and normal saline 2L washing. Finally, we show the correlations between the intraperitoneal CO2 concentration and postoperative pain after laparoscopic cholecystectomy. (Methods)
We studied on 101 patients between 18~65-year-old with ASA score 1~2. Group 1 was set as the ordinary operative method without normal saline washing, group 2 as with normal saline 1L washing and group 3 as with normal saline 2L washing. We washed the peritoneal cavity with normal saline after removal of gall bladder, and measured CO2 concentration by inserting the measuring instrument through the port that was inserted for the operation. We evaluated the pain by VAS at 6 hours, 12 hours and 24 hours after the operation.

**Results** The intraperitoneal CO2 concentrations were decreased to 1016.0 + 960.3 ppm in group 1, 524.5 + 383.2 ppm in group 2, 362.2 + 293.6 ppm in group 3, respectively. The intraperitoneal CO2 concentration decrease significantly were in both group 2 and 3. VAS, which is postoperative pain score, was decreased significantly in group 3 after 6 hours, in both group 2 and 3 after 12 hours, but showed no difference among 3 groups after 24 hours. **Conclusion** Although pains at 6 and 12 hours after the operation, which are correlated with the pain on the day of operation, were decreased significantly in the normal saline washing groups, did not show difference among 3 groups after 24 hours. The causal relations between volume of normal saline washing and intraperitoneal CO2 concentration, and between normal saline washing and pain relief on the day of operation are statistically significant, respectively.

**Table 1.** Clinical characteristics and comparison of VAS

<table>
<thead>
<tr>
<th></th>
<th>Group1</th>
<th>Group2</th>
<th>Group3</th>
<th>p-value†</th>
<th>post-hoc§</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>(N=32)</td>
<td>(N=34)</td>
<td>(N=35)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sex, n/N (%)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
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<td>14.0</td>
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<td>Female</td>
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<td>21.0</td>
<td>21.0</td>
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<td></td>
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</tr>
<tr>
<td>1</td>
<td>23.0</td>
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<td>2</td>
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<tr>
<td>ing</td>
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<td>total_vol</td>
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<td>tridual</td>
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<tr>
<td>eo2</td>
<td>1016.0</td>
<td>362.2</td>
<td>362.2</td>
<td>*0.000 G1&lt;G2&lt;G3</td>
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<tr>
<td>vas1</td>
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<td>4.4</td>
<td>4.4</td>
<td>*0.000 G1=G2&lt;G3</td>
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<tr>
<td>vas2</td>
<td>4.4</td>
<td>3.4</td>
<td>3.4</td>
<td>*0.001 G1&lt;G2=G3</td>
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</tr>
<tr>
<td>vas3</td>
<td>3.3</td>
<td>2.3</td>
<td>2.3</td>
<td>*0.001 G1=G2=G3</td>
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</table>

†p-value by one-way ANOVA test
§p-value by kruskall-wallis test
†p-value by chi-squared test
§p-value adjusted by Turkey HSD

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**IOP07-7**

**The Oncologic Impact of Lymph Node Dissection for Intrahepatic Cholangiocarcinoma: A Propensity Score Matched Study**

Division of Hepatobiliopancreatic Surgery, Department of Surgery, Yonsei University College of Medicine, Severance Hospital, Korea

**Sung Hyun Kim, Dae Hoon Han, Gi Hong Choi, Kyung Sik Kim*, Jin Sub Choi**

(Purpose) Surgical resection has been shown to improve long-term survival for patients with intrahepatic cholangiocarcinoma (ICC). Although, the impact of lymph node (LN) metastasis is known, the benefit of lymph node dissection is still controversial. The aim of this study is to examine the oncologic impact of lymph node dissection on
From January 2000 to December 2014, 148 medical records of the patients who underwent curative resection for ICC were retrospectively reviewed. The patients were divided by extent of lymph node dissection. LN dissection was defined as containing LN 8, 12, 13 regardless of retrieved LN. If not containing the whole range of LN, it was considered LN sampling. 34 patients underwent no dissection, 41 patients underwent LN sampling and 73 patients underwent LN dissection.

Propensity score matching generated a matched composed of 68 patients. (No dissection group, n=34 and LN dissection group, n=34) Disease free survival (DFS) and overall survival (OS) were analyzed. (Results) At baseline, the LN dissection group showed more aggressive tumor characteristics. (Lymph vascular invasion: No dissection vs. LN dissection, 43.2% vs. 70.8%, p=0.015; Perineural invasion: No dissection vs. LN dissection, 16.2% vs. 42.7%, p=0.014; T stage: p=0.014) In the propensity score-matching, baseline characteristics did not differ between the two groups. In survival analysis, there was marginal significant difference between two group in DFS (No dissection vs. LN dissection: 20.0 months (4.2-35.8) vs. 64.0 months (27.3-120.8), p=0.077) In OS analysis, LN dissection group was superior to No dissection group. (No dissection vs. LN dissection: 44.0 months (31.1-56.9) vs. 120.0 (51.1-188.9), p=0.027) 

(Figure) (Conclusion) Hepatic resection with LN dissection could improve oncologic outcome for ICC.
operation time: \( p=0.764 \), hospital stay: \( p=0.0.062 \), and intraoperative blood loss: \( p=0.574 \), however, age of nSILC was younger than that of TPLC \( (p=0.047) \). **(Conclusion)** In our study, there were no significant differences in surgical outcomes. However, nSILC group was younger than TPLC group, this result was thought that the number of performed cases were small. There was no case of intra-operative and post-operative complications. A single incision laparoscopic cholecystectomy performed by resident merits training under experienced supervisor surgeon. This training could improve the skill and help encourage the motivation of resident surgeon.

**Table 1.** Demographics and surgical outcome of nSILC and TPLC.

<table>
<thead>
<tr>
<th></th>
<th>nSILC</th>
<th>TPLC</th>
<th>P value</th>
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</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>48.6±11.9</td>
<td>55.6±15.1</td>
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<tr>
<td>Male (n,%)</td>
<td>9 (36.0%)</td>
<td>25 (46.3%)</td>
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<tr>
<td>BMI (Kg/m²)</td>
<td>24.5±364</td>
<td>25.2±41</td>
<td>0.491</td>
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<tr>
<td>Diagnosis</td>
<td></td>
<td></td>
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<tr>
<td>GB stone</td>
<td>21 (84.0%)</td>
<td>38 (70.4%)</td>
<td></td>
</tr>
<tr>
<td>Acute cholecystitis with or without GB stone</td>
<td>1 (4.0%)</td>
<td>9 (16.7%)</td>
<td></td>
</tr>
<tr>
<td>GB polyp</td>
<td>3 (12.0%)</td>
<td>3 (5.6%)</td>
<td></td>
</tr>
<tr>
<td>GB adenomyomatosis</td>
<td>0</td>
<td>1 (1.9%)</td>
<td></td>
</tr>
<tr>
<td>Etc.</td>
<td>0</td>
<td>3 (5.6%)</td>
<td></td>
</tr>
<tr>
<td>Stone number</td>
<td>7.7±12.6</td>
<td>5.3±8.1</td>
<td>0.305</td>
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<tr>
<td>CVS time</td>
<td>27.3±11.9</td>
<td>24.1±12.4</td>
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<td>Main procedure time</td>
<td>45.3±15.2</td>
<td>43.9±15.9</td>
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<tr>
<td>Skin to skin time</td>
<td>69.3±18.3</td>
<td>68.6±21.4</td>
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<tr>
<td>Total operation time</td>
<td>89.3±19.4</td>
<td>87.6±21.0</td>
<td>0.764</td>
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<tr>
<td>Hospital stay</td>
<td>2.0±0.2</td>
<td>2.2±0.5</td>
<td>0.062</td>
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<tr>
<td>Blood loss</td>
<td>9.1±11.2</td>
<td>7.6±5.0</td>
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</table>

**IOP07-9**

The Modified Duct-to-Mucosa Pancreateicojejunostomy for Small Pancreatic Duct During Pancreatectoduodenectomy

Division of Hepato-biliary Pancreas Surgery and Abdominal Organ Transplantation, Department of Surgery, Catholic University of Daegu College of Medicine, Korea

**Joo Dong Kim, Dong Lak Choi***

**(Purpose)** Postoperative pancreatic fistulas (POPFs) due to anastomotic leak are always closely related to significant morbidity and mortality following pancreatectoduodenectomy (PD). In addition, small pancreatic duct was occasionally considered as the risk factor for POPF after PD. The aim of this study is to introduce modification of the conventional duct-to-mucosa (DM) pancreateicojejunostomy (PJ) and the improved outcomes of this modified PJ technique for small main pancreatic duct. **(Methods)** The modified DM anastomosis is characterized that matching internal stent was inserted into the pancreatic duct remnant and secured with suture at the opening of the pancreatic duct to enhance sealing, prior to the anastomosis. From January 2012 to June 2016, 86 patients underwent PD for small main pancreatic duct \( (\leq 3\text{mm}) \). In total, 33 patients received conventional DM pancreateicojejunostomy and 53 patients received modified DM pancreateicojejunostomy. The clinicopathological features and surgical outcomes of the two groups were compared, with focusing on POPF. **(Results)** The operation time, postoperative stay time, diet resumption time and timing of drain removal in the modified DM group were significantly lower than those in conventional DM group. The overall incidence of POPFs was not significantly different between two groups. But, the clinical POPFs (grade B/C) in the modified DM group occurred less frequently than those in the conventional DM group. \( (1.9\% \text{ vs. 15.2\%, } p=0.019) \). Moreover, no grade C POPF occurred in the modified DM group. **(Conclusion)** The modified DM anastomosis technique in our study is a safer anastomotic method than the traditional DM pancreateicojejunostomy technique. This new technique could effectively reduce the incidence of POPF.
Annual Congress of KSS 2016

68th Annual Congress of the Korean Surgical Society

Integrated Oral Presentation 8

Date. Saturday, November 5, 2016
Venue. Dongkang Hall B, 3F, Avenue

Moderators:
Kang Young Lee (Yonsei Univ.),
Jeong Yoon Song (Kyung Hee Univ.)
IOP08-1

Long Noncoding RNA SNAR Regulates Proliferation, Migration, and Invasion of Triple Negative Breast Cancer Cells

Department of Surgery, Kyungpook National University School of Medicine, 1Department of Hemato-Oncology, Kyungpook National University School of Medicine, 2Cell and Matrix Research Institute, Kyungpook National University School of Medicine, Korea (*The following authors equally contributed to this work.)

Jeeyeon Lee, Ho Yong Park, Wan Wook Kim, Soo Jung Lee¹, Jae-Hwan Jeong², Seung Hee Kang², Jin Hyang Jung*, Yee Soo Chae¹

(Purpose) Long noncoding RNAs (lncRNAs), a new class of transcript, have recently been revealed to be widely transcribed in the human genome. However, the details of the function and mechanism of action of most lncRNAs in breast cancer remain unknown. In this study, we evaluated the role of an lncRNA, snaR, which was up-regulated in breast cancer cell lines and we also determined the lncRNA expression in breast cancer cell lines by quantitative RT-PCR. (Methods) Long noncoding RNAs (lncRNAs), a new class of transcript, have recently been revealed to be widely transcribed in the human genome. However, the details of the function and mechanism of action of most lncRNAs in breast cancer remain unknown. In this study, we evaluated the role of an lncRNA, snaR, which was up-regulated in breast cancer cell lines and we also determined the lncRNA expression in breast cancer cell lines by quantitative RT-PCR. (Results) Of 90 lncRNAs which were performed a screening study for breast cancer cells, E2F4 antisense, IGF2AS, snaR, SNHG5 were up-regulated in MDA-MB-231 (triple negative breast cancer cells) and the 7SK, ANRIL, IGF2AS, Nespas, p53 mRNA and snaR were up-regulated in MCF-7 (estrogen-receptor positive breast cancer cells). However, the BC200, lncRNA-SFMBT2, MEG9, NTT, UCA1, Y RNA-1 were down-regulated in MDA-MB-231 and lncRNA-SFMBT2, Y RNA-1 were down-regulated in MCF-7 breast cancer cell line. And a specific siRNA could down-regulate the expression of snaR in MDA-MB-231 cells with statistical significance. With this down-regulated snaR inhibited the proliferation, migration and invasion of MDA-MD-231 breast cancer cells. (Conclusion) The lncRNA snaR was found to be upregulated in MDA-MB-231 cells, but the proliferation, migration, and invasion of these cells were significantly suppressed by its knockdown. Therefore, snaR knockdown has potential as a treatment modality for triple-negative breast cancer.

IOP08-2

The Comparison with Two Detecting Methods of BRAFV600E Mutation

Department of Surgery, Seoul National University Hospital and College of Medicine, 1Department of Surgery, Seoul National University Bundang Hospital and College of Medicine, 2Department of Surgery, Seoul National University Boramae Hospital, Korea

Jong-Kyu Kim, Chan Yong Seong, In Eui Bae¹, Jin Wook Yi, Hyeong Won Yu¹, Su-Jin Kim, Young Jun Chai², June Young Choi¹, Kyu Eun Lee*

(Purpose) The recently discovered activating mutation in BRAF represents the most common genetic alteration in papillary thyroid cancer (PTC). Most methods for detecting the BRAF mutation are based on polymerase chain reaction (PCR). Recently, immunohistochemical (IHC) visualization of the mutant BRAFV600E protein using a mutation-specific antibody was shown to have high sensitivity and specificity. In this study, we analyzed the concordance between the IHC method and a direct sequencing method, and evaluated the clinical usability of IHC for detecting the BRAF mutation in PTC patients. (Methods) This study included 126 patients who underwent primary thyroidectomy for PTC and clinically observed between 2013 November and 2016 May at Seoul National University Hospital. All tissue specimens underwent IHC and direct sequencing. We analyzed this data retrospectively. (Results) Overall concordance between IHC and direct sequencing was 95.2% (120/126). Six PTC samples showed IHC weak + or strong +, but were negative for the BRAF V600E
mutation by direct sequencing. The sensitivity and specificity of the IHC were 100% (110/110) and 72.7% (16/22), respectively. Positive predictive value and negative predictive value of the IHC were 94.5% (104/110) and 100% (16/16), respectively. No false negative were detected with IHC tests. **(Conclusion)** The IHC test is a reliable, highly sensitive method for detection of the BRAFV600E gene mutation in PTC. Therefore, it can alternate with PCR based tests.

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### IOP08-3

**Vitamin D Inhibit the Growth of Papillary Thyroid Cancer Stem-Like Cells**

Department of Surgery, Korea University College of Medicine Guro Hospital, 1Ansan Hospital, 2Anam Hospital, Korea

**Woo Young Kim, Jae Bok Lee**,  
**Seong Hoon Lee, Sang Uk Woo**,  
**Gil Soo Son**,  
**Hoon Yub Kim**,  
**Jeong Won Bae**

**Purpose** An anti-proliferative effect of vitamin D has been reported in different carcinomas. Several studies show that vitamin D can be used as a powerful tool to elucidate novel pathways that are crucial for cancer stem cell activity. We addressed the question as to whether cancer stem cells derived from the papillary thyroid carcinoma cell lines SNU790. **(Methods)** The effect of vitamin D on growth of SNU790 cell lines was investigated by cell viability assays. Furthermore, the role of vitamin D in the formation of cancer thyrospheres were analysed. **(Results)** Vitamin D inhibited proliferation of papillary thyroid carcinoma cells with a more pronounced effect on higher concentration of vitamin D, and it significantly reduced the capacity to form stem cell-derived spheres and decreased the size of these spheres. Finally, vitamin D altered morphology of cancer stem cells. **(Conclusion)** Vitamin D inhibited the growth of cancer stem-like cell derived from papillary thyroid cancer cells.

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### IOP08-4

**A RET D898Y Germline Mutation in a Korean Family with Pheochromocytoma**

Department of Surgery, Seoul National University Hospital and College of Medicine, 1Department of Surgery, Seoul National University Boramae Medical Center, 2Department of Surgery, Seoul National University Bundang Hospital and College of Medicine, 3Department of Laboratory Medicine, Seoul National University Hospital, Seoul National University College of Medicine, Korea

**Chan Yong Seong, Jin Wook Yi, Hye In Kang, Jong Kyu Kim, In Eui Bae**,  
**Hyeong Won Yu**,  
**Su-Jin Kim, Young Jun Chai**,  
**June Young Choi**,  
**Moon-Woo Seong**,  
**Kyu Eun Lee**,  
**Sung Sup Park**

**Purpose** Pheochromocytoma and paraganglioma are tumors of neuroectoderm origin. Up to 40% of patients with these tumors have germline mutations in known susceptibility genes, one of which, RET, is associated with multiple endocrine neoplasia type 2 (MEN2, pheochromocytoma, medullary thyroid carcinoma, and hyperparathyroidism). We discovered a germline mutation in exon 15 of RET, c.2692G>T (D898Y), in a patient with pheochromocytoma, and her two asymptomatic sons and older sister. **(Methods)** A 49 years old female patient came to our clinic presenting with right adrenal gland mass, detected in healthcare exam. Her mother and two sisters had history of thyroidectomy due to papillary thyroid carcinoma. VMA and other catecholamine levels were elevated in 24-hour urine analysis and imaging study revealed right adrenal mass. She received laparoscopic adrenalectomy. **(Results)** Final pathologic diagnosis was pheochromocytoma. Mutation test identified a p.D898Y mutation in RET gene of the index patient. After genetic counseling of the patient and her relatives, same RET gene mutation was detected in patient’s older sister and two sons. Still, they had not been developed MEN2 related tumors in three year’s surveillance. **(Conclusion)** This is the first description of this mutation in a family with pheochromocytoma and expands the mutational spectrum of MEN2. Genetic counseling and mutation screening are important for proper management of pheochromocytoma or paraganglioma patients.
IOP08-5

Evaluation of PRMT6 as a Therapeutic Target and a Prognostic Marker for Colorectal Cancer

Department of Surgery, Samsung Medical Center, Sungkyunkwan University, School of Medicine, Korea

Yongchul Lim, Heecheol Kim*

(Purpose) Colorectal cancer (CRC) is one of the most common diagnosed cancers and the fourth most cause of cancer deaths in the world. Nevertheless, molecular pathogenesis of CRC is heterogeneous and remains poorly understood. Protein arginine methyltransferase 6 (PRMT6) is one of the major PRMTs and known to localize exclusively in the nucleus. Recently, the enzyme is known to repress tumor suppressor genes such as p21waf1/CIP1 and p53 through methylating histone H3 Arg 2. In addition, PRMT6 is up-regulated in breast, cervix, bladder, prostate and lung cancers. Depletion of the enzyme in a subset of cancer cell lines suppresses viability and growth, and induces cellular senescence. However, expression level of PRMT6 in CRC tissues or the effect of the enzyme on CRC cell proliferation and apoptosis has not been studied.

(Methods) We retrospectively reviewed a total of 524 patients who were diagnosed as pathologic stage II, IIIA or IIIB after surgery of primary tumor, and divided them into two groups according to PRMT6 positivity by immunohistochemistry. Then, we analyzed and compared the clinicopathologic data and survival between PRMT6 expression and non-expression groups. To investigate the effect of PRMT6 on cell proliferation, colony formation and apoptosis of colon cancer cells, RNAi technology was applied.

(Results) We found an expression of PRMT6 in 23.7% of the carcinomas by immunohistochemistry at the nucleus. Among the clinicopathologic parameters, the ratio of poorly differentiated cancer cells was about two-fold higher in PRMT6-positive patients than in PRMT6-negative ones (p=0.002). In addition, patients with PRMT6-positive colorectal carcinomas had a significant more recurrence and lower disease free survival than patients with PRMT6-negative carcinomas in both univariate and multivariate analyses (p=0.018 and p=0.035, respectively). When PRMT6 expression was down-regulated by siRNA transfection in CRC cells, cell proliferation and colony formation was significantly inhibited with the increased expression of p21, compared to those transfected with the negative control siRNA. Furthermore, FACS analysis showed that knockdown of PRMT6 promoted the cell apoptosis.

(Conclusion) Our data suggest that PRMT6 can be a potential indicator of unfavorable prognosis as well as a therapeutic target for colon cancer.

IOP08-6

RUNX3 Inhibits Metastasis and Angiogenesis in Colorectal Cancer

Division of Colorectal Surgery, Department of Surgery, Division of Oncology, Department of Internal Medicine, Korea University Guro Hospital, Korea

Young Hyun Na, Sung Yup Joung, Sang Hee Kang, Sun Il Lee, Byung Wook Min*, Dae Hee Lee1, Sang Cheul Oh1

(Purpose) The runt-related transcription factor (RUNX) family consists of RUNX1, RUNX2, and RUNX3, which play an important role in cell proliferation and tumorigenesis. Among them, RUNX3, in particular, has been shown to play a tumor suppressor role in several cancers and its expression levels are down-regulated in tumor tissues. Recent studies proved that an inactivation of RUNX3 expression is highly associated with lymph node metastasis and poor prognosis in various cancer types. However, the mechanism of RUNX3-mediated suppression of tumor metastasis remains unclear. Herein, we aimed to clarify the effect of RUNX3 on metastasis and angiogenesis in colorectal cancer (CRC).

(Methods) We retrospectively reviewed a total of 524 patients who were diagnosed as pathologic stage II, IIIA or IIIB after surgery of primary tumor, and divided them into two groups according to PRMT6 positivity by immunohistochemistry. Then, we analyzed and compared the clinicopathologic data and survival between PRMT6 expression and non-expression groups. To investigate the effect of PRMT6 on cell proliferation, colony formation and apoptosis of colon cancer cells, RNAi technology was applied.

(Results) First, we found that the reduction of
expression of RUNX3 in CRC tissues when compared with tumor adjacent normal colon tissues, as indicated by reduced RUNX3 staining, was significantly correlated with TNM stage. Second, we demonstrated that RUNX3 overexpression inhibited CRC cell migration and invasion resulting from the elevated upregulation of matrix metalloproteinase-2 and -9 (MMP-2 and MMP-9) expression. In contrast, the knockdown of RUNX3 reduced the inhibition of migration and invasion of CRC cells. Last, we found that restoration of RUNX3 decreased vascular endothelial growth factor (VEGF) secretion and suppressed endothelial cell growth and tube formation in CRC cells. (Conclusion) Our study revealed that the tumor suppressor gene RUNX3 was inactivated by promoter methylation in CRC cell lines and primary CRC tissues. Restoration of RUNX3 inhibition suppresses cell invasion and migration, but has no effect on cell proliferation. Consequently, these findings show that the knockdown or restoration of RUNX3 presents a possible means of inhibiting angiogenesis or metastasis and of inhibiting CRC progression. Our data demonstrated that RUNX3 may provide insights into the development of RUNX3 for CRC metastasis diagnostics and therapeutics.

**IOP08-7**

**Expression and Clinical Significance of the Lymphocyte Antigen 6 Complex Locus (LY6E) in Colorectal Cancer**

Department of General Surgery, Soonchunhyang University, Korea

Taesung Ahn, Hyun Yong Lee, Dong Hee Cho, Young Ju Kim, Jee Hyun Ahn, Jong Hyuck Yun, Moo-Jun Baek*

(Purpose) Lymphocyte antigen 6 complex locus (LY6E) is a glycosylphosphatidylinositol (GPI)-linked cell-surface protein that is induced by Interferon (IFN). LY6E mRNA was found to be overexpressed in colon cancer (CRC) suggesting a role in carcinogenesis. However, function of LY6E remains largely unknown. The aim of this study was to define the role and clinical relevance of LY6E in colon cancer. (Methods) A total of 101 tissue samples were obtained from surgically resected specimens from patients with CRC in Soonchunhyang University Cheonan Hospital between January 2002 and December 2009. The expression of LY6E were examined by immunohistochemistry. The expression of LY6E and clinical factors including survival were analyzed. We also investigated the functional study of LY6E using colon cancer cell lines. (Results) The seventy-three of 101 (72.3%) tissues from patients with CRC had LY6E expression. We found LY6E is associated with advanced pathologic stage (P=0.004) and positive lymph node status (P=0.027) in patients with CRC. Most notably, patients with LY6E overexpression showed a significantly worse prognosis after surgery (P=0.034). Functional analysis revealed LY6E-depleted cancer cells exhibited markedly reduced migration and invasion ability in vitro (P<0.05). (Conclusion) Altogether, our results imply that LY6E is a marker of poor prognosis in CRC and may be a promising target for cancer treatment.

**IOP08-8**

**Therapeutic Effect of Ultrasound Targeted Destruction of Echogenic Nanobubbles Containing Doxorubicin in Rat Liver**

Department of General Surgery, St. Paul Hospital, Catholic Medical University, 1Department of General Surgery, Bucheon St. Mary's Hospital, Catholic Medical University, Korea

Jung Hyun Park, Il Young Park1*

(Purpose) Ultrasound is widely used diagnostic medical imaging modality, Recently its therapeutic potential was reported for several decades. Microbubbles and nanobubbles were used for ultrasound-targeted destruction in order to therapeutic drug delivery. This study is designed to find the most effective frequency and duration of ultrasound for doxorubicin delivery on the rat liver under ultrasound targeted nanobubble destruction. (Methods) Rats weighing 200 to 250gm were underwent intravenous nanobubble injection via caudal vein. Ultrasound probe was applied to rat liver location to ultrasound targeting for nanobubble
destruction. Experiment were divided by frequency and duration of ultrasound irradiation. In frequencies, experimental group were divided as control group, 5MHz group, 10MHz group and 13MHz group. By the duration of ultrasound irradiation, experimental group were divided as control group, 15 minutes group and 30 minutes group. The animals were sacrificed and organs(liver, kidney, heart, lung) were extracted and fluorescence images were acquired by IVIS® system. Laboratory test including serum AST, ALT, total bilirubin and creatinine were checked.

(Results) Under ultrasound irradiation, the more nanobubbles were destroyed and doxorubicin uptake was increased with statistically significant difference at rat liver.(p<0.05) In frequencies, 5MHz group showed increased fluorescence efficiency of the liver with statistically significant difference between groups.(p<0.05) By the duration of ultrasound irradiation, ultrasound applied groups showed increased fluorescence efficiency of the liver with statistically significant difference against control group.(p<0.05) Other organs did not show any significant differences against control group. Ultrasound applied groups showed increased Serum AST and ALT levels. However the effects did not last 30 minutes.

(Conclusion) We found that ultrasound targeted nanobubble destruction was effective on rat liver for doxorubicin delivery. The most effective ultrasound frequency was 5MHz and duration of ultrasound irradiation was 15 minutes for drug delivery by ultrasound targeted nanobubble destruction.

IOP08-9

Pharmacologic Properties of Anticancer Drugs Mixed in the Lipid Solution for Hyperthermic Intraperitoneal Chemotherapy: Comparative Analyses Between Mitomycin-C and Oxaliplatin in the Rat Model

Department of Surgery, Ajou University School of Medicine; 1Department of Surgery, Yonsei University College of Medicine; 2Yonsei Institute of Pharmaceutical Sciences, Yonsei University, Korea

Eun Jung Park, Seung Hyuk Baik1,*, Junhyun Ahn2, Sang Won Gwak2, Seung Yeop Oh, Kwang Wook Suh, Sung-Joo Hwang2

(Purpose) Mitomycin-C (MMC) has been widely used for hyperthermic intraperitoneal chemotherapy (HIPEC) in patients with colorectal cancer with peritoneal carcinomatosis. However, oxaliplatin was regarded as an inadequate drug for intraperitoneal chemotherapy because it has a short half-life and rapid absorption rate to the blood flow compared with MMC. In this study, we hypothesized that the absorption rates of anticancer drugs into the peritoneum can be changed by controlling properties of HIPEC solution because drug solubility and distribution can be affected by the partition coefficient between the water and lipid layer of the HIPEC solution. Therefore, we aimed to investigate the pharmacologic properties between MMC and oxaliplatin when it is mixed in the water or lipid solution during HIPEC.

(Methods) In this study, HIPEC was performed in 25 Sprague Dawley rats for 60-90 minutes in 42-43°C temperature. Oxaliplatin 460mg/m² or MMC 35mg/m² were mixed in the HIPEC solution, which was composed of 300ml of 1.5% dextrose peritoneal dialysis solution (Dianeal,® n=3) or 20% purified soybean lipid solution (Lipision,® n=3). Oxaliplatin was mixed in the 300ml of 5% dextrose solution additionally (n=3). MMC was inserted three times as the following doses: 17.5mg/m² at 0 minute, and 8.8mg/m² at 30 and 60 minutes after HIPEC. On the other hand, oxaliplatin was inserted at once at the beginning of
HIPEC. All samples were pretreated by de-proteinization methods for high-performance liquid chromatography (HPLC). The concentration (Cmax) and the area of under the curve (AUC) in the peritoneal fluid and plasma were analyzed by tandem mass spectrometry and Inductively coupled plasma mass spectrometry (ICP-MS). (Results) The Cmax ratio (peritoneal fluid vs. blood) of MMC was 351.8 in the dianeal solution and 325.0 in the lipid solution. Meanwhile, the Cmax ratio of oxaliplatin was 6.8 in the dianeal solution, 4.7 in the 5% dextrose solution, and 9.3 in the lipid solution. According to the ratio of AUC between peritoneal fluid and blood, AUC ratio of MMC was 410.8 in the dianeal solution and 398.5 in the lipid solution. On the other hand, AUC ratio of oxaliplatin was 11.5 in the dianeal solution, 7.9 in the 5% dextrose solution, and 16.5 in the lipid solution. (Conclusion) Oxaliplatin had lower rates of both AUC and Cmax ratio than MMC. However, oxaliplatin mixed in the lipid solution showed more increased rate of AUC and Cmax than in the water solution. Therefore, these results can suggest that the controls of HIPEC solution can overcome the disadvantages of oxaliplatin for HIPEC. It is expected that the pharmacologic aspects of HIPEC solution can be used to make a long-acting oxaliplatin, which is more effective to treat patients with colorectal cancer with peritoneal carcinomatosis.
Annual Congress of KSS 2016

68th Annual Congress of the Korean Surgical Society

Integrated Oral Presentation 9

Date. Friday, November 4, 2016  
Venue. Geumkang Hall, 2F, Avenue

Moderators:  
Ji-Young Sul (Chungnam National Univ.),  
Seong Pyo Moon (Chosun Univ.)
Predictors for Necessity of Early Brain Computed Tomography in Trauma Patients Suspected Brain Injury

Department of Surgery, Division of Trauma and Critical Care, Yonsei University College of Medicine, Korea

Dae Hyun Cho, Jin Young Lee, Yeon Ju Lee, Rn, Seung Hwan Lee*

(Purpose) Brain computed tomography (CT) is a useful diagnostic tool to determine the presence and extent of injury in patients with suspected brain injury. However, it is still under debate whether brain CT scan should be performed early on minor head injury despite it may be time-consuming or unnecessary procedures. Thus, the aim of this study was to investigate indications for early CT scanning in suspected brain injury. (Methods) The medical records of 913 trauma patients with suspected brain injury during the primary or adjunct primary survey, between January 2013 and June 2016 were reviewed retrospectively. Patients were divided into two groups according to brain CT findings: the brain injured group (n=293) and the normal brain group (n=545). Multivariate logistic regression analysis was performed to determine predictors for necessity of early brain CT scanning in trauma patients suspected brain injury. (Results) Among the 913 patients, 838 underwent a brain CT. 293 (34.9%) patients had evidence of an acute traumatic intracranial lesion on brain CT. CT findings after trauma included combined brain injury (70.6%), subarachnoid hemorrhage (12.3%), subdural hemorrhage (8.5%), intracranial hemorrhage (5.8%) and epidural hemorrhage (2.8%) each alone. Multivariate logistic regression model demonstrated following factors need for brain CT scan in blunt trauma patients in secondary survey; GCS (<11) (odds ratio [OR] 0.704; 95% confidence interval [CI] 0.703-0.830; P<0.001), the presence of loss of consciousness (OR, 2.789; CI, 1.801-4.319; P<0.001), the presence of scalp laceration or hematoma (OR, 3.423; CI,2.120-4.959; P<0.001) (Conclusion) Scalp laceration or hematoma, GCS (<11) or loss of consciousness can be used as predictors for necessity of early brain CT scanning in trauma patients suspected brain injury.

Which Factor Does Affect the Recovery From Extreme Hyperbilirubinemia in Critically Ill Patients?

Department of Surgery, Critical Care Medicine, Samsung Medical Center, Sungkyunkwan University, Korea

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(Purpose) Extreme hyperbilirubinemia occurs rarely in critically ill patients. It is usually caused due to hepatic failure or cholestasis with various causes and has a dreadful clinical course without recovery. However, only a few reports are available regarding the clinical course or prognostic factors of extreme hyperbilirubinemia in critically ill patients. We evaluated the clinical course and various factors affecting the recovery and survival from extreme hyperbilirubinemia in critically ill patients. (Methods) A retrospective study was performed at a single center from 2006 to 2015. We defined extreme hyperbilirubinemia as a state of total bilirubin above 20 mg/dl and selected all patients whose serum total bilirubin increased above 20 mg/dl at least once during their stay in the intensive care unit. We investigated the overall clinical course of the patients and compared the differences between one group with normalization of total bilirubin (recovery group) and the other group without normalization (non-recovery group). Furthermore, we evaluated the association between prognosis and various clinical factors, including the peak total bilirubin levels, increasing rate of total bilirubin (Vi), results of laboratory analyses related to hepatic function, and clinical features at the time of extreme hyperbilirubinemia. These data were analyzed using Chi-square test and Cox and logistic regression analyses. (Results) In total, 610 patients experienced extreme hyperbilirubinemia. The mean age was 56.4±14.0 years. The number of recovery group was 46 (7.5%) and non-recovery group was 564 (92.5%). A high Vi, young age, and use of hepatotonic agents were identified as influential factors for the recovery from extreme hyperbilirubinemia, whereas obesity, diabetes mellitus, hypertension, and dyslipidemia were the unfavorable factors. The mortality...
rate was 86.89% of total patients, and there were no significant differences in mortality rate according to the highest level of total bilirubin. The Vi (95% CI 1.070-1.221, P<0.001), serum level of aspartate aminotransferase (95% CI 1.000-1.001, p=0.005) and lactate (95% CI 1.125-1.298, P<0.001), and use of vasoactive drugs (95% CI 1.014-1.943, p=0.04) were identified as significant risk factors for mortality, whereas the use of hepatotonic agents decreased the mortality risk (95% CI 0.610-0.887, p=0.001). **(Conclusion)** The mortality rate of patients with extreme hyperbilirubinemia was exceedingly high. This study identified the various factors related to the recovery and mortality from extreme hyperbilirubinemia. We expect that the results of this study will be helpful in treating and predicting the prognosis of patients with extreme hyperbilirubinemia.

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**IOP09-3**

**Delayed Diagnosis of Traumatic Diaphragmatic Injury: 22 Years of Experience in a Single Institution**

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**Dong Hun Kim, Jeongseok Yun,**

**Sung Wook Chang**

**(Purpose)** Diaphragmatic injury following blunt or penetrating trauma may be a missed diagnosis in an acute setting. The objective of this study is to better understand why diaphragmatic injury with delayed presentation and diagnosis are missed. **(Methods)** We reviewed, retrospectively, the medical records of 20 patients who underwent diaphragmatic repair for diaphragmatic injury, including simple laceration or rupture, with delayed diagnosis following blunt or penetrating trauma from 1995 to 2016. **(Results)** The mean age of the 20 patients at the delayed diagnosis was 42.5 years (range: 18-71 years). Male to female ratio was 9:1. Median duration between trauma and delayed diagnosis was 3 days (range: 1-744 days). Fourteen patients had left-sided diaphragmatic injuries. Diagnoses of diaphragmatic injury were confirmed in chest X-ray (N=5), computerized tomography (N=4), and incidentally during operation (N=11). Injury sites of the diaphragm were mostly lateral side (N=13). Thoracostomy for ipsilateral hemopneumothorax was performed in 10 patients. Eight patients of them were presented with massive hemothorax. Operative approaches were 18 thoracotomy and 2 laparotomy. Operative findings showed in 6 of the 20 patients that fractured rib segments caused diaphragmatic injuries. Mesh repair was utilized in one patient. The mean hospitalization time was 64.2 days (range: 8-387 days). There was one postoperative death. **(Conclusion)** A high clinical index of suspicion is needed to diagnosed and effectively manage diaphragmatic injury. This is particularly true when other signs of severe trauma are present such as multiple rib fracture and hemopneumothorax.

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**IOP09-4**

**Effects of Steroid Therapy on Brain-Dead Donors**

Department of Surgery, Ulsan University Hospital University of Ulsan College of Medicine, Korea

**Kyu-Hyouck Kyoung, Chan Woo Nam**, **Yan Won Nah, Min Ae Keum**

**(Purpose)** Steroid replacement in septic shock has been known to stabilize vital sign and to be a rescue therapy. Brain-dead patients are usually in shock state, and disturbance of hormonal axis makes the patient’s condition more aggravated. Hormonal resuscitation therapy has been known to increase the quality and availability of organs from brain-dead donors (BDDs) and steroid is one of the important regimen. Many brain-dead donors underwent high-dose steroid (HDS) therapy in initial phase of critical illness, then HDS therapy is finished by schedule or discontinuation of therapy. The purpose of this study was to investigate the influence of HDS on the organ function and the severity of BDD’s condition. **(Methods)** A retrospective analysis of BDDs between January 2010 and June 2016 was conducted. Based on the 48 hours from organ procurement, steroid therapy of
BDDs was categorized into continue and discontinue. The outcomes of continuation of steroid therapy were analyzed based on the last value including sequential organ failure assessment (SOFA) score, dose of vasopressors, total bilirubin, serum creatinine and the number of transplanted organs. **(Results)** A total of 41 BDDs were enrolled and continue group was 43.9% (n=18). Continue group showed significant better outcome in the last values of SOFA score (10.1 vs. 12.0, p=0.02), dopamine dose (226.7 ug/hr vs. 683.5 ug/hr, p=0.002) and total bilirubin (1.2 mg/dl vs. 2.4 mg/dl, p=0.004). Conversely, norepinephrine dose was higher in continue group (16.9 ug/hr vs. 5.4 ug/hr) and there was no difference in number of transplanted organs (p=0.304). **(Conclusion)** HDS therapy is conducted for diminishing brain damage. But if the patients deteriorate into brain death and organ donation is expected, steroid therapy should not be discontinued to preserve organ function and BDD’s condition.

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**IOP09-5**

**Predictors for Acute Kidney Injury in Major Blunt Trauma Patient**

Department of Surgery, Yonsei University College of Medicine, Korea

**Tae Hwa Hong, Jin Young Lee, Myung Jae Jung, Seung Hwan Lee, Jae Gil Lee**

**(Purpose)** The trauma patient suffers numerous harmful insults that may contribute to a risk of acute kidney injury (AKI). The aim of this study was to assess clinical characteristics and predictors of the AKI in major blunt injured patients. **(Methods)** From January 2011 to March 2013, a total of 283 trauma patients who over 16 of injury severity score were analyzed retrospectively. Patients were divided into two groups according to the presence of AKI. AKI defined by using the Kidney Disease: Improving Global Outcomes criteria diagnosed between admission and third hospital day. Initial clinical parameters and outcomes were compared. Regression analysis was performed to identify predictors associated with AKI development. **(Results)** Seventy seven patients developed AKI. Common cause of trauma developed AKI was falling (28, 36.4%) and pedestrian traffic accident (27, 35.1%). Overall Mortality rate of AKI patient was 35.5%. Statistically significant difference were observed between AKI group and non-AKI group in overall mortality rate (P<0.001). Injury severity score (P=0.024), Age (P=0.028), Medical history of hypertension (P=0.019), Revised trauma score (RTS) (P<0.001), Hypotension (<90mmHg) at admission (P<0.001) are showed statistically significant difference in univariate analysis. RTS (odds ratio [OR] 0.758; 95% confidence interval [CI] 0.635-0.904, P=0.002), Medical history of hypertension (OR, 2.246; 95% CI, 1.135-4.448, P=0.020), Hypotension (<90mmHg) at admission (OR of 2.700; 95% CI of 1.477-4.936, P=0.001) are identified as independent predictors for AKI in multivariate analysis. **(Conclusion)** AKI is common in severe injured patients and is associated with medical history of hypertension, Hypotension (>90mmHg) at admission and RTS. Traumatic AKI is more correlated with initial physiologic state of patient rather than severity of anatomical injury. Future studies should further define this process.

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**IOP09-6**

**Early Postoperative Small Bowel Obstruction after Laparotomy for Trauma: the Incidence and Risk Factors**

Division of Trauma Surgery, Department of Surgery, Chonnam National University Medical School, Korea

**Wu Seong Kang, Ji Woong Yeom, Young Goun Jo, Jung Chul Kim**

**(Purpose)** This study was performed to investigate the incidence and risk factors of Early Postoperative Small Bowel Obstruction (EPSBO) after laparotomy for trauma patients. **(Methods)** Consecutive patients who had undergone laparotomy for trauma were studied. EPSBO was defined as (1) the patient with sign and symptom of obstruction between postoperative days 7 and 30, or (2) obstruction occurring any time within 30
days and lasting more 7 days. **(Results)** In total, 297 patients met inclusion criteria. 72 (24.2%) patients developed EPSBO. There were more male patients in EPSBO group (88.9% vs. 71.1%, p=0.002). Patients with EPSBO received more intraoperative PRC (4[0-36] vs. 3[0-17], p=0.024), more intraoperative FFP (2[0-10] vs. 0[0-16]), and more intraoperative crystalloids (>3300ml) (51.4% vs. 37.3%, p=0.035). Multivariate logistic analysis showed male (OR 3.061, CI 1.379-6.795, p=0.006) and intraoperative PRC (OR 1.07, CI 1.011-1.133, p=0.020) as independent risk factors for EPSBO. But the incidence of adhesive small bowel adhesion after postoperative 30 days is not different. (5.6% vs. 5.3%, p=0.571). **(Conclusion)** After laparotomy for trauma patients, the incidence of EPSBO was 24.2% in our study. Male sex and intraoperative PRC transfusion were independent risk factors.

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**IOP09-7**

**Evaluation of the Necessity of Abdominal CT in Blunt Trauma Patients: What are Predictors for Selective Use of Abdominal and Pelvic CT?**

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**Jin Young Lee, Cho Dae Hyun, Jae Gil Lee, Yeon Ju Lee, Seung Hwan Lee**

**(Purpose)** In the evaluation of blunt trauma patients, computed tomography (CT) is very sensitive and specific diagnostic tool. However, radiation exposure, high costs, and time consumptions are make limitations in which patients should perform CT scan. The purpose of our study was to identify what are the predictors for selective use of abdominal and pelvic CT (APCT) in blunt trauma patients. **(Methods)** A retrospective chart review was performed during January 2013 to June 2016, and total 910 blunt trauma patients were enrolled who were age over 15, received primary and secondary survey according to the advanced trauma life support, and scanned APCT. The variables that collected in this study were initial vital signs, findings on physical examinations, initial simple radiologic findings, laboratory findings, and result of focused assessment with sonography for trauma (FAST), and compared between positive findings in APCT group (with PF) and without positive finding in APCT group (without PF). A multivariate logistic regression model was applied to determine independent predictors for abnormal APCT findings. **(Results)** A three hundred fifty six patients had positive findings in APCT. Emergency abdominal operations and mortality was significant higher in with PF group than in without PF group. Multivariate logistic regression model found 5 independent predictive factors for selective use of APCT in blunt trauma; pain in abdomen, back and pelvis (odds ratio [OR] 4.589; 95% confidence interval [CI] 2.752-7.650; P<0.001), peritoneal sign (OR, 5.413; CI, 1.324-22.133; p=0.019), abnormal chest x-ray finding (OR, 2.542; CI, 1.575-4.102; P<0.001), abnormal pelvis x-ray finding (OR, 27.799; CI, 14.561-53.074; P<0.001), abnormal FAST finding (OR, 7.745; CI, 3.206-18.708; P<0.001). **(Conclusion)** In the blunt trauma patients, pain in abdomen, back and pelvis, peritoneal sign, abnormal x-ray findings in chest and pelvis, and abnormal FAST findings might be useful in prediction for APCT.

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**IOP09-8**

**Do We Need to Repair Popliteal Vein Injury in Patients with Popliteal Artery Injury?**

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**Jayun Cho, Kenji Inaba**, Daniel Grabo, Elizabeth Benjamin, Lydia Lam, Kazuhide Matsushima, Aaron Strumwasser, Demetrios Demetriades

**(Purpose)** Popliteal artery (PA) injury is often associated with a popliteal vein (PV) injury. The outcomes associated with PV injury management in these combined injuries have not been clearly delineated. **(Methods)** This was a retrospective, 8-year (2007-2014) review of the NTDB including all patients with combined PA and PV injuries ≥18 years old. Exclusion criteria were transfer from out-
side hospital, death on arrival, other body region AIS ≥3, and other concomitant vascular injuries. We compared the rates of lower extremity (LE) amputation (below-the-knee or higher) in patients who underwent PV reconstruction versus ligation.

(Results) After exclusion, 568 patients had a combined PA and PV injury. Of these, there were 440 patients who underwent PA repair. Overall, median age was 31 (24-45) years, 88% were male, and 29% sustained blunt trauma. 4% had a Glasgow coma scale (GCS) <9, 17% a systolic blood pressure (SBP) <90 mmHg, and 7% an injury severity score (ISS) >15. Associated LE bone fracture was seen in 54% and associated LE nerve injury in 13%. Of the 440 patients undergoing PA repair, 173 (39.3%) patients also underwent PV repair. On univariate analysis the patients with a PV repair had a decreased LE amputation rate compared to those with PV ligation (9.2% vs 14.2%, p=0.12). Multivariate analysis showed no statistically significant difference (adj p=0.53, OR=0.80 [0.39-1.62]) after adjustment for age, injury mechanism, GCS on arrival, SBP on arrival, ISS, and associated LE bone fracture and nerve injury. (Conclusion) The repair of popliteal vein injury does not decrease the lower extremity amputation rate in patients with combined popliteal artery and vein injuries. Prospective validation of these findings is warranted.

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IOP09-9

Clinical Characteristics and Injury Pattern of Geriatric Trauma Patients

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Tae Hwa Hong, Myung Jae Jung, Seung Hwan Lee, Jae Gil Lee*

(Purpose) The social activities of the aging population have increased, which has also increased the number of elderly patients injured. The aim of this study is to analyze the characteristics of elderly patients involved in trauma. (Methods) This study was conducted retrospectively from January 2014 to April 2016 among trauma patients. The patients divided in two groups, a geriatrics group and an adult group on the basis of an age of 65. Patients under 18 years of age were excluded. The variables related with trauma were extracted and examined. (Results) A total number of 613 patients were included in this study. Among them, 128 patients were classified as the geriatric group. There were differences in sex, mechanism of injury, injury severity score (ISS), trauma and injury severity score, and mortality rate between the two groups. The geriatric group had a higher rate of female than the adult group (p=0.01). The most common mechanism of injury in the adult group was driver traffic accident (23.9%). In the geriatric group, pedestrian traffic accident (44.5%) was the most common mechanism. The average ISS of geriatric group was higher than that of adult group (17.3±11.42 vs. 14.0±11.17, p=0.003). The mortality rate was higher in geriatric group (14.8%) than in adult group (5.4%) (p=0.001). (Conclusion) The geriatric group was more severely injured and prone to pedestrian traffic accident than the adult group. This result showed that the geriatric group should be needed additional clinical considerations and national scale studies of traffic system.
Annual Congress of KSS 2016
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Date. Saturday, November 5, 2016
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Moderators:
Oh Jung Kwon ((Hanyang Univ.),
Ki Hyuk Park (Daegu Catholic Univ.)
Early and Long-term Outcomes of Conventional Patch or Eversion Carotid Endarterectomies

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Sujin Park, Deokbi Hwang, Hyung-Kee Kim, Yongwon Kim1, Yangha Hwang1, Seung Huh*

(Purpose) We report the comparison of early and long-term outcomes after conventional patch carotid endarterectomy (PCEA) or eversion carotid endarterectomy (ECEA). (Methods) We reviewed retrospectively consecutive atherosclerotic carotid artery stenosis patients who underwent CEA from July 2007 to August 2016. For early outcomes assessment, we analyzed postoperative new brain lesions (NBLs), nerve injury, and major adverse events (MAEs) such as perioperative death, stroke, and myocardial infarction. We also evaluated survival rate, and restenosis during the follow-up period. (Results) Among 155 consecutive patients (mean age, 66.4±7.7 years, male 85%), 95 PCEA and 60 ECEA were performed. Symptomatic patients were 76% (PCEA, 75% vs. ECEA, 77%) and majority of patients (132, 85%) had severe (70%~99%) stenosis (PCEA, 82% vs. ECEA, 90%). There was no significant differences in medical (PCEA, 8% vs. ECEA, 8%) and anatomic (PCEA, 10% vs. ECEA, 7%) high risk patients. In the PCEA group, there were statistically more patients with shunt placement (88% vs. 2%) because majority of PCEA (85, 89%) were performed under general anesthesia. Operative time was slightly longer in PCEA group (157.3±34.2 minutes vs. 144.4±34.5 minutes). There was one postoperative stroke with right hand weakness, and bleeding or hematoma in 5 (3%), headache or dizziness in 10 (6.5%), and temporary nerve injury in 4 (2.6%) patients. NBLs occurred in 15% of patients (PCEA, 18% vs. ECEA, 10%). The risk factors for NBLs were symptomatic patients (96% vs. 73%, p=0.016), late CEA after 2 weeks from symptom development (74% vs. 26%, p=0.012), and ulcerative plaque (74% vs. 47%, p=0.023) in the univariate analysis. Among them letter two factors were significant in the multivariate analysis also. During the follow-up period, 9 deaths occurred and 3 restenosis over 30% in diameter were found. There was no statistical difference in the survival rate between PCEA and ECEA group (100%, 97.5% and 97.5% vs. 100%, 100% and 100% in 1-year, 3-year and 5-year; p=0.073). (Conclusion) There is no difference in the outcomes of PCEA vs. ECCEA, and both were safe and effective procedures for chronic atherosclerotic carotid stenosis to prevent stroke. Careful management of ulcerative plaque and early CEA within 2 weeks from symptom development may be beneficial to prevent NBLs.

Comparison Between Hybrid Common Femoral Artery Endarterectomy Associated to Endovascular Femoropopliteal Revascularization and Femoropopliteal Bypass

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(Purpose) In femoropopliteal(FP) occlusive lesion involving femoral artery bifurcation(FB) such as calcification, endovascular surgery isn't suitable to treat lesion. Recently hybrid common femoral artery(CFA) endarterectomy with FP revascularization have the advantages such as avoiding mortality and morbidity. But, hybrid surgery showed lower patency rates comparing FP bypass. The purpose of our study was to compare the postoperative complication and mid-term clinical results between hybrid CFA endarterectomy with endovascular FP revascularization and FP bypass. (Methods) A retrospective study was used and included all patients at our hospital from January 2013 to June 2016 who had underwent 18 CFA endarterectomy and FP revascularization with PTA or stent(Hybrid group) or 21 FP bypasses(bypass group) for treatment of FP occlusive disease involving CFA. We examined patient’s characteristics, procedural detail
and follow up data. We compared to primary and secondary patency rate between hybrid group and bypass group. (Results) We underwent 18 Hybrid surgeries (CFA endarterectomy with PTA (n=12) or stent (n=6) and 20 FP bypass surgeries with saphenous vein graft (n=12) and PTFE graft (n=9). There is statistically no difference in patient characteristics (age, sex, comorbidity and indication) between two groups including popliteal involvement (Hybrid group(n=3) vs. bypass group(n=8) p=0.11). There was 1 technical failure in postoperative immediate occlusion in hybrid groups. But, operative time of hybrid group(mean±sd, 123±24 mins) is shorter than of bypass group (mean±sd, 176±32) (p<0.01). The primary patency rates at 1 years for hybrid group and surgery group were 80% and 85%, respectively (p=0.26). The secondary patency rates at 1 years for hybrid group and surgery group were 85% and 90%, respectively (P=0.434). (Conclusion) Hybrid CFA endarterectomy with FP endovascular revascularization provide feasible and effective as treatment of selected patients with FP occlusive disease involving CFA.

IOP10-3

Current Trend in the Treatment of Carotid Body Tumor in Korea

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(Purpose) We attempted to know the current status of CBT treatment in Korea and reviewed surgical treatment of CBT in single institute during 2003 to 2016. (Results) On the HIRA data annual number of patients who were diagnosed as CBT was mean 117 (range 106-149) patients /year including 73.6 (63%); range 68-85) benign CBTs, 6 (5.1%; range 3-11) malignant CBTs and 37.2 (31.8%; range 32-53) CBT with unknown behavior. Female was more prevalent than male by 1.5: 1. The most common age group was 40-49 years (23.6%) and annual number of patient who underwent surgical resection was 17.8 (range 12-25; 15.2% of CBTs) patients/year in Korea. CBT resections were most frequently performed by ENT surgeons (80%) followed by general surgeons (10%) and neurosurgeons in Korea. During the CBT resections, 13% of patients underwent concomitant carotid artery resection. In our institution, we have experienced 21 CBT patients (mean age 40.5, male 48%) and 19 patients underwent surgical treatment. According to Shamblin classification, they were 12(63%) type II, 4(21%) type I and 3 (16%) type III and 3 patients had bilateral CBTs. Histopathologically, 15(79%) were paraganglioma and 4(21%) were Schwannoma. We have experience 1(5%) case of concomitant resection of carotid artery during the CBT surgery. As postoperative complications, 3 (16%) swallowing difficulty, 2 (11%) transient vocal cord palsy, 2 (11%) Horner’s syndrome and 1 first bite syndrome developed. During the follow-up of mean 79 months, there was no local recurrence but 2 (11%) distant metastasis developed. (Conclusion) We found that CBT was undertreated and most frequently by ENT surgeons in Korea. There were relatively high rate of concomitant carotid artery resection during CBT resection. Korean surgeons need more attention to CBT surgery.
Management of Severe Arterial Occlusive Disease Simultaneous with Kidney Transplantation

Division of Vascular and Transplant Surgery, Department of Surgery, College of Medicine, The Catholic University of Korea, Korea

Mi-Hyeong Kim, Kyung-Jai Ko, Young-Hwa Kim, Kang-Woong Jun, Jeong-Kye Hwang, Sang-Dong Kim, Sun-Cheol Park, Ji-Il Kim, In-Sung Moon*

(Purpose) Arterial occlusive disease (AOD) is common in end-stage renal disease patients due to atherosclerosis caused by senile change, hypertension and dyslipidemia but it is more advanced and progressive than general population for combined medial calcification which is typically involved in these patients. In the majority of cases, however, the external iliac artery is preserved and there are few cases that is failed to make anastomosis, so evaluation about vascular status is missing or performing insufficiently. We want to share our experiences to manage severe AOD simultaneous with kidney transplantation (KT).

(Methods) Between January 2010 and May 2016, we reviewed medical records retrospectively. We have a program for evaluating vascular status of KT candidates and it is composed of history taking, physical exam, ankle-brachial index (ABI) and duplex ultrasound scan (DUS) of lower extremity arteries. History taking and physical exam is conducted by vascular surgeons and ABI and DUS is done by three registered vascular technologists. All of information is interpreted comprehensively by vascular surgeons, and need for further study (CT or MR angiography) and treatment strategies are determined.

(Results) Correction of AOD and KT was performed simultaneously in 10 patients. Mean follow-up period is 1440 days (144-2399 days). Two aorto-iliac occlusion (aorto-biiliac Y graft interposition), three iliac artery severe occlusion (patch angioplasty), two iliac artery near total occlusion (graft interposition) and two iliac artery aneurysm (resection and graft interposition) were corrected. One common iliac artery focal occlusion was corrected by stent installation 4 days ahead of KT. Eight were elective living donor KT. One recipient had history of coronary artery surgery and only one recipient has diagnosed AOD before. Five recipients had diabetes. Operation time was 377±68 minutes, total ischemic time was 59 minutes in living donor KT and 180 minutes in deceased donor KT. Five recipients needed transfusion during surgery and mean transfusion volume was 1.8 packs. There was no vascular related complication and no one needed reintervention or reoperation. All renal grafts represented excellent function at immediate postoperative period. Three recipients expired with functioning graft due to sepsis and cardiac arrest. Graft failure was occurred in one recipient 2 years after KT. (Conclusion) AOD is very significant problem not only conducting transplantation surgery but also maintaining renal function and patient’s limbs. We need to care this problem properly during pre-transplant period. Simultaneous correction of AOD during KT prolongs operation time and cold ischemic time, however, it is safe and can improve graft and limb perfusion.
grade and retrograde recanalization for the acute or chronic occlusions of the LE artery. **(Methods)** A retrospective review of consecutive patients who underwent revascularization procedures for the infrainguinal disease from September 2009 to September 2016 was completed. Antegrade approach was achieved with two kinds of access including contralateral common femoral artery (CFA) puncture plus up-and-over technique and antegrade ipsilateral CFA puncture. Retrograde approach was completed with the puncture of distal to the lesion such as popliteal or tibial artery. Final wire passage could be completed with ‘Randez-vous technique’. For the initial access, ultrasound was used. For the patients with acute embolic occlusion, cut-down of the ipsialteral femoral artery was done. We evaluated the technical success rate and puncture-related complications. **(Results)** During the study period, 143 patients underwent revascularization procedures for the infrainguinal disease. The mean age was 71.5±7.9 years. Among them, 2 patients had acute embolic occlusion of LE artery. For proximal access, ultrasound guided contralateral CFA puncture was made in 82 (57.3%) patients. Ipsilateral femoral artery puncture was made in 59 (41.3%) patients including fluoroscopic and ultrasound guidance. Cut-down was done in 2 (1.4%) patients with acute embolic LE arterial occlusion. Distal puncture and Rendez-vous technique was performed in 25 (17.5%) patients. A technical success rate was 100%. Extensive ecchymosis was developed in two patients with fluoroscopic guided antegrade CFA puncture. Ultrasound guided, antegrade puncture of CFA was not made in one patient due to hostile groin. There was no hemorrhage, hematoma, pseudoaneurysm, arteriovenous fistula, or other complications in patient groups who underwent ultrasound guided puncture. **(Conclusion)** Ultrasound-guided puncture for the combined antegrade and retrograde recanalization for the LE arterial occlusion is safe and effective.

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**IOP10-6**

**The Evaluation of Femoral Artery IMT as Risk Factor of Cardiovascular Disease**

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Jeawhan Kim, Teahyeon Kong, Keun-Myoung Park*, Yong Sun Jeon1, Soon Gu Cho1, Kee Chun Hong

**(Purpose)** The carotid artery Intima-media Thickness (IMT) was known a risk factor of atherosclerosis and predicted association of cardiovascular disease. There were rare studies about femoral artery IMT. So that, our study was performed to analyze correlation between the carotid artery and femoral artery IMT. Also we evaluate the value femoral IMT associated to the carotid artery stenosis, peripheral artery disease (PAD) and coronary artery disease **(Methods)** This is prospective study that include 39 patients that underwent carotid artery duplex, lower extremity duplex and coronary artery angiography or CT for health check up in our health promotion center from January 2014 to June 2016. The values of carotid and femoral IMT were measured the thickness of 3 places from bifurcation using B-mode. The coronary artery stenosis, carotid artery stenosis and peripheral artery occlusive disease was defined by stenosis over 50% in duplex and CT angiogram. We performed the correlation analysis between maximum and sum of both IMT with total arterial disease. **(Results)** The maximum and sum correlated between both IMT(R=0.346, p=0.031; R=256, p=0.038). There were 20 patients with CAD (51.2%), 8 patients with CAS (20.5%) and 7 patients with PAOD (17.9%). The total arterial disease including any one of three arterial disease was correlative with maximum values of the femoral IMT(R=0.322, p=0.023) and sum of femoral IMT(R=0.346, p=0.015). **(Conclusion)** The femoral artery IMT correlated with carotid artery IMT in our study. Also femoral artery IMT correlated with occurrence of total arterial disease including coronary, carotid and peripheral artery occlusive disease although sample size was small.
(Purpose) To evaluate the safety and effectiveness of directional atherectomy as a primary treatment modality for in-stent restenosis (ISR) of the superficial femoral artery. (Methods) Fourteen limbs in 13 patients with ISR following superficial femoral artery (SFA) stenting were treated with excisional atherectomy using Silver Hawk™ device. All underwent additional balloon angioplasty. Technical success rate, target lesion revascularization (TLR) at 12 months, and any complications were evaluated retrospectively. Technical success was defined as residual stenosis <20% and absence of complications such as distal embolism. (Results) All patients except one (92.3%) had recurrent claudication after stenting. The mean duration for reintervention was 44.1±8.2 months. Mean grade of ISR was 88.6% (±6.3), mean lesion length was 122±92 mm. Length of stented vessel segments was 176±50 mm. On intention-to-treat basis, technical success rate of excisional atherectomy alone was 92.9%. Additional stents were required for residual stenosis in one (7.1%). There was one case of distal embolization, treated by aspiration thrombectomy. Mean ankle-brachial index improved from 0.64±0.3 to 0.92±0.3. Primary patency rates at 12 months was 85.7% and TLR at 12 month is 14.3%. (Conclusion) Directional atherectomy as a primary treatment modality for ISR of the SFA is safe with high technical success rate and low complication rate. The theoretical advantage of removing neointimal tissue without repeated barotrauma may contribute the efficacy. The clinical benefit need to be proven by larger clinical trials.

(Purpose) Femoral-popliteal surgical bypass and percutaneous transluminal angioplasty with stent are both accepted treatment for claudication due to superficial femoral artery (SFA) disease. However, long-term results comparing these modalities have not been reported in Korean registry. We evaluated the contemporary outcome of 3-year follow up in terms of clinical data and patency. (Methods) We evaluated 283 patients with symptomatic peripheral arterial disease (PAD) who received surgical bypass or percutaneous transluminal angioplasty with stenting of SFA from May 2011 to December 2015. We compared the overall patency between the two groups according to TransAtlantic Inter-Society Consensus (TASC) II. Descriptive analyses and categorical variables were performed using Two-tailed t-test and two-tailed Fisher exact test. (Results) We identified 90 surgical bypass (mean age 71.4±9.28 years; males, 81.1%) and 193 stenting (mean age, 70.3±8.73 years; males, 83.9%). Overall, 63.2% of patients with TASC II A and B lesions underwent stentng, whereas 92% of patients with TASC II C and D lesions underwent surgical bypass (P<0.01). The mean stenting length was 10.8 cm, and material for bypass was PTFE graft. The primary patency at 12, 24, and 36 months were bypass group 86%, 81.5%, and 76.1% vs stenting group 83.9%, 75.1%, and 60.5% (P<0.39). The primary assisted patency at 12, 24, and 36 months were bypass group 91.6%, 87.2%, and 82.1% vs stenting group 91.2%, 89.1%, and 85.3% (P<0.79). The secondary patency at 12, 24, and 36 months were bypass group 100%, 95.7%, and 90.6% vs stenting group 94.2%, 94.2%, and 94.2%, retrospectively (P<0.79). Cox proportional hazard models demonstrated a trend toward reduced risk of primary patency failure among patients receiving stents compared with those under-
ongoing bypass procedures (HR, 2.66; 95% CI, 1.20-5.90; P=0.01). **(Conclusion)** This is the first study comparing SFA surgical bypass and stenting in Korean registry. Even though open surgical bypass remains the gold standard for revascularization of SFA disease, results of angioplasty with stenting showed feasible outcomes according to primary assisted patency and secondary patency. We suggest bypass is considered last method after failing SFA stenting.

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**IOP10-9**

**Treatment of Delayed Type I Endoleak**

Division of Vascular and Endovascular Division, Department of Surgery, Pusan National University Yangsan Hospital, Korea

*Hyuk Jae Jung*, Sang Su Lee

**(Purpose)** Endovascular aneurysm repair (EVAR) is considered standard treatment for most patient with abdominal aortic aneurysm (AAA). Endoleak is a well-known EVAR-related complication that require long term follow up. Especially, type I endoleak is a potential disaster caused by inadequate proximal sealing zone. Here, we have an experience for treatment of delayed type I endoleak. **(Case)** 74-year-old male patient admitted emergency room complaining abdominal pain. CT scan showed infrarenal AAA with 8.4 cm sized diameter and hostile neck anatomy (angle >60°). After conventional EVAR, final angiography showed scanty and insignificant type I endoleak below the left renal artery. We decided close follow up with CT scan. 3 and 6 month follow up CT scan revealed small amounts of type II endoleak from lumbar artery. However, 1 year follow up CT scan showed 9.4 cm sized enlarged sac with interval increased amounts of type II endoleak and suspicious type I endoleak. We decided additional procedure with endovascular repair. Using brachial approach, a 5F Ansel catheter was placed into endoleak channel that existed at the top of stent graft, we tried to advance and place microcatheter in the endoleak sac. Unfortunately, selection was failed. After 2 weeks later, we did open conversion using PTFE Y graft. Cutting proximal fabric component and removal of remnant distal stent graft, suturing proximal remnant stent graft and both distal external iliac artery with PTFE was successfully done. **(Conclusion)** Type I endoleak after EVAR is associated with a high risk of aneurysm expansion and rupture. Cutting and pulling out stent graft maneuver may help to easily repair AAA with type I endoleak.
Annual Congress of KSS 2016
68th Annual Congress of the Korean Surgical Society

Integrated Oral Presentation 11

Date. Saturday, November 5, 2016
Venue. Dongkang Hall A, 3F, Avenue

Moderators:
Seung Yong Jeong (Seoul National Univ.),
Gyu Seog Choi (Kyungpook National Univ.)
Reduced-Port Robotic Versus Multi-Port Laparoscopic Anterior Resection for Left-Sided Colon Cancer: Short-Term Outcomes and Patient Scar Assessment

Sung Uk Bae, Woon Kyung Jeong, Ok Suk Bae, Seong Kyu Baek*

(Purpose) Recently, the robotic single-port platform was especially designed to overcome the shortcomings of single-port laparoscopic surgery. The single-port plus one conventional robotic port, a reduced-port robotic surgery for colon cancer, can enable lymphovascular dissection using the wristed instrumentation maintaining the cosmetic advantage of single-port surgery. The aim of our study is to compare the clinicopathologic outcomes and patient-reported body image and cosmesis assessment between reduced-port robotic and multi-port laparoscopic surgery for colon cancer. (Methods) The study group included 21 patients who underwent a reduced-port robotic surgery and 34 patients who underwent a multi-port laparoscopic surgery for colon cancer between August 2014 and February 2016. Body image and cosmesis were evaluated using Patient Scar Assessment Questionnaire administered at 12 weeks postoperatively. The questionnaire consists of four subscales: Appearance, Consciousness, Satisfaction with Appearance, and Satisfaction with Symptoms. Each subscale is a set of items with 4-point categorical responses (from 1=most favorable to 4=least favorable). (Results) The median operative time was significantly longer in the reduced-port robotic group than in the multi-port laparoscopic group (245 vs. 175 minutes, p<0.05). One patient (5.6%) required a conversion from reduced-port robotic to reduced-port laparoscopic surgery. There were no apparent differences in the time taken to return of normal bowel function, tolerance of diet, length of hospital stay, and pain score, which was measured on the numeric rating scale on post-operative day 1 and 2 but the reduced-port robotic group had a significantly smaller total incision length (5.1cm vs. 8.3 cm, P=0.013). The median proximal and distal resection margins and median number of harvested lymph nodes between two groups were similar. There were no significant differences in the rate of postoperative complications between the groups. There was no mortality within 30 days in two groups. There were significant differences in appearance, consciousness, satisfaction with appearance, satisfaction with symptoms and overall score, all favoring the reduced-port approach. (Conclusion) We demonstrated the feasibility and short-term oncologic safety of reduced-port robotic surgery for colon cancer. The clinicopathologic outcomes of reduced-port robotic surgery were comparable to those of multi-port laparoscopic with superior scar assessment at short-term follow-up, suggesting that there is a cosmetic benefit favoring the reduced-port approach.
were performed Laparoscopic Left lateral sectionectomy and 3 patients were performed Laparoscopic Left hepatectomy. The most common cause of complication was acute cellular rejection (25.9%). Mean follow-up period was 59.2 months (range 4.2-93.1) There were not reported on In-hospital mortality and all patients were survived until end of follow-up date. (Dec. 2015). (Conclusion) Laparoscopic donor hepatectomy was feasible and safe tool for living-liver transplantation and may provide excellent graft outcomes in children. The circumstance of laparoscopic surgery has not adverse effect on recipient of living donor liver transplantation.

IOP11-3

The Limitations in Surgical Skill Acquisition of Laparoscopic Gastrectomy: the Viewpoint of Assistants

Department of Surgery, Korea University College of Medicine, Korea

Do Hyun Jung, Chang Min Lee, You Jin Jang, Jong-Han Kim, Sungsoo Park, Seong-Heum Park, Young-Jae Mok*, Seung-Joo Kim, Chong-Suk Kim

(Purpose) Assistants can improve proficiency in surgical skills during open gastrectomy: surgical knotting, instrument handling, gentle tissue grasping, and so forth. However, laparoscopic gastrectomy provides limited opportunities for laparoscopic assistants to learn laparoscopic surgical skills. The purpose of the present study was to evaluate the probability of surgical skill acquisition in assistants of laparoscopic gastrectomy. (Methods) We reviewed 20 consecutive videos of laparoscopic distal gastrectomy between January 2016 and April 2016. We counted the duration time of assistants’ procedures or instruments shown by laparoscope. The quality of assistants’ grasping was scored: fine grasping, score 3; rough grasping, 2; missed grasping; 1. High-quality skills of assistants were counted: dissection, harmonic procedures, intracorporeal knotting, and so forth. Bleeding or torn tissue attributable to assistants’ grasping was checked. (Results) The mean operation time of laparoscopic distal gastrectomy was 179.2±25.7 minutes. The duration time of assistants’ procedures or instruments shown by laparoscope was 15.4±3.4 minutes (8.6% of total operation time). There were no high-quality skills in all 20 operations. The mean quality score of assistants’ grasping was 1.85±0.11. The mean number of bleeding or torn tissue attributable to assistants’ grasping was 2.6±0.99. (Conclusion) The probability of surgical skill acquisition might be low in assistants of laparoscopic gastrectomy. The separate program or consideration would be needed for assistants of laparoscopic surgery.

IOP11-4

Hand-Sewn Closure using Knotless Unidirectional Barbed Suture During Laparoscopic Repair for Perforated Peptic Ulcer

Department of Surgery, Gyeongsang National University School of Medicine and Gyeongsang National University Hospital, Korea

Ji-Ho Park, Sang-Ho Jeong, Chi-Young Jeong, Young-Tae Ju, Eun-Jung Jung, Soon-Chan Hong, Sang-Kyung Choi, Woo-Song Ha, Young-Joon Lee*

(Purpose) Laparoscopic primary repair is one of the main procedure for perforated peptic ulcer which require safe and reproducible suturing. The aim of this study is to compare the safety and efficiency between the usual interrupted sutures and a continuous barbed suture during laparoscopic repair for perforated peptic ulcer. (Methods) A comparative study involved 116 consecutive patients undergoing laparoscopic repair for perforated peptic ulcer between November 2009 and October 2015. 15-cm-long unidirectional absorbable barbed sutures (V-Loc; Covidien, Mansfield, MA, USA) were used for laparoscopic repair in knotless unidirectional barbed suture group (VL group; n=51). In As controls, 65 patients using usual interrupted sutures were used for comparisons (non-VL group). (Results) Although there was no difference between the VL and non-VL group in the overall complication rates (15.7% vs 24.6%; P=0.259), the complication rate related to suture was lower (3.9% vs 15.4%; P=0.04)
in VL group. The VL group had rate of 0% for leakage, 2% for intra-abdominal fluid collection and 1% for stricture. The non-VL group had rate of 3.1%, 7.7% and 4.6%, respectively. In terms of operative data, total operation time (VL vs non VL, 87.7 min vs 131.2 min), total suture time (7.1 min vs 25.3 min) and suture time per stitch (1.2 min vs 6.2 min) were significantly shorter in VL group (P<0.001). (Conclusion) The use of barbed suture is as safe as usual sutures and allows easier and faster suture in the closure of perforated peptic ulcer.

IOP11-5

The Significance of the Positive Resection Margin in Endoscopically Resected T1 Colorectal Cancer; Does It Really Signify Residual Tumor or Obligation for Additional Surgery?

Center for Colorectal Cancer, Research Institute and Hospital, National Cancer Center, Korea
Je-Wook Shin, Kyung Su Han*, Jong Hee Hyun, Sang Jae Lee, Bun Kim, Chang Won Hong, Byung Chang Kim, Dae Kyung Sohn, Hee Jin Chang, Min Jung Kim, Sung Chan Park, Jae Hwan Oh

(Purpose) The positive resection margin is widely accepted as one of the risk factors for recurrence in endoscopically resected T1 colorectal cancer (CRC). So, additional surgery is strongly recommended if endoscopically resected T1 CRC specimen shows the positive resection margin. Present study aimed to investigate the significance of the positive resection margin in endoscopically resected T1 CRC. (Methods) This study enrolled 228 patients with following inclusion criteria; 1) T1 CRC treated by endoscopic resection from January 2001 to December 2015 at National Cancer Center, 2) endoscopic complete resection, 3) the histopathological findings showing positive (involved or uncheckable) resection margin. Among included 228 patients, 185 patients underwent additional surgery, and 43 patients did not. In patients with additional surgery, details regarding various clinicopathologic factors were evaluated with respect to presence or absence of residual tumor. The follow-up results were also studied. (Results) In 185 patients with additional surgery, residual tumor was detected in 11 patients (5.9%), and there were not any clinicopathologic factor significantly associated with the presence of residual tumor. Among included 228 patients, 33 had no other risk factors for lymph node metastasis (LN M). Of these 33 patients, 10 underwent additional surgery and had no recurrence during follow-up period (mean=43.3±35.6 months). In other 23 patients without additional surgery, 3 had local recurrences at resection site, underwent successful salvage surgeries, showed no LNM (rpTis/T1/T3N0) and no mortality during follow-up period. (Conclusion) Present study showed that the positive resection margin in endoscopically resected T1 CRC signify the relatively low incidence of residual tumor (5.9%), and may not associated with survival. Although current guidelines recommend additional surgery for the endoscopically resected T1 CRC with positive resection margin, surveillance only and timely salvage surgery (if necessary) may be another option in selected cases, if showing no other risk factors for lymph node metastasis.

IOP11-6

Transumbilical LESS Live Donor Nephrectomy: Initial Experience at a Single Low-Volume Center

Department of Surgery, Daejeon St. Mary’s Hospital, College of Medicine, The Catholic University of Korea, Korea
Won Jun Jeong, Byung Jo Choi, Sang Chul Lee*

(Purpose) Laparoscopic live donor nephrectomy (LDN) has been established as a useful alternative to the traditional open methods of procuring kidneys. Recently, a minimally invasive technique, transumbilical laparoendoscopic single-site surgery (LESS), has been introduced as a type of LDN. Successful outcomes of LESS LDN have been reported from a study done on a large volume-transplant center. We report our initial
experiences with LESS live donor nephrectomy in a small-volume renal transplant center. (Methods) Between December 2013 and May 2015, 7 patients underwent transumbilical LESS LDN at the center. A single experienced surgeon (SC LEE) performed all procedures. Because all LESS-DN allografts were left-sided, patients were placed in a modified right flank position. The operating table was tilted to the right in order to achieve an optimal view. (Results) A total of 7 LESS donor nephrectomies were performed (all left sided). The mean age of the donors was 42.1±17.6 years (range, 21-67). Mean BMI was 26.7±4.1 (23.3-34.1). The ratio of males to females was 3:4. In the 3rd case, we retrieved the graft transvaginally. The average operating time was 292.7±99.4 min and the average warm ischemia time was 187 sec. There were no intra-operative complications. Blood loss during surgery was below 50cc in every case. No accessory needle-scopic or mini-laparoscopic ports were used. There were no conversions to standard laparoscopic or HAL nephrectomy. (Conclusion) Our initial experience showed that LESS LDN can be performed safely at low-volume transplant centers by experienced laparoscopic surgeons. The outcomes were found to be equivalent to those of operations done at large-volume transplant centers, with no increased risks to the donor or recipient. Several surgical techniques can make LESS LDN easier.

Table 1. Demographic data (total=7)

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Table 2. Perioperative data

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(Purpose) When managing intestinal obstruction patients there is a critical time when surgical intervention is needed. Recently, majority of surgical treatment is performed laparoscopically but there are no guidelines to operation method in case of emergency surgery in intestinal obstruction patients. This article deals with the factors that should be considered when selecting surgical method in mechanical obstructive patients. (Methods) We performed retrospective chart review of 43 intestinal obstruction patient who underwent surgical treatment in Dongtan sacred heart hospital, Korea from July 2013 to August 2016. Total 43 patients with mechanical obstruction who underwent surgical treatment was analysed. Data of past operation histories and type, symptom development time, laboratory values, types of surgery performed, complications were collected. (Results) Total 43 patients with mechanical obstruction underwent surgical treatment. 20 of the patients had laparoscopic surgery and 23 patients had open surgery and 5 of them had open conversion. 13 patients had bowel resection, 20 patients had adhesiolysis, 10 patients (23.2%) had bandlysis only. The data showed significant difference between two groups in age(p=0.033), hospital day (average 17 vs. 9.1 p=0.004) and small bowel resection(p=0.028). The risk factors for small bowel resection were age(p=0.015) and symptom development duration 24hrs(p=0.069), 48hrs(p=0.03), 72hrs(p=0.008) each and in multivariate analysis only 72hrs had significant difference(p=0.028). The risk factor for open conversion was previous operation history. (Conclusion) Laparoscopic approach can give better to emergency surgery. Patients with no or mi-
nor operation history is more appropriate for attempting laparoscopic surgery and can gain benefits of shorter recovery time and lower chance to postoperative ileus.

(IOP11-8)

Robotic Cholecystectomy using Korean Developing Robotic Surgical System, Revo-I (Model MSR-5000): the First Case in Clinical Trial

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Chang Moo Kang1,2,*, Jin Hong Lim3, Dong Won Park4, Woo Jung Lee1,2

(Purpose) Robotic Surgical System has been introduced to overcome the limitations of the conventional laparoscopic surgery. However, due to high cost of robotic surgical system, it cannot be applied in routine daily clinical practice. Recently, we developed Korean robotic surgical system (Revo-I) granted by Ministry of Health and welfare of Korea. We have already performed successful preclinical trial for feasibility of Revo-I in porcine model. (Methods) On July 8th, 2016, the first robotic (Revo-I) cholecystectomy was successfully performed in 50-year-old male patient with gallbladder polyp. IRB approved the current clinical trial. In order to check the functional availability, all 3 robotic arms and camera holding robotic arms were used in usual way of conventional laparoscopic cholecystectomy. (Results) Eleven minutes(mins.) were required for robot- docking. Actual dissection time (from dissection start of Calot to complete detachment of gallbladder off the liver bed) was 40 mins. Console time was 69 mins, and total operation time was 130 mins. Patient could go home the next day of surgery. No complication and mortality was detected. (Conclusion) This is the first successful human clinical trial for testing the safety and feasibility of Korean developed robotic surgical system (Revo-I). This clinical trial is still on the way now and hope to approve the safety and clinical availability of Revo-I system in minimally invasive surgery era.

(IOP11-9)

Comparison of Open vs. Laparoscopic Assisted Abdominoperineal Resection for Rectal Cancer

Section of Colon and Rectal Surgery, Department of Surgery, Soonchunhyang University College of Medicine, Soonchunhyang University Bucheon Hospital, Korea

Dae Ro Lim, Jung Cheol Kuk, Taehyung Kim, Eung Jin Shin*

(Purpose) The present study compared the perioperative/postoperative clinical and oncological outcomes of open assisted abdominoperineal resections (APRs) to laparoscopic assisted APRs for rectal cancer. (Methods) Between January 2001 and December 2014, 110 patients who underwent APRs for low rectal cancers were retrieved from a prospective database. Open APRs were performed on 81 patients (group I), and laparoscopic assisted APRs were performed on 29 patients (group II). The groups were compared with respect to the patients' demographics, perioperative/postoperative morbidity, and pathologic and oncologic outcomes. (Results) With a median follow up of 59.7 months, patient characteristics were not significantly different between the two groups. Mean operation times for groups I and II were 265.4 min and 283.8 min, respectively (p=0.987). The mean blood losses were 666.9 ml and 375.8 ml, respectively (p<0.05). Mean lengths of hospital stay were 27.7 days and 19.1 days, respectively (p=0.054). Mean times to a soft diet were 7.22 days and 5.21 days (p<0.05). Urinary dysfunction was in seven (8.7%) and two (6.8%) (p=0.769). Wound infections were in seven (8.7%) and zero (0.0%) patients (p=0.102). Ileus was in four (4.9%) and zero (0.0%) (p=0.293). The five-year overall survival rates for group I and group II were 66.3% and 78.0%, respectively.
The five-year disease free survival rate was also comparable, being 64.8% (group I) vs. 67.3% (group II) (p=0.791). The local recurrence rates were 9.9% vs. 3.4% (p=0.278). **(Conclusion)** Based on the present data, laparoscopic assisted APRs have the benefits of less blood loss, time to diet, length of hospital stay, and lower wound infection rate compared to open APRs. Oncologic outcomes of open APRs and laparoscopic assisted APRs were not significantly significant.
Annual Congress of KSS 2016
68th Annual Congress of the Korean Surgical Society

Integrated Oral Presentation 12

Date. Saturday, November 5, 2016
Venue. Dongkang Hall B, 3F, Avenue

Moderators:
Ku Yong Chung (Ewha Womans Univ.),
Jong Kwon Park (Inje Univ.)
IOP12-1

Complete Surgical Resection of the Carotid Body Tumor: Report of Two Cases

Department of Surgery, Seoul National University College of Medicine, Korea

Minji Cho, Sungshin Cho, Song-Yi Kim, Sanghyun Ahn, Sang-Il Min, Jongwon Ha, Seung-Kee Min*

(Purpose) To discuss the optimal technique and result of surgical resection of CBT with a report of two cases. (Methods) Two cases of Samblin type II carotid body tumors (CBT) were surgically resected in SNUH. Surgical technique and the result was reviewed. (Results) In the first case of a 57-year-old woman, a 3.3 cm x 1.5 cm x 1.0 cm-sized type II CBT was completely resected without preoperative embolization of a tumor. ECA was resected with the tumor. One simple suture was required for ICA wall bleeding. In the second case of a 24-year-old man, a 4.9 x 2.9 x 2.4 cm-sized type II CBT was completely resected without significant bleeding by early division of ECA and cranio-caudal resection. No complication such as cranial nerve injury or stroke was developed in both cases. (Conclusion) As van der Bogt recommended, early ECA ligation and cranio-caudal dissection technique was effective in reducing blood loss and the risk of postoperative morbidity.

IOP12-2

Clinical Experience of Endoleaks that Were Newly Diagnosed Over 1 Year after EVAR

Department of Surgery and 1Radiology, College of Medicine, Inha University, Korea

Sunbin Park, Keun-Myoung Park*, Yong Sun Jeon¹, Soon Gu Cho¹, Le Trong Binh¹, Kee Chun Hong

(Purpose) Endovascular aneurysm repair (EVAR) is treatment of choice for abdominal aortic aneurysm (AAA). Endoleak is common complication that is necessary to follow up for long time. But, there were rare study about endoleaks that were newly diagnosed over 1 year after EVAR. Our study is to determine the incidence and outcomes of endoleaks that were newly diagnosed over 1 year after EVAR (Methods) We retrospectively analyzed the data of 120 patients who underwent EVAR for AAA at our institution from December 2010 to June 2015. We included the patients who had follow-up over 1 year. We defined delayed endoleaks as newly diagnosed over 1 year after EVAR and defined persistent endoleak as that lasted over 1 year after EVAR. We compared patients characteristics, procedural detail and postoperative follow up data among delayed endoleaks group, persistent group and none group. (Results) A total of 60 patients (51 men (85%), mean age; 71.9) were enrolled in this study. The mean follow-up duration was 39.6 months(range, 12-101 months). There were endoleaks in twenty-five patients (41.7%) including 18 early endoleaks (30%) and 7 delayed endoleaks (11.7%). The delayed endoleak group consisted of 6 types II and 1 type Ia endoleaks. In AAA with hostile neck, there were more delayed endoleaks comparing other groups (84% vs 33% p<0.05). There were no difference in aneurysm rupture and re-intervention between delayed group and persistent group (0/7 vs. 2/18 (11.1%), p=0.38; 2/7 (28.6%) vs. 6/18 (33.3%),p=0.82). (Conclusion) About 12% of follow up, new endoleaks were diagnosed over 1 year after EVAR. This endoleaks were associated with hostile aneurysmal neck. Long-term imaging follow-ups are needed to clarify further complications such as aneurysm rupture and re-intervention.
**IOP12-3**

**EVAR using Temporary Graft after Endarterectomy in Case of Unilateral Iliofemoral Occlusion**

Division of Transplant and Vascular Surgery, Keimyung University Dongsan Medical Center, *Department of Radiology, Keimyung University Dongsan Medical Center, Korea

Hyun Ji Lee, Hyoung Tae Kim*, Ui Jun Park, Won Hyun Cho, Young Hwan Kim

**(Purpose)** EVAR had largely replaced conventional open repair and increased total number of treatment of patients with abdominal aortic aneurysm. For successful EVAR procedure there are several anatomical requirements; proximal and distal neck size, angulation and morphology have paramount importance. Not uncommonly, size and condition of access artery are source of trouble. Occlusion of unilateral iliac artery is not uncommon and can be treated with unibody placement and femoro-femoral bypass. Iliac and common femoral artery occlusion also can be managed in the same way except changing outflow femoral level to deep femoral artery. **(Methods)** Recently we had a patient with AAA and unilateral iliofemoral occlusion. We invented novel approach; EVAR through graft after endarterectomy for the common femoral and distal iliac artery. Technique are illustrated as following cartoon. **(Results)** Recovery was uneventful and the patient went home at 5th postoperative day. **(Conclusion)** EVAR through femoral graft after endarterectomy can be a viable option for the patients with AAA and ipsilateral iliofemoral occlusion.

Fig. 1. Illustration of the procedure. After common femoral and distal iliac endarterectomy, PTFE graft was anastomosed as usual manner. Distal portion was controlled with vascular clamp then iliac artery was opened and EVAR was performed. After completion of EVAR, graft was longitudinally closed.

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**IOP12-4**

**Treatment Result in Lower Extremity Amputation in Patients Diagnosed Diabetes Mellitus or Atherosclerotic Occlusive Disease or Buerger’s Disease**

Vascular Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Korea

Seon Hee Heo, Yang-Jin Park, Young Wook Kim, Shin-Young Woo, Dong-Ik Kim*

**(Purpose)** To examine the treatment results of lower extremity amputations in patients diagnosed diabetes mellitus or atherosclerotic occlusive disease or Buerger’s disease **(Methods)** We retrospectively reviewed the database of patients who undergone lower extremity (LE) amputation from 1995 to 2015 in single institute. We investigated demographic data, comorbidity and preoperative revascularization and compared result of amputation such as amputation level, re-amputation, perioperative mortality and morbidity, overall survival according to the underlying disease (Group I; diabetes mellitus(DM) with or without atherosclerotic occlusive disease(ASOD), Group II; ASOD without DM and Group III; Buerger’s disease). We performed Kruskal-Wallis test, Chi-square and Fisher’s exact test, Kaplan Meier method to compare the treatment results between three groups. **(Results)** Total 297 limbs for 260 patients (142 in Group I, 64 in Group II, 54 in Group III) undergone LE amputations. Hypertension and chronic kidney disease (including dialysis dependent) were more common in Group I(62.7% vs.50% vs. 7.4%, p<0.001 and 24.6% vs.3.1% vs. 1.9%, p<0.001). Toe was the most common amputation level in three groups and most frequently performed in Group III (50.3% vs. 39.7% vs 64.1% in Group I, II, III, p=0.020), but above knee amputation was performed most fre-
quently in group II (4.2% vs 16.2% vs 0%, p<0.001). Mean frequency of amputation was 1.7, 1.9 and 2.5 in Group I, II and III respectively and re-amputation rate was highest in Group III (27.9% vs 14.7%, 45.3% <0.001). Re-amputation free rate at 10 years was significantly higher in Group II (60.7%, 80.5% and 43.7% in Group I, II and III, p=0.002) but overall survival rate at 10 years was higher in Group III compared Group I and II (65.4%, 83.1%, 100% in Group I, II and III, p<0.001) (Conclusion) There showed the different treatment result of lower extremity amputations in patients diagnosed diabetes mellitus or atherosclerotic occlusive disease or Buerger’s disease. Major amputation was more common in patients with diabetes mellitus or atherosclerotic occlusive disease. In patients with Buerger’s disease, toe or mid foot amputation was more common but had higher re-amputation rate.

IOP12-5

Results of Carotid-Subclavian (Or Axillary) Bypasses

Division of Vascular Surgery, Department of Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Korea

Ji-Yoon Hong, Seon-Hee Heo, Young-Wook Kim*, Di Kim, YJ Park, KW Yun

(Purpose) Carotid-subclavian (or axillary) bypass can be used for patients with symptomatic occlusion of the proximal subclavian artery or as an adjuvant procedure with TEVAR for patients with type B aortic dissection or thoracic aortic aneurysm. (Purpose) We reviewed indications for carotid-subclavian (or axillary) bypass and the results. (Methods) We retrospectively reviewed database of the patients who underwent carotid-subclavian (or axillary) bypass during the period of the past 10 years. Clinical characteristics of the patients, surgical indications, surgical procedure, concomitant procedure, and surgical results were investigated. (Results) During the period, 20 carotid-subclavian (or axillary) bypasses were performed for 20 patients (median age, 67 years, IQR, 59-72; male gender, 90%). Indications for the operation were proximal subclavian artery occlusion (PSAO, n=9, 45%), type B thoracic aorta dissection (n=4, 20%), subclavian artery aneurysm (n=2, 10%), arch aneurysm (n=2, 10%), thoracic outlet syndrome (n=2, 10%) and innominate artery occlusion (n=1, 5%). Symptoms of PSAO were subclavian steal syndrome (n=8, 67%) and arm ischemia (n=5, 41%). Surgical procedures were common carotid-to-subclavian artery bypass (n=12, 60%) and common carotid-to-axillary artery bypass (n=8, 40%). Bypass conduit used for the bypasses were great saphenous vein (n=10), PTFE (n=6), and Dacron graft (n=4). Concomitant surgical procedures were thoracic endovascular aneurysm repair (TEVAR, n=7) and distal arterial embolectomy (n=3). As an early postoperative complication, stroke (n=1) and neck seroma (n=1) developed and there was one operative mortality due to stroke. Symptomatic improvement was noted in all patients with neurologic or ocular symptom and in 75% of patients had hand or arm ischemic symptom. Postoperatively, unrelieved hand or arm ischemic symptom was due to residual distal arterial embolic occlusion. During the follow-up period of median 20.5 months (1-120 months), 85% were available to follow up and graft patency was 100%. (Conclusion) Carotid-subclavian (or axillary) bypass was an effective surgical treatment for patients with PSAO or as an adjuvant procedure to the TEVAR. Long term result of the procedure was durable and efficacious to relieve symptom.

IOP12-6

Unfavorable Clinical outcome of Non-Operative Management for Anastomotic Stricture after Ultralow Anterior Resection or Intersphincteric Resection

Department of Surgery, Chonnam National University Hwasun Hospital and Medical School, Korea

Soo Young Lee, Chang Hyun Kim, Young Jin Kim, Hyeong Rok Kim*

(Purpose) Anastomotic stricture following colorectal
cancer surgery is not a rare complication, but proper management of stricture of anastomosis located very close to anal verge is uncertain. This study aimed to investigate clinical outcome of non-operative management for anastomotic stricture after ultralow anterior resection or intersphincteric resection. (Methods) We retrospectively reviewed database of rectal cancer patients who underwent ultralow anterior resection or intersphincteric resection between January 2007 and June 2015, and included patients with anastomotic stricture within 4 cm from anal verge who underwent initial non-operative management. Clinical outcome of non-operative management for anastomotic stricture were investigated in detail. (Results) A total of 44 rectal cancer patients with anastomotic stricture within 4 cm from anal verge were included. Twelve patients underwent ultralow anterior resection with double-stapling colorectal anastomosis, whereas 32 patients underwent intersphincteric resection. Most (97.7%, 43/44) of them had a diverting ileostomy at their initial surgery. Forty-one (93.2%) underwent anastomotic dilatation with Hegar dilator, while 3 (6.8%) patients underwent endoscopic balloon dilatation. Twenty-one (47.7%) patients were completely cured with non-operative management only; however, 23 (52.3%) patients showed unfavorable results, 12 (27.3%) of whom experienced complications such as bowel perforation, anastomotic rupture, and perirectal abscess, which were associated with non-operative anastomotic dilatation. Twenty-one (47.7%) underwent further surgical management, and 14 (31.8%) eventually had permanent stoma. (Conclusion) Non-operative anastomotic dilatation showed poor clinical outcome, with high rates of complication and subsequent surgical management, in patients with very-low colorectal or coloanal anastomotic stricture. Non-operative management of such patients should carefully be selected.

Extranodal Extension is a Powerful Prognostic Factor in Stage III Colorectal Cancer

Department of Surgery and 1Department of Pathology, University of Ulsan College of Medicine, Asan Medical Center, Korea

Chan Wook Kim, Seung-Seop Yeom, Jihun Kim, Jong Lyul Lee, Yong Sik Yoon, In Ja Park, Seok-Byung Lim, Chang Sik Yu, Jin Cheon Kim*

(Purpose) We evaluated the clinicopathologic characteristics of the presence of extranodal extension (ENE) patients and we also investigated prognostic implications of the presence of LNE in stage III colorectal cancer. (Methods) We retrospectively reviewed the records of 1,984 stage III colorectal cancer patients who underwent curative surgery between January 2003 and December 2010. (Results) ENE was observed more frequently in young age, rectal cancer, higher T stage, higher N stage, the presence of lymphovascular invasion (LVi) and perineural invasion (PNi). The 5-year disease-free survival (DFS) rate of patients with ENE-positive tumors was lower than that in patients with ENE-negative tumors (66.4% vs. 80.1%, P<0.001). The 5-year overall survival (OS) rate of patients with ENE-positive tumors was lower than that in patients with ENE-negative tumors (74.8% vs. 85.6%, P<0.001). Multivariate analysis identified that pathologic stage, presence of ENE, presence of LVi, presence of PNi, and no adjuvant chemotherapy group were statistically significant independent prognostic factors for DFS and OS. There was no difference in DFS and OS between ENE-positive stage IIIB tumors and ENE-negative stage IIIC tumors (Conclusion) The presence of ENE with well-known other risk factors, such as stage, the presence of LVi, PNi, no chemotherapy, is independent statistically significant prognostic factor for DFS and OS after curative resection for stage III colorectal cancer. Therefore, ENE should be considered from the pathologic report, as well as staging system.
Preoperative Prognostic Prediction using Neutrophil to Lymphocyte Ratio in Gastric Cancer

1Department of Surgery, Seoul National University College of Medicine, 2Medical Research Collaborating Center, Seoul National University College of Medicine, 3Cancer Research Institute, Seoul National University College of Medicine, Korea

Jong-Ho Choi1, Yun-Suhk Suh1,*, Yunhee Choi2, Tae Han Kim1, Seong-Ho Kong1, Hyuk-Joon Lee1,3, Han-Kwang Yang1,3

(Purpose) Purpose of this study is to investigate the role of neutrophil to lymphocyte ratio (NLR) as a preoperative prognostic indicator in gastric cancer. (Methods) We retrospectively reviewed patients with primary gastric cancer who underwent surgery during 2007-2010. Patients with neoadjuvant chemotherapy, other primary malignancy, preoperative leukocytosis/neutropenia, or history of transplantation were excluded. Preoperative clinicopathologic factors including NLR were analyzed using Cox hazards regression, and used for constructing nomogram to predict prognosis before operation. For cross validation of nomogram, discrimination and calibration were performed using 1,000 bootstrap samples. (Results) Using 2,539 records satisfying enrollment criteria, NLR showed linear correlation to log hazard after correction of age, sex, tumor size, gross type of tumor, clinical N stage (cN). Multivariate analysis revealed that age, sex, tumor size, gross type of tumor, cN and NLR were independent prognostic predictors. Out of those predictors, NLR interacted with only age, and prognostic power of NLR was significant especially at age <50-years old. Nomogram constructed with preoperative factors including NLR showed 0.799 of Harrell’s C-index and 0.262 of Nagelkerke R2, compared to 0.8083 of C-index and 0.260 of Nagelkerke R2 by nomogram using pathologic TNM stage. (Conclusion) NLR is an independent prognostic indicator for gastric cancer, especially under age <50-years old. Nomogram using preoperative factors with NLR can predict prognosis as well as that using pathologic TNM stage.

Nutritional Safety of Long Limb Uncut Roux-En Y Gastrojejunostomy for Obese Gastric Cancer Patients

1Department of Surgery, Seoul National University Bundang Hospital, 2Department of Surgery, Seoul National University College of Medicine, Korea

Young Suk Park1,*, Do Joong Park1,2, Ki-Hyun Kim1, Dong Jin Park1, Yoontaek Lee1, Dong Wook Kim1, Sang-Hoon Ahn1, Hyung-Ho Kim1,2

(Purpose) The metabolic effect of long limb Roux-en Y reconstruction has been revealed in a few pilot studies. However, the nutritional safety has not been dealt with in previous literatures. This is a preliminary result of a prospective pilot study for evaluating the safety of long limb uncut Roux-en Y gastrojejunostomy (uRYGJ) for obese early gastric cancer patients. (Methods) Between September 2015 and July 2016, long limb uRYGJ was performed in 20 patients with clinical T1N0 stage and preoperative body mass index (BMI) ≥ 32.5 kg/m² or ≥ 27.5 kg/m² with co-morbidities. The primary endpoint is the incidence of micronutrients’ deficiency (iron, folate, vitamin B12) at postoperative 1 year. (Results) Median follow-up period was 8.2 (range, 2.3 to 12.4) months. Iron, folic acid, and vitamin B12 deficiencies were not observed in any patient (0 out of 11 patients) during postoperative 6 months. Median ferritin, folate, and vitamin B12 changes were -22.4 (-146.8 to 72) ng/mL, 4.1 (0 to 13.2) ng/mL, and -130.4 (-1289.8 to 21.9) pg/mL, respectively. Anemia of chronic illness without symptoms was occurred in 36% (4/11). Median BMI change was -3.43 (-4.76 to -1.05) kg/m². Two patients (10%, 2/20) experienced surgical complications (wound dehiscence and duodenal stump leakage). (Conclusion) Long limb uRYGJ is nutritionally safe in early gastric cancer patients. On the basis of this study, future phase II and III trials for evaluating its clinical efficacy can be justified.
Annual Congress of KSS 2016

68th Annual Congress of the Korean Surgical Society

Integrated Oral Presentation 13

Date. Saturday, November 5, 2016
Venue. Dongkang Hall B, 3F, Avenue

Moderators:
Young Jin Suh (The Catholic Univ. of Korea),
Se Jeong Oh (The Catholic Univ. of Korea)
Comparison Between Groups with and Without Adherence to Breast Screening in Patients with Small Breast Cancer (≤2Cm)

Department of Surgery, Severance Hospital, Yonsei University College of Medicine, Korea

Jung Min Park, Jong Won Lim, Hak Woo Lee, Sung Gwe Ahn*, Joon Jeong

(Purpose) Breast screening program has brought clinical benefit as early detection of breast cancer. Furthermore, it is known that screening-detected breast cancer is associated with a better prognosis compared with symptom-detected breast cancer. In this study, we investigated clinical effect of screening program in small breast cancer, comparing the differences between two groups adherence to breast screening or not in the populations with breast cancer equal to or less than 2cm.

(Methods) Patients diagnosed with invasive cancer with maximal tumor size not larger than 2cm (T1) from January 2006 to December 2012 in Gangnam sev- erance hospital were included in this study, excluding stage IV breast cancer, patients received neo- adjuvant chemotherapy, and bilateral breast cancer. Total number of patients is 605, with screen-adherent group (N=319), non-adherent group (N=165), and unclassified (N=121). Screen-adherent group includes screening detected patients and true interval patients, and non-adherent group includes false interval patients and true symptomatic patients. The method of cancer detection for an individual patient was defined by intensive chart review.

(Results) Non-adherent patients were significantly younger (49.6 vs 52.3, P=0.006) and were more likely to have larger size of tumor (1.4cm vs 1.20cm, P<0.001) than the screen-adherent patients. Non-adherent patients were also more likely in advanced stage (P=0.003) and higher histologic grade (P=0.001). Non-adherent patients also expressed more positive nodal status (27.88% vs 21.63%, P=0.003). There is no significant difference in ER/PR status between two group, but non-adherent patients expressed positive HER2 status more than screen-adherent group (30.46% vs 17.91%, P=0.003).

In comparisons subtypes of tumor, screen-adherent patients have more favorable type than non-adherent patients (Luminal A 70.68% vs 55.63%, P=0.002), whereas they had less TNBC subtype than non-adherent patients (11.73% vs 13.91%, P=0.002). Screen-adherent patients also received less adjuvant chemotherapy than non-adherent patients (63.75% vs 48.04%, P=0.001). Recurrence-free survival was significantly higher in screening adherent group (P=0.028) (Conclusion) Breast cancers detected under the adherence to breast screening are associated with a better tumor biology and a prognosis than cancers detected outside of screening even in patients with small breast cancer. Our findings suggest that the adherence to breast screening may offer a clinical benefit in terms of tumor biology, as well as migration of stage.

Does a Positive Sentinel Lymph Node Positive Pattern Predict the Need for An Axillary Lymph Node Dissection in Clinically Node-Negative Breast Cancer Patients in the ACOSOG Z0011 Criteria?

Department of Surgery, Chonbuk National University Medical School, Korea

Sang Yull Kang, Hyun Jo Youn*, Sung Hoo Jung

(Purpose) Recent years have seen a dramatic shift to more conservative management of the axilla in patients with a positive sentinel lymph node (SLN) biopsy. Data from the American College of Surgeons Oncology Group Z0011 trial proposes that not all patients with positive axillary lymph nodes require completion axillary dissection. The purpose of this study was to investigate the patterns of non-sentinel lymph node (NSLN) metastasis in early breast cancer and to evaluate the usefulness of the Z0011 trial. (Methods) In this analysis, we reviewed the clinicopathologic features of 70 patients who had undergone sentinel lymph node biopsy and axillary lymph node dissection. The clinical features of patients, histologic parameters and hor-
monal receptor status of primary tumor and histopathologic features of SLN metastasis were reviewed retrospectively. Furthermore, association between pattern of positive SLN (hot uptake SLN vs cold uptake SLN) and NSLN metastasis was reviewed. Clinically more than T3 or node positive breast cancer patients and more than 3 positive SLN patients were excluded in this study. **(Results)** NSLN metastasis was noted in 28 patients (37.8%). Only hot uptake SLN positive were noted in 21 patients (75.0%), both hot and cold SLN positive were noted in 5 patients (17.9%), only cold SLN positive were noted in 2 patients (7.1%). However, SLN positive pattern was not predictor of NSLN metastasis statically. Tumor size, intrinsic subtype, tumor grade, Ki-67 status, multifocality were not predictor of NSLN metastasis in our study. Of NSLN positive patients, 16 patients (21.6%) were diagnosed as N2 stage. **(Conclusion)** In our study, pattern of SLN positivity was not predictor of NSLN metastasis. Given consideration of high proportion of N2 stage in Z0011 criteria in our study, effort to reveal predictors for NSLN metastasis is needed.

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**IOP13-3**

**Characteristics and Prognosis of Nulliparity Breast Cancer**

Division of Breast & Thyroid, Department of Surgery, Seoul St. Mary’s Hospital, Catholic University of Medical College, Korea

Sun Hyong You, Byung Joo Chae*, Byung Joo Song, Yong Hwa Eom, Hyung Suk Kim, Man Sik Shin, Chang Jong Kim, Tae-Kyung Robyn You

**(Purpose)** The definition of Nulliparous is “A women who has never carried a pregnancy beyond 20 weeks”. Prolonged nulliparity is one of well known risk factors for breast cancer by meta-analysis of 8 studies from the Nordic countries. It is associated with a 30% increase in risk compared to parous women. Present study aimed to investigate the cancer characteristics and prognosis of nulliparity breast cancer women. **(Methods)** We selected 260 unmarried female patients who has any history of delivery, operated for primary breast cancer(any TN, M0) between Jul. of 2009 and Mar. of 2016 from Seoul St. Mary’s hospital, South Korea. Chi squared test was used for discrete data. Disease free survival (DFS) rates were estimated using Kaplan-Meier method. We compared the cancer subtypes and age that affect disease free survival using Breslow test. **(Results)** Total of 260 patients, 174 patients were identified as nulliparous. The median follow up time was 41 months. There were no differences in cancer characteristics (Tumor grade, subtype) and T, N stages by sexual activity in nulliparous breast cancer women. Age below 35 years were associated with higher tumor grade (P<.001) and higher rate of TNBC(Triple Negative Breast Cancer) subtypes. (P=.001). DFS was significantly shorter in age below 35 years(Breslow test P=.031). Also, subtypes of breast cancer had statistically significant relationship to the DFS (Breslow test P=.039). TNBC and Luminal B subtype had shorter DFS compared to Luminal A subtype and HER-2 subtype. **(Conclusion)** This study showed the subtypes of breast cancer in nulliparous women were significant risk factors for DFS. TNBC subtype and Luminal-B subtype were associated with higher rate of recurrence and that of disease-related death. Also, age below 35 at diagnosis had shorter DFS and more poor prognostic factors. Further investigation for parous breast cancer women should also be performed.

**Fig. 1.** Flow sheet of the study design
Table 1. Chi square test for breast cancer characteristics by sexual activity and age (<35, ≥35)

<table>
<thead>
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<th>Sexual activity</th>
<th>Cohort HR.</th>
<th>Cohort HR.</th>
<th>P-value</th>
<th>Age (≤35)</th>
<th>Age (≥35)</th>
<th>P-value</th>
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<td>P71</td>
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</tbody>
</table>

1. Total of 174 patients had the record of cohort history in Gynecologic chart
2. Histologic grade was described according to Nottingham histologic grading system. Ductal carcinoma in situ type was excluded.
3. 2 patients did not meet the criteria to identify tumor subtype in sexual activity group and 3 patients did not meet in age group.

IOP13-4

Evaluation of the Changes in Serum CA15-3 Level after Adjuvant Chemotherapy in Breast Cancer Patients: Correlation with Clinicopathological Parameters and Survival Rate

Department of Surgery, Kosin University College of Medicine, Korea

Alvinyle Kim, Chang Wan Jun, Dong Won Ryu*

(Purpose) The aims of our study were to assess the correlation between serum CA15-3 and clinicopathologic factors and to assess the effect of the changes in serum CA15-3 levels after adjuvant Chemotherapy on survival rate. (Methods) The study subjects, 662 women with breast cancer, were a subset of patients operated at OOO hospital from Jan 2010 to Dec 2015. Patients were grouped according to disease free survival (DFS) and categorized as survivors without metastasis (Group A), or survivors with metastasis (Group B). We used a cutoff of 25ng/mL to distinguish between high and low serum CA15-3 levels. We also evaluated the changes in serum CA15-3 levels between measures. Clinicopathologic factors were compared with changes of serum CA15-3 level. (Results) The numbers of Group A were 576 and 86 patients were included in Group B. Mean level of CA 15-3 before operation in Group B were higher than Group A (26.98 vs 11.87 U/ml, p=0.001 respectively). Also Mean level of CA15-3 after adjuvant Chemotherapy in Group B were higher than Group A (34.35 vs 9.59 U/ml, p=0.001 respectively). We evaluated the differences between pre operative CA15-3 serum levels and post Adjuvant chemotherapy CA15-3. Decreased Mean Serum levels of CA15-3 after adjuvant chemotherapy were found in Group A (Mean decreased levels of CA15-3 in Group A=0.9552) but Increased Mean Serum levels of CA15-3 after adjuvant chemotherapy were found in Group B (Mean increased levels of CA15-3 in Group B=6). (Conclusion) According to our study, Increased Serum levels of CA15-3 after adjuvant Chemotherapy was associated with poor prognosis. So close Follow up will be needed Key word: serum CA15-3 levels changes, breast cancer, survival rate.

IOP13-5

Feasibility of Sentinel Lymph Node Mapping with Near-Infrared Fluorescence Imaging using ICG in Breast Cancer Patients Receiving Neoadjuvant Chemotherapy

Department of Surgery, Chonnam National University Medical School, Korea

Young Jae Ryu, Dong Hoon Cho, Jin Seong Cho, Min Ho Park*, Jung Han Yoon

(Purpose) Near-infrared (NIR) fluorescence imaging using indocyanine green (ICG) has the potential to improve sentinel lymph node (SLN) mapping of breast cancer. We performed a preliminary experiment to assess the value of NIR dyes to do a SLN biopsy in patients receiving neoadjuvant chemotherapy (NAC). We also preliminarily examined the possibility of performing SLN mapping without
radiotracers. **Methods** Clinical trial subjects were breast cancer patients scheduled to undergo SLN biopsy after NAC. Patients were assigned to undergo SLN biopsy with ICG NIR fluorophore. To assess the possibility for ICG NIR fluorophore to localize the SLN or SLNs, the surgeon did not use the handheld gamma probe during the SLN biopsy procedure. **Results** SLN mapping was successful in breast cancer patients receiving NAC. Identification of the SLN with NIR fluorescence imaging was demonstrated easily although SLN was not demonstrated with gross eye imaging. And also, resected SLNs were obviously demonstrated with fluorescence imaging. In breast cancer patients receiving NAC, the use of the gamma probe was not necessary to localize the SLN. **Conclusion** This preliminary study shows the benefit of using ICG NIR fluorophore for SLN mapping in breast cancer patients receiving NAC. And real time intraoperative fluorescence imaging can provide a novel surgical field to surgeon in the SLN biopsy procedure for breast cancer patients receiving NAC.

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**IOP13-6**

**The Utility of ACS NSQIP Surgical Risk Calculator in Thyroidectomy Patients**

Thyroid Cancer Center, Department of Surgery, Gangnam Severance Hospital, Yonsei University College of Medicine, Korea

Hyeok Jun Yun, Soo Young Kim, Seok-Mo Kim, Bup-Woo Kim, Yong Sang Lee, Hang-Seok Chang*, Cheong Soo Park

**Purpose** The ACS Surgical Risk Calculator estimates the chance of an unfavorable outcome such as complication or death after surgery. The risk is calculated based on the information given by the healthcare provider about the patient’s health history and the surgery performed. This study is performed to evaluate the use of Risk Calculator at a large tertiary specialized center. **Methods** Between November 2015 and December 2015, 97 patients who underwent thyroidectomy for thyroid cancer at the Thyroid Cancer Center, Gangnam Severance Hospital Seoul Korea were included. The medical records of these patients were retrospectively reviewed. Risk calculations were performed using the ACS Surgical Risk Calculator (http://riskcalculator.facs.org/RiskCalculator/index.jsp). Patient’s information about age, sex, functional status, emergency case, ASA Class, steroid use for chronic condition, ascites within 30 days prior to surgery, systemic sepsis within 48 hours prior to surgery, ventilator dependency, disseminated cancer, diabetes, hypertension requiring medication, congestive heart failure in 30 days prior to surgery, dyspnea, current smoker within 1 year, history of severe COPD, dialysis, acute renal failure, BMI were entered to get information about outcomes of serious complication, any complication, pneumonia, cardiac complication, surgical site infection, urinary tract infection, venous thromboembolism, renal failure, readmission, return to OR, death, discharge to nursing or rehab facility. **Results** There were 19 male (20%) and 78 female (80%) patients included in this study with a mean age of 44.6±12.2 years. ASA scores were evaluated which showed that 50 (52%) patients were graded as ASA 1, 42 (43%) patients as ASA 2 and 5 (5%)
patients as ASA 3. There was 1 (1%) patient with history of steroid use, and 4 (4%) patients had DM, 11 (11%) patients with hypertension. The calculated risk for serious complications were 1.7%±0.5, any complications 1.9%±0.5, pneumonia 0.2%±0.1, surgical site infection 0.4%±0.1, urinary tract infection 0.3%±0.1, venous thrombosis 0.1%. None of them had risk for renal failure, cardiac complication nor death. Retrospective analysis of the patient’s data showed that there was only 1 (1%) patient with any kind of complication. **(Conclusion)** Thyroidectomy is a very safe operation with low risk for complications no matter of severity of complication. At a tertiary referral center, the risk for complications seems to be lower than the risk calculated using ACS NSQIP. The scoring system need to be evaluated with a bigger number of patients.

**IOP13-7**

**Current Trends in the Feature of Male Thyroid Cancer: Evaluation of Its Prognostic Value**

Department of Surgery, Severance Hospital, Yonsei Cancer Center, Yonsei University College of Medicine, Korea

**Min Jhi Kim, Jong Ju Jeong, Seul Gi Park, Seul Gi Lee, Jung Bum Choi, Tae Hyung Kim, Eun Jeong Ban, Cho Rok Lee, Sang-Wook Kang, Jandee Lee, Kee-Hyun Nam, Woong Youn Chung**

**(Purpose)** Thyroid cancer is the most common endocrine cancer with gender disparity, and male patient with papillary thyroid cancer (PTC) have been shown more aggressive disease and worse survival than female patient in the previous studies. The incidence of thyroid cancer has continuously increased in the last three decades all over the world, and the increase has been shown mainly in papillary microcarcinoma (PMC). This study aimed to review changing trends in male PTCs and suggest treatment strategies to early stage of PTCs in male patients by comparing patient characteristics and oncologic outcomes with female PTCs. **(Methods)** Between January 2007 and December 2010, 8508 patients with PTC underwent thyroid surgery in the endocrine surgery division of the Severance Hospital, Yonsei University College of Medicine. Of these, 1232 patients (14.5%) were male patients, and 7276 (85.5%) were female. First, an exact 1:4 matching for operation type was performed to decrease the risk of confounding variables, and the patient characteristics and 5-year oncologic outcomes were compared in the matched groups. Second, we compared 270 male and 1501 female patients who received hemithyroidectomy after applying exact 1:4 matching analysis for age. **(Results)** Male patients had significantly more lymph node (LN) metastases than female, both in total (612/1232 [49.7%] vs. 2537/7276 [33.9%]; P<0.0001) and hemithyroidectomy (82/270 [30.4%] vs. 285/1501 [19.0%]; P=0.0001) patients. In hemithyroidectomy patients, tumor size ≤2.5mm in male would have same nodal status with female. In pN1 hemithyroidectomy patients, male and female had the similar proportion of LN micrometastases (65/82 [79.3%] vs. 130/161 [81.7%]; p=0.962) and similar size of metastatic LNs (5.2±2.3 vs. 6.2±2.5; p=0.203). Even with different nodal status, male and female had similar 5-year recurrence-free survivals, both in total (55.7±17.8 vs. 59.0±17.9; p=0.815) and hemithyroidectomy (54.2±18.5 vs. 66.0±16.9; p=0.148) patients. **(Conclusion)** According to our data, more aggressive treatment strategies seems unnecessary to male patients, especially in small PMCs. Prospective randomized clinical trials with long-term follow-up data are needed to validate these results.

**IOP13-8**

**Clinical Significance of Mean Platelet Volume in Patients with Papillary Thyroid Carcinoma**

Department of Surgery, Chonbuk National University Medical School, Korea

**Sang Yull Kang, Hyun Jo Youn**, Sung Hoo Jung

**(Purpose)** A growing body of evidence suggests that oncogenesis is associated with systemic inflammation. Recent studies present platelet indices whose values change during the inflammatory
response may be a prognostic factor in various carcinoma. This study aimed to determine the relationship between mean platelet volume (MPV) and prognosis of thyroid carcinoma. (Methods) We performed a retrospective review of 361 patients who underwent thyroidectomy for papillary thyroid carcinoma from January 2005 to December 2007. We measured the mean platelet volume within 1 month preoperatively. We determined the cut-off value of MVP using a receiver operating characteristics (ROC) curve. Logistic regression analysis was applied for comparison MVP with other prognostic factors such as tumor size, lymph node metastasis, multiplicity, extrathyroidal invasion, and TNM stage. (Results) The mean age was 47 years (16-86 years) and rate of papillary thyroid microcarcinoma was 57.6% (208/361 cases). The median value of MPV was 9.22 (6.1-12.8). There were 37 recurrent patients. MVP was not related to any other prognostic factors of papillary thyroid carcinoma (extrathyroidal extension, lymph node metastasis, tumor size, multiplicity). The cut-off value of MVP for the prediction of recurrence was 0.91, where the sensitivity was 81.1% and specificity was 46.6%. In multivariate analysis, MPV was a significant prognostic factor of papillary thyroid carcinoma. (Conclusion) Patients with MPV higher than 0.91 showed significantly higher recurrence of papillary thyroid carcinoma. Further validation study should be performed for clinical use of MVP as a prognostic marker.

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IOP13-9

Dynamic Risk Stratification in Medullary Thyroid Cancer

Department of Surgery, Yonsei University College of Medicine, Korea

Jung Bum Choi, Seul Gi Lee, Min Jhi Kim, Tae Hyung Kim, Eun Jeong Ban, Cho Rok Lee, Jandee Lee, Sang-Wook Kang, Jong Ju Jeong*, Kee-Hyun Nam, Woong Youn Chung

(Purpose) Recently dynamic risk stratification has been approved to be more valuable than static anatomic staging system in non-medullary thyroid cancer and this notion has been also accepted in medullary thyroid cancer (MTC). The present study was designed to compare the clinical usefulness of response to initial therapy stratification with a traditional anatomic staging system. (Methods) From August 1982 to December 2012, a total of 144 MTC patients underwent thyroidectomy in Yonsei University Hospital. Among them, 117 (82.2%) patients with complete clinical data and sustained follow-up were enrolled in this study. Clinicopathologic features and surgical outcomes were analyzed by retrospective medical chart review. Mean follow up duration was 85.78±62.51 months. (Results) In this study, mean tumor size was 1.94±1.40 cm and 22 (18.9%) patients had hereditary MTC, 95 (81.1%) patients had sporadic MTC. Stage I patients had highest probability of excellent response to initial therapy (92.1%). Stage IV patients had highest probability of biochemical and structural incomplete response to initial therapy (57.5% and 30.3%) and lowest probability of excellent response to initial therapy (12.1%). Response to initial therapy stratification and TNM staging system were significantly difference in statistically (p=0.000). The TNM staging system provided risk stratification regarding to disease free survival (DFS), disease specific survival (DSS) and the probability of having no evidence of disease at final outcome, but did not provide risk stratification regarding to the probability of having biochemical persistent/recurrence disease at final outcome. However response to initial therapy stratification provided risk stratification regarding to not only DFS, DSS and the probability of having no evidence of disease at final outcome but also the probability of having biochemical persistent/recurrence disease at final outcome. (Conclusion) In this study, we demonstrated that dynamic risk stratification with adjusted response to initial therapy system can offer more useful prognostic information than anatomic staging system in MTC.
Annual Congress of KSS 2016

68th Annual Congress of the Korean Surgical Society

Integrated Oral Presentation 14

Date. Saturday, November 5, 2016
Venue. Dongkang Hall B, 3F, Avenue

Moderators:
Jong Han Kim (Korea Univ.),
Un Jong Choi (Wonkwang Univ.)
IOP14-1

The Intensive Surgical Skill Training for the Medical Students: An Introduction of Training Program to Improve Surgical Ability and to Increase Interest in Surgery

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Ho Seok Seo¹, Yong Hwa Eom¹, Min Ki Kim¹, Young Min Kim², Byung Joo Song¹, Kyo Young Song¹*

(Purpose) Although basic surgical skill education of the medical students has been introduced, there is critical variation of surgical skill between beginning doctors. (Methods) Ninety one medical students participated with the intensive training program called “Surgical Skill Weekend” which is composed of basic surgical procedures, advanced techniques, and clinical performance. The improvement of surgical suture skill and the change of interest for surgery were evaluated. (Results) After the training, the ability of surgical suture was significantly improved in all participants (score from 14.0 to 19.4, p<0.05). The interest in application for surgery has increased after the program (from 56 to 81%, p<0.05). (Conclusion) Intensive and standardized surgical skill training program for the medical students can improve not only surgical ability of the basic surgical skill, but also interest in surgery.

IOP14-2

Proper Management of Diastasis Recti

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Min Chung*

(Purpose) Diastasis recti describes a condition in which the two rectus abdominis muscles are separated by an abnormally wide distance. Usual causes of diastasis recti are multifetal pregnancy and obesity. Diastasis recti was classified by Nahas; Type A: These patients have a classic rectus diastasis caused by pregnancy and a well-defined waistline. Type B: who present rectus diastasis secondary to pregnancy and do not have adequate tension of the lateral and infraumbilical areas of the myoaponeurotic layer. Type C: These patients present a congenital lateral insertion of the rectus abdominis muscles at the costal margins Type D; Patients with rectus diastasis and poor waistline definition are included in this group. Prevalence of diastasis recti was 33.1%, 60.0%, 45.4%, and 32.6% at gestation week 21, 6 weeks, 6 months and 12 months postpartum, respectively. There were no consensus of diagnosis criteria and proper management of diastasis recti. Data of diastasis recti is analyzed to help planning diagnosis and repair. (Methods) Data was collected via electrical medical record of hospital. All patients diagnosed as diastasis recti. Single surgeon performed all repairs. (Results) Between Feb 2005-July 2007, 12 cases of diastasis recti repair was done. All patients were female. Median age was 35 years old (30-43). Median of Body Mass Index was 23.6 (17.9-36.1). Average operation time was 129 minutes (80-210). All patients stated they found abdominal bulging after delivery. Seven patients had one delivery history and 6 patients had two delivery histories. One patient had three delivery histories. Two patients had twin delivery history. Open repairs were 2 cases of sublay mesh techniques (retrorectal), 2 cases of open repair with abdominoplasty and 1 case of open repair with abdominal subcutaneous flap. Laparoscopic repairs were 4 cases of IPOM(intraperitoneal onlay mesh) technique and 4 cases of IPOM and linea alba closure with transfascial fixation device. (Conclusion) Accordingly, diastasis recti is a common phenomenon in post-partum women who are not necessarily pathological and not necessarily requiring surgical repair, as conservative management may be an alternative. In conclusion, the lack of consensus on classification of diastasis recti, and definition of when the condition is pathologic, making decision of surgical corrections is very difficult. Complaints of patient are the most important factors for decision making of diastasis recti repair.
IOP14-3

Single-Port Laparoscopic Totally Extraperitoneal Inguinal Hernia Repair: A Single Center Experience of 500 Procedures

Department of Surgery, Daejeon St. Mary’s Hospital, the Catholic University of Korea, Korea

Byung Jo Choi, Won Jun Jeong, Sang Chul Lee*

(Purpose) Single-port laparoscopic surgery (SPLS) has been introduced for totally extraperitoneal (TEP) inguinal hernia repair. This study reports a single center experience with single-port TEP (SP TEP) inguinal hernia repair in a large number of patients. (Methods) Between October 2012 and June 2016, 420 consecutive patients underwent 500 SP TEP inguinal hernia repair by a single surgeon. Laparoscopic instruments and the procedures in the preperitoneal space did not differ from that in conventional TEP repair. Patient demographics, type of hernia, operative and postoperative outcomes were analyzed. (Results) SP TEP inguinal hernia repair was successful in 418 patients. One patient required additional incisions for inserting the trocar and another required open conversion. Indications for surgery included primary repair 435 (86.6%), recurrence from open repair 64 (13.4%), and incarcerated inguinal hernia 21 (4.2%). 340 (81.0%) cases were unilateral and 80 (19.0%) were bilateral. Operative time±SD was 63.8±22.6 min for unilateral repair and 97.6±41.5 min for bilateral repair. Postoperative length of stay±SD was 1.0±0.6 day. Postoperative complications included urinary retention 5 (2.1%), seroma 34 (6.8%), and hematoma 1 (0.2%). (Conclusion) On the basis of our experience, SP TEP inguinal hernia repair is safe and feasible. However, a learning curve is necessary.

IOP14-4

Surgical outcome after Laparoscopic Extraperitoneal Hernia Repair: About Pneumoperitoneal Pressure

Department of Surgery, Hanyang University College of Medicine, Korea

Sungho Jang, Taekyung Ha*

(Purpose) Recently, laparoscopic totally extraperitoneal (TEP) hernia repair is the most common procedure for treatment of inguinal hernia. The effects of different pneumatic pressure during TEP have been poorly investigated. The aims of this study were to investigate the effects of different pressure of carbon-dioxide (CO2) in sufflation on the surgical outcome and functional disability after laparoscopic extra-peritoneal hernia repair (TEP) and elucidate the appropriate pneumoperitoneal pressure during TEP. (Methods) 91 patients with inguinal hernia were included for the assessment of the effect in this study. The patients were randomly assigned to undergo TEP under low pressure of 6-8 mmHg or standard pressure of 10-12 mmHg. Operation time, early surgical complications, postoperative pain score, and inguinal pain questionnaires in one month were compared between the two groups. (Results) There was no significant difference between the two groups in related with age, sex, Body mass index, American Society of Anesthesiology degree, type of hernia, operation time, urinary retention, use of MESH anchoring, peritoneal tearing and postoperative pain score(VAS score). Compared with standard pressure group, the low pressure group needed more pain-killer and requirement of analgesics showed relatively increase(P=0.002). (Conclusion) The use of different preperitoneal pressure has no significant impacts on surgical outcomes of TEP and showed no different effects on recovery after surgery. However, the amount of pain control could be reduced in patients who had TEP surgery under standard pressure.
IOP14-5

Can We Use Prealbumin as a Marker for Nutritional Status in Critically Ill Surgical Patients?

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Jee Hye Jeong1,2, Yeon Kyung Kim1, Yoon Jung Jeong1, Suk Kyung Hong1,3,*

(Purpose) Serum prealbumin (PAB) is used as a nutrition indicator because it reflects the short-term nutritional status with a short half-life. However, PAB is influenced by not only nutrition therapy, but also other several factors. The purpose of this study was to evaluate the correlation between PAB and CRP and compare with correlation between PAB and nutritional intake in critically ill surgical patients. (Methods) This retrospective cohort study included the patients (n=67) who had been admitted to the surgical intensive care unit (SICU) for more than 7 days in 2015 and checked the level of PAB sequentially two more times. Electronic medical records were reviewed the patient characteristics, nutritional status, PAB, CRP and the amount of nutritional intake. Statistical analysis was performed using Pearson's correlation coefficient, independent t-test methods of SPSS 21.0 program. (Results) The PAB measured just after SICU admission demonstrated no relation with nutritional status (adequate (n=29), 9.8±5.2 mg/dL vs. malnutrition (n=38) 10.5±6.3 mg/dL, p=0.607). In addition, PAB sequentially measured (on ICU 14th day) showed no correlation with the amount of caloric intake (≥25 kcal/kg/day (n=24) 13.4±6.4 mg/dL vs. <25kcal/kg/day (n=43) 11.2±5.5 mg/dL, p=0.149). The change of PAB showed correlation with not the amount of nutrition intake (r=0.129, p=0.296), but the level of CRP (r=-0.508, p=0.000). (Conclusion) In acute phase of critically ill surgical patients, the level of PAB showed a strong correlation with CRP level, rather than the amount of nutritional intake. Therefore, we should be careful to interpret PAB of critically ill surgical patients.

IOP14-6

Predictors of Resolution of Glomerular Hyperfiltration in Obese Patients following Bariatric Surgery

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Zi Kun Lee, Yong Jin Kim*, Si Nae Lee1, Soon Hyo Kwon1, Su Yeon Park2

(Purpose) Obesity is associated with increased glomerular filtration (GFR). Bariatric surgery has been shown to improve glomerular hyperfiltration. The aim of the present study was to elucidate the predictors of resolution of glomerular hyperfiltration. (Methods) Glomerular hyperfiltration was defined as GFR more than two standard deviations above the mean GFR of an age, sex-matched cohort selected from the Korean National Health and Nutritional Survey Database. GFR was estimated using a body surface area (BSA)-adjusted Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation (ml/min). Through a review of our Bariatric surgery database, we identified 89 patients (age range, 25-39; 15 men; 74 women) with glomerular hyperfiltration who underwent bariatric surgery and had more than one-year of follow-up data. (Results) Of the 89 patients, diabetic (27%) and hypertensive (25%) patients were included. Bariatric surgery decreased CKD-EPI eGFR in the patient group (152.2±18.2 vs. 121.9±23.6 ml/min; p<.0001). In of 54% (n=48) of patients, eGFR returned to the normal range. Multivariate analysis identified BMI (p=0.02, OR=0.916; 95% CI 0.850-0.988) and age (p=0.01, OR=0.17; 95% CI 1.014-1.132) at the time of bariatric surgery as independent predictors of resolution of glomerular hyperfiltration (Conclusion) The predictive factors for resolution of increased GFR following bariatric surgery include BMI and age at surgery time. Bariatric surgery can be beneficial in obese patients with glomerular hyperfiltration.
**IOP14-7**

**Validation of the Alterable Weight Loss (AWL) Metric in Morbidly Obese Patients Undergoing Gastric Bypass in Korea**

Ji Yeon Park, Yong Jin Kim1,*

(Purpose) Percentage of excess weight loss (%EWL) is the most commonly adopted metric in reporting weight loss outcomes after bariatric surgery. However, there has been consistent argument against the use of %EWL as it shows significant variation by initial body mass index (BMI). This study aimed to validate the newly suggested metric, percentage of alterable weight loss (%AWL) metric in Korean patients. (Methods) A retrospective review of the prospectively established database at Soonchunhyang University Seoul Hospital identified 165 patients who underwent primary laparoscopic Roux-en-Y gastric bypass (RYGB) and also had at least 2-year follow-up weight loss results after surgery. They were classified into subgroups based on their initial BMI and the weight loss results expressed in BMI, %EWL, %AWL, and percentage of total weight loss (%TWL) were compared in terms of nadir weight as well as weight loss trajectory. (Results) The study cohort included 27 male (16.4%) and 138 female (83.6%) patients and their baseline BMI was 38.1±5.4 kg/m². They achieved nadir weight at 24.1±10.6 months postoperatively. Female patients required significantly longer period to reach nadir weight than male (16.2 vs 22.4 months, p=0.001) and achieved smaller weight loss in terms of nadir BMI, %EWL, and %AWL. Of all four metrics mentioned above, AWL was the only metric which was not significantly influenced by preoperative BMI and showed the least variation (variation coefficient 25.2%) in reporting weight loss. (Conclusion) AWL metric can be applied in reporting weight loss regardless of baseline BMI in Korean patients undergoing RYGB. It is encouraged to validate the data from larger population involving multiple centers from Asia-pacific area before its clinical use.

**IOP14-8**

**Technical Report for Single Anastomosis Gastric Bypass in Morbidly Obese Patients**

Chae Dong Lim, Yong Jin Kim*

(Purpose) Mini-gastric bypass (Single anastomosis gastric bypass; SAGB) was first reported in 1997. Because of the risk of reflux esophagitis and the cancer risk of gastric pouch, it couldn’t take center stage. However, experiences of past 20 years suggest potential benefits which shed new light on SAGB. Now, here we will report our surgical technique. (Methods) All operative procedures were performed by laparoscopic approach. The patient was placed in a supine position with the surgeon on the right. Five trocars and one liver retractor were used: one 11-mm port for a scope at the umbilicus, one 12-mm port at left upper quadrant, one 5-mm port at left lower quadrant, one 15-mm port at right upper quadrant, one 12-mm port at right lower quadrant, and one liver retractor used. The first trocar used to establish a pneumoperitoneum was typically placed at left upper quadrant using the optical access method. The liver was lifted for proper exposure the His angle, released the posterior adhesions to mobilize the stomach. Careful dissection at lesser curvature(40-mm proximal to pyloric ring) along the stomach wall to make window. A laparoscopic linear stapler (black 45-mm) was introduced through the window and fired. Additional staples (one black 60-mm and four purple 60mm in order) were applied toward the angled of His using a Goldfinger™ dissector (Johnson & Johnson Medical Products, Ethicon Endo-Surgery, Cincinnati, OH, USA), creating elongated gastric pouch of approximately 120mL in volume. The greater omentum and transverse colon were advanced to the upper abdomen to expose the ligament of Treitz. The distal jejunum, which is approximately 200 cm from the ligament of Treitz, was raised near the gastric pouch in an antecolic fashion to establish the gastrojejunal anastomosis. A 20 mm sized gastrojejunal anastomosis was constructed using a linear stapler and the entry hole was hand-sewn closed. The gastrojejunal...
anastomosis was occasionally reinforced when necessary. Mesenteric defects between transverse mesocolon and small bowel loop were closed by non-absorbable 2-0 Ethibond (Results) We did 4 obese Korean male patients. 3 cases were successful. But, 1 case was converted to conventional Roux-en-Y gastric bypass due to severe adhesion as a sequela of acute pancreatitis. Mean operation time was 230 minutes(150-310) and hospital stay was 2 days(1-4). There were no postoperative adverse events. (Conclusion) SAGB was technically feasible and safe for morbidly obese patients.
Pediatric 1. Free paper

Date. Thursday, November 3, 2016
Venue. Hankang Hall, 1F, Avenue

Moderators:
Jong In Lee (Cha Univ.),
Jin Young Park (Kyungpook National Univ.)
Pediatric I-1

In Drg (Diagnosis Related Group) System, is Pathology the Ultimate Diagnosis for Appendicitis?

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Joohyun Sim, Jeong Hong*

(Purpose) In National Health Insurance system in Korea, a surgeon who performed an appendectomy can enter either simple or perforated for surgical fee according to clinical diagnosis and procedures performed. However, the random surveillance from the Health Insurance Review and Assessment Service requires pathology report. In several cases in our center, clinical and pathologic diagnosis did not agree, and the hospital could not be paid from the government for the proper treatment offered. Therefore, we reviewed operational records of pediatric appendectomy patients who visited our center and their corresponding pathologic reports, to figure out the concordance rate.

(Methods) Pediatric patients from age 0 to 18 who received appendectomy at Ajou University Medical Center from March to August in 2016 were included. A total of seven general surgeons participated during their on-call days. When peritoneal fluid was serous, drain was not inserted and the surgeons charged the patient with ‘simple’ as the surgical fee. When peritoneal fluid was turbid and local or diffuse peritonitis or periappendiceal abscess was noticed, Jackson-Pratt drain was inserted, and surgeons charged the patient with ‘perforated’ fee.

(Results) 80 pediatric patients with acute appendicitis were reviewed, whereas the patients who underwent incidental appendectomy due to intussusception were excluded. 61 cases were classified as simple and 19 cases were classified as perforated. 55 cases of simple appendicitis showed a concordance with pathological results. In the pathologic report, they were given acute suppurative appendicitis, acute appendicitis, and acute nonspecific appendicitis. Two cases of clinically simple appendicitis were given over-graded diagnosis with perforation, and 4 cases showed down-graded diagnosis, which were lymphoid hyperplasia and serosal congestion. On the other hand, only 5 cases of clinically perforated appendicitis showed a concordance with pathological diagnosis. 14 cases did not show evidence of perforation in the pathological results. (Conclusion) The concordance rate was 90.16% in the simple group and 26.32% in the perforated group. Further study with larger sample group should be done to gain academic authenticity. However, the Korean Health Insurance Review and Assessment Service might have to consider that the pathologic result, especially in perforated appendicitis patients, may not always reflect the clinical condition.

Pediatric I-2

Who are Needed Ostomy in Children with Crohn’s Disease: Single-Center Experience

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Juyeon Lee, Jung Hyun Choi, Dae Yeon Kim*, Seongchul Kim, Jung Man Namgoong

(Purpose) The overall incidence of children with Crohn’s disease is increasing. Surgery is most frequently needed when medical management fails. Patients with severe or refractory bowel involvement may be needed ostomy. We report a single center experience on children with Crohn’s disease who were needed ostomy. (Methods) This is a retrospective single center study of children with Crohn’s disease, who underwent ostomy between January 2008 to June 2016. The demographics, time from diagnosis to operation, indication, and surgical outcomes including surgical complications of Crohn’s disease were obtained retrospectively through reviewing medical records. (Results) 550 patients were diagnosed with Crohn’s disease, and among them 24 patients underwent ostomy were included in this study. The median age at operation was 15.5 years (range, 3-19). The ratio of male to female was 1.4:1. The duration from diagnosis to operation was 3.6 years (0 day-9 years). The indications of ostomy were intra-abdominal fistula
and abscess (9 cases, 37.5%), intractable perianal abscess or fistula in ano (6 cases, 25%), bowel perforation with peritonitis (4 cases, 17%), bowel stricture or obstruction (3 cases, 12.5%), and others such as severe hematochezia, terminal ileitis (1 case each). Three patients had post-operative wound complications, and one patient needed re-operation due to bowel perforation. (Conclusion) A safe surgical approach in high-risk children with post-operative risk of anastomotic leak, fistula or abscess is to fashion a temporary ostomy rather than perform an immediate primary anastomosis. And ostomy can be considered in complicated perianal fistula with proctitis.

**Pediatric I-3**

**Jejunoileal Atresia: A 20-Year Experience in a Single Institute**

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Hye Kyung Chang*, Shinn Young Kim1, Jae Hee Chung2, Myung-Duk Lee

(Purpose) Jejunoileal atresia is common cause of neonatal intestinal obstruction. The aim of the study is to review our experience of jejunoileal atresia and to evaluate the surgical outcome. (Methods) Medical records were reviewed retrospectively for the patients who underwent surgical procedures to correct their jejunoileal atresia from August 1997 to June 2016 in our hospital. (Results) A total of 37 neonates received correction of jejunoileal atresia for last 20 years in our hospital. Two of them were transferred to our hospital for the management of their intolerance to feeding after their first abdominal surgeries in other hospitals (primary anastomosis in one, and enterostomy in the other). The mean gestational age at their birth was 34 weeks and 5 days, and the mean birth weight was 2.407±0.848 kg. The mean age at their first surgery for their jejunoileal atresia was 6.4±13.6 days after their birth. Most of them (83.8%, 31/37) underwent primary anastomosis of small intestine after resection of atretic segment except six patients who received primary enterostomy formation because of their prematurity or poor intestinal status to make intestinal anastomosis. Two patients (5.4%, one of them after enterostomy) expired immediately after surgery because of their sepsis with entire necrotic intestine. Two other patients (5.4%) were suffered from short bowel syndrome. One of them was aggravated to hepatic failure and lost during follow-up period in out-patient clinic. One patient (2.7%) with severe congenital anomalies died during follow-up period. Nine patients (30.0%, 9/30) who had underwent primary anastomosis received one or two repeated surgery for their adhesive ileus with feeding intolerance postoperatively. Feeding was started at 22.4±18.9 days after their primary anastomosis. All the patients, except two died immediately after surgery, were tolerable to feed and discharged at 59.4±64.5 days postoperatively. (Conclusion) The causes of death in neonate with jejunoileal atresia were sepsis combined with necrosis of whole intestine, short bowel syndrome complicated to hepatic failure, and multiple congenital anomaly. Repeated surgery was needed to correct their remained intestinal obstruction in third of the patients who underwent primary repair of jejunoileal atresia.

**Pediatric I-4**

**Clinical Experiences of Prenatally Diagnosed Meconium Peritonitis**

Department of Surgery, Keimyung University Dongsan Medical Center, Korea

Eun-Jung Koo, Eunyoung Jung, Soon-Ok Choi*

(Purpose) Meconium peritonitis (MP) is defined as sterile chemical peritonitis, which results from intrauterine bowel perforation. MP is rare but highly concerned with morbidity and mortality in neonate. The purpose of this study is to review of treatment and clinical course of MP and to find out the possible relationship between perinatal parameters and outcomes in our center. (Methods) All patients who were diagnosed as MP from Feb 2006 to Jul
2016 were investigated retrospectively. MP was diagnosed with prenatal ultrasonography and types of MP were identified with operation. Findings of prenatal ultrasonography, gestational age, types of delivery, gender, birth weight, clinical symptoms and signs, surgical strategies, causes of MP, mortality and morbidity, and hospital stay were analyzed. (Results) 12 patients were antenatally diagnosed as MP between 24-35 weeks of gestation. Median gestational age was 37 weeks and 2 days (range 31+1-38+4 weeks). Delivery types were Cesarean section in 10 and normal vaginal delivery in 2. All of them were diagnosed by prenatal ultrasonography. Through prenatal sonography polyhydramnios in 6, fetal ascites in 7, bowel dilatation in 8, calcification in 1 and pseudocyst in 1 were found. Four were female and 8 were male. Average birth weight was 3025g (range, 2020-4000g). Symptom of abdominal distension was in 10 patients, bilious vomiting in 2, pneumoperitoneum in 2 and no symptoms and signs of MP were in 1 patients. One patient recovered with conservative management and eleven patients out of 12 required surgical treatment. The operation methods included segmental resection and anastomosis (5) and enterostomy (6). Two cases of mortality occurred after operation with the course of multiple organ failure. Postoperative complications of severe adhesion and bowel obstruction arose in 2 patients and did stoma necrosis in 1 patient. The types of MP of surgically treated eleven cases were consisted with pseudocyst (5), generalized peritonitis (4) and fibroadhesive (2). The most common operation finding which might have caused bowel perforation and MP was ileal atresia (5) followed by jejunal atresia (2) and idiopathic bowel perforation (1). Median average hospital stays were 23 days (range, 3-76 days). (Conclusion) The clinical treatment of MP initiates from prenatal diagnosis and postnatal close observation. Early surgical treatment might prevent progression of inflammation and reduce the morbidity and mortality rates.

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**Pediatric I-5**

**Serial Transverse Enteroplasty in Children with Short Bowel Syndrome**

Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine, Korea

Dae Yeon Kim*, Juyeon Lee, Junghyun Choi, Nam Gung Jungman, Sungchul Kim

(Purpose) Serial transverse enteroplasty (STEP) is one of intestinal lengthening procedures for short bowel syndrome (SBS) introduced in 2003. The aim of this study was to report clinical outcomes in children who have received the STEP at our institution. (Methods) STEP procedures were performed as HB Kim et al. had done. Five children dependent on parenteral nutrition (PN) received the STEP since March 2008. Clinical outcomes at pre-STEP and post-STEP were reviewed. (Results) There were three girls and two boys. The causes of SBS were Jejunoileal atresia (2), necrotizing enterocolitis (2), Hirschsprung's disease (1). The median age on STEP was 37 months (7-59). STEP procedures were done three times STEP in one, two STEP in two, one STEP in two. Intestinal length was increased in all. There were no perioperative complications and no evidence of intestinal leak or obstruction. Three patients have been completely weaned from PN. Percentage of enteral nutrition was increased in one patient on home parenteral nutrition, now on weaning trial. One patient with small bowel involved Hirschsprung’s disease is waiting for intestinal transplantation. (Conclusion) The STEP procedure is a simple bowel-lengthening procedures with promising early PN weaning and nutritional outcomes. Further data from a multi-center registry are needed to evaluate its long-term efficacy.
Pediatric I-6

The Manifestation of Meconium Plug Syndrome and Surgical Options - Always It Needs Enterostomy?

Department of Surgery, Dong-A University College of Medicine, Dong-A University Hospital, Korea

So Hyun Nam*

(Purpose) Meconium plug syndrome (MPS) is one of cause for neonatal intestinal obstruction, especially in premature baby. It can present not only bowel perforation but also persistent abdominal distension with feeding intolerance. We usually performed the enterostomy for MPS. However, the complication after enterostomy is considerable. Here, we introduced the surgical options of MPS and reviewed the surgical outcome. (Methods) We retrospectively reviewed the medical records for 33 infants who underwent the operation for MPS from March, 2010 to August 2016 in Haeundae Paik hospital and Dong-A university medical center by single surgeon. Gestational age, birth weight, the cause of operation, operation method and time to full enteral feeding were recorded. (Results) Total 33 infants (17 of males and 16 of females) underwent the operation at 19.4±18 days after birth. All except one were premature baby. Mean gestational age was 200±24.9 days and birth weight was 1196.3±585 g. 11 patients manifested the free air on the X-ray and 19 showed feeding intolerance with abdominal distension despite of aggressive gastrografin enema. 3 patients showed fixed bowel loop on the X-ray and physical examination. The weight at operation was mean 1196.27±585 g and bedside operation was done for 21 small babies, and the operation time was 70.12±28 minutes. Ileostomy was performed in 25 patients. We extracted thick meconium fully via appendix orifice, and then only did appendectomy for 5 patients. 2 patients underwent side to side anastomosis. We could extract meconium via enterotomy and repaired the enterotomy immediately. 8 patients (24.4%) died from sepsis, respiratory failure, and liver failure. They could start feeding around 7 days regardless of operation method, and the time to full enteral feeding was mean 36.34±34.24 days. (Conclusion) The presentation of MPS without definite bowel perforation was diverse. The decompression via appendectomy and primary anastomosis could be another surgical option. It was helpful to prevent 2nd operation and the complication of enterostomy.

Pediatric I-7

Long-Term Clinical Outcomes in the Management of Total Colonic Aganglionosis

Department of Pediatric Surgery, Seoul National University Children’s Hospital, Korea

Joong Kee Youn, Ji-Won Han, Chaeyoun Oh, Sung-Eun Jung, Hyun-Young Kim*

(Purpose) Total colonic aganglionosis (TCA) occurs in 2-13% of Hirschsprung’s disease (HD), and the prognosis of HD varies according to the extent of aganglionic bowel involvement. The purpose of this study is to assess the long-term clinical outcomes and bowel function of patients with TCA after surgery. (Methods) Patients diagnosed with aganglionic extending from the anus to at least the ileocecal valve were included. The medical records of 31 TCA patients treated surgically out of total 1298 HD patients from 1981 to 2014 were reviewed. (Results) Male patients were 24 (77.4%). Obstructive symptoms were present in all patients. Preoperative colon study was performed in 21 (67.7%) patients and long-segment aganglionosis was suspected in 19 (90.5%). Median age of enterostomy formation and corrective operation was 1 (0.1-108.0) and 8 (3-124) months. Transition zone in distal and mid-ileum were in 27 (87.0%) and 2 (6.5%) respectively by pathologic review. Corrective Duhamel, Martin and Soave’s operations were performed in 18 (58.1%), 11 (35.4%), and 2 (6.5%) patients. Re-pull through was done in 5 patients due to remaining aganglionic segment. Median follow-up duration was 216 months. Enterocolitis that needs hospital admission was observed in 4 (12.9%) patients. Other long-term complications include ileus (3, 9.7%), septum adhesion after Duhamel operation (2, 6.5%) and anastomosis stenosis (2, 6.5%). Average frequency of defecation was 5.5 times in 6
months after operation, and decreased to 2.4 times in 3 years after operation. Weight-for-age was -1.05 standard deviation (SD) at the time of the corrective operation, the lowest (-1.48 SD) at 2 years after surgery and showed gradual recovery afterwards (-1.18 SD at 5-year follow-up. **Conclusion** In the diagnosis of TCA, colon study shows accuracy of higher than 90%. In terms of long-term post-operative bowel function evaluation, gradual improvement was observed. For proper nutrition and growth, immediate postoperative nutritional support should be considered.

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**Pediatric I-8**

**Urinary Tract Infection Prior to Corrective Surgery in Male Anorectal Malformation with Recto-Urethral/-Vesical Fistula**

Department of Surgery, Sungkyunkwan University School of Medicine, Samsung Medical Center, Korea

Sanghoon Lee, Minjung Kim, Jeong-Meen Seo*, Suk-Koo Lee

**Purpose** To investigate the incidence and clinical characteristics of urinary tract infection (UTI) occurring prior to corrective surgery for male anorectal malformation (ARM) with rectourethral (RU) or rectovesical (RV) fistula. **Methods** Data were collected retrospectively by reviewing patients’ medical records. From February 2014 to March 2016, 24 male infants with ARM and RU or RV fistula underwent corrective surgery at Samsung Medical Center. **Results** Mean gestational age was 38 weeks and mean birth weight was 2784 g. Mean age of patients at the time of surgery was 4.2 months. 20 infants had RU fistula (17 prostatic urethra, 3 membranous urethra) and 4 infants had RV fistula. Fecal diversion was done by sigmoid loop colostomy in 20 cases, loop ileostomy in 2 cases, transverse loop colostomy in 1 case and sigmoid divided colostomy in 1 case. Vesicoureteral reflux (VUR) was present in 10 infants by voiding cystoureterography (VCUG): 2 grade I, 4 grade II, 3 grade III and 1 grade IV reflux. 6 infants with VUR underwent UTI prophylaxis with antibiotics and UTI occurred in 5 infants on prophylaxis (83.3%). Out of 4 infants not receiving antibacterial prophylaxis, 2 infants developed UTI (50%). No cases of preoperative UTI were seen in infants without VUR on VCUG. **Conclusion** Overall incidence of UTI was 29.2% and all infants that developed UTI had VUR seen on preoperative VCUG.

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**Pediatric I-9**

**Long-Term outcome of Cloaca Anomaly According to the Concomitance of Vaginal Reconstructive Surgery and the Length of Common Channel**

Department of Pediatric Surgery, Seoul National University Children’s Hospital, Korea

Ji-Won Han, Joong Kee Youn, Chaeyoun Oh, Hyun Young Kim*, Sung-Eun Jung

**Purpose** Cloacal anomaly is most complex type of imperforate anus (IA) in which the vagina, urethra, and rectum are fused together creating a common channel. The patients generally undergo several steps of surgery including posterior sagittal anorectoplasty (PSARP) with vaginal reconstructive surgery, simultaneously or separately. The aim of this study is to report differences in long-term outcome of urinary and bowel function according to the concomitance of vaginal reconstructive surgery and the length of common channel. **Methods** We reviewed the medical records of 45 patients who underwent surgeries in our hospital diagnosed as cloacal anomaly between May 1989 and December 2015. The reconstructive surgeries include PSARP and posterior sagittal anorectovaginourethroplasty. Abnormal bowel function is defined as ‘soiling’, ‘constipation’, ‘stomy state’ and abnormal urinary function as ‘incontinence’, ‘self catheterization’, and ‘stomy state’ in medical records. **Results** We found 45 patients out of 468 patients of IA (9.62%). The median follow-up period was 11 years (range 0-24 years). The median age at first operation (colostomy or ileostomy) was 1 day (range 0-108 days) and at first reconstructive surgery was 11.4 months (range 3.6-106.8 months). There were 20 patients who underwent PSARP with vaginal reconstructive surgery simultaneously, 8 patients who underwent PSARP...
and vaginal reconstructive surgery separately, and 17 patient who underwent only PSARP without vaginal reconstruction. Among 8 patients in separate group, the median age at first reconstructive surgeries was 17.52 month (range 0.66-36.73 months) and vaginal reconstructive surgeries were performed at median age of 11.74 years (range 1.6-23.6 years). There was no significant difference of the average number of total surgeries (4.55 vs 5.63, p=0.072) and the number of additional vaginoplasty surgeries (8 vs 2, p=0.521) performed during follow-up period. The outcome of urinary function (p=0.118) and bowel function (p=0.158) was not different between simultaneous group and separate group. When we also classified the patients into long and short channel group according to the length of common channel, 3cm, there were 27 patient (60%) in long channel group, 15 patients (33.3%) in short channel group, and 3 patients of unknown length (6.7%). There was no significant difference of urinary function (p=0.164) and bowel function (p=0.312) but more surgeries were performed in long channel group significantly (4.37 vs 5.53, p=0.028). (Conclusion) When we review the long-term outcome of urinary and bowel function according to the concomitance of vaginal reconstructive surgery and the length of common channel, there was no significant difference. But could find that the more surgeries were performed in long common channel group.

Inhibitory Effect of Sustained Perivascular Delivery of Paclitaxel on Neointimal Hyperplasia in the Jugular Vein after Open Cutdown Central Venous Catheter Placement in Rats

Younglim Kim, Suk-Bae Moon*

(Purpose) In a previous study, we identified neointimal hyperplasia (NH) and resultant luminal narrowing after venous cutdown central venous catheter (CVC) placement in rats. The aim of this study was to evaluate the inhibitory effect of sustained perivascular delivery of paclitaxel on NH after open cutdown CVC placement. (Methods) For the control group (n=16), silicone 2.7-French catheters were placed via the right external jugular vein with the cutdown method. For the treatment group (n=16), a mixture of 0.65 mg of paclitaxel and 1 mL of fibrin glue was infiltrated around the exposed vein after CVC placement. After scheduled intervals (1, 2, 4, and 8 weeks), the vein segment was harvested and morphometric analysis (NH index, lumen area (mm2), smooth muscle cell (SMC) count) was performed on cross-sections. Plasma concentration of paclitaxel in the systemic circulation was measured using high-performance liquid chromatography. (Results) Proliferation of SMC was strongly suppressed in the treatment group, and the NH index was significantly reduced in the treatment group (8 weeks; 0.63±0.08 vs. 0.2±0.08, p<0.05). Luminal patency was significantly more preserved in the treatment group, and the luminal area was significantly wider in the paclitaxel-treated group compared to the control group (8 weeks; 1.91±0.43 mm2 vs. 5.1±0.43 mm2, p<0.05). Mean SMC counts measured at 1-week and 2-weeks after cutdown were significantly lower in the treatment group (2-week; 115±22 vs. 62±22). Paclitaxel was undetectable in systemic circulation (<10 ng/mL). (Conclusion) Sustained perivascular delivery of paclitaxel in a mixture with fibrin glue effectively prevented NH and subsequent venous narrowing after open cutdown CVC placement in rats while maintaining systemic paclitaxel concentrations below the detectable limit.
Annual Congress of KSS 2016

Vascular: Scientific Session 1.
Arterial Disease I

Date. Saturday, November 5, 2016
Venue. Crystal ballroom B, 3F, Convention Center

Moderators:
Jong In Lee (Cha Univ.),
Jin Young Park (Kyungpook National Univ.)
Vascular I-1

Comparison of Long-Term Results of Carotid Endarterectomy Between Primary Closure and Patch Angioplasty Groups

Division of Vascular Surgery, Department of Surgery, Neurology, Heart Stroke and Vascular Institute, Samsung Medical Center, Sungkyunkwan University School of Medicine, Korea

Ji-Hee Kang, Seon-Hee Heo, Young-Wook Kim*, DI Kim, YJ Park, SY Woo, KW Yoon, KH Lee, JS Chung, KM Kim, OY Bang

(Purpose) Many previous studies have reported that patch angioplasty (PA) after carotid endarterectomy (CEA) reduces the risk of early stroke and restenosis rates compared with primary closure (PC). We attempted to determine whether the beneficial effect of the PA persists on the long-term survival of patients. (Methods) We retrospectively reviewed a database of 828 CEAs which performed in a single institution between 2003 and 2016. After excluding 43 patients who underwent synchronous CABG and CEA (n=42) and CEA and RND (n=1), we compared patient characteristics and postoperative results including operative complications, restenosis rate, stroke rates, long-term survival rates and stroke-related mortality rates between PC (n=332, 58%) and PA (n=453, 42%) groups. To determine long-term survival rates and cause of death in those patient groups, we used database of Cause of Death Statistics by Statistics Korea. All CEAs were performed under the general anesthesia routinely using carotid shunt (Pruit-Inahara® carotid shunt, LeMaitre Vascular, Inc.). For PA, we used bovine pericardial patch (VascuGuard; Synnovis Surgical Innovations, St. Paul, Mn). Patient stratification between PC and PA depended on the surgeon’s assertion with performing routine PC by one surgeon while routine PA by the other surgeon. Postoperative duplex US surveillance was periodically performed to detect restenosis at the CEA site. (Results) PA was more frequently performed for patients with coexisting coronary artery disease (43% vs 35%, p=0.019) and symptomatic carotid stenosis (39% vs 29%, p=0.004) compared to PC group. During the follow-up period of mean 43±37 months (range 1-154 months), carotid restenosis (>70% on duplex US) was detected more often in PC group (2.7% vs 0.9%, P=0.047). However, there was no statistically significant difference in early postoperative stroke (1.2% vs 1.5%), stroke-related mortality rates (0.9% vs 0.2%) and survival rates at 3, 5, 7 years (98%, 95%, and 94% vs 99%, 95%, and 91%) during the follow-up period between 2 groups. (Conclusion) Though PA following CEA reduces the risk of carotid restenosis but did not show significant beneficial effects on the stroke rate and long-term survival rate on the late follow-up.

Vascular I-2

Comparing the Outcomes using Propensity Score Matching Analysis in Carotid Endarterectomy Versus Carotid Artery Stenting: Single-Center Data

Division of Vascular Surgery, Samsung Medical Center, Sungkyunkwan University, Korea

Kyoung Won Yoon, Shin-Young Woo, Seon-Hee Heo, Yang-Jin Park, Young-Wook Kim, Dong-Ik Kim*

(Purpose) Despite of many reports, there continues to be debate in efficacy between carotid endarterectomy (CEA) and carotid stenting (CAS). One of the major advantages of propensity score matching (PSM) methods is making possible observational studies to be designed similar to randomized controlled trials (RCTs). In this study, we used PSM as statistical technique to balance the covariates and mimic randomization. (Methods) From January 2002 to December 2015, 1293 cases of CEA (n=728) or CAS (n=565) with embolic protection device were performed in our institute. Primary endpoint was defined as any clinical stroke, myocardial infarction and death within postoperative 30 days. Secondary endpoint was defined as restenosis rates after postoperative 30 days. PSM matching and multiple logistic regressing analysis were performed. To avoid duplicated matching, secondary procedure in same patient, which has possibility of having same matching score, was excluded from analysis. (Results) After PSM matching(CEA:
n=487, CAS: n=487), baseline characteristics (ages, gender, hypertension, diabetes, dyslipidemia, smoking, atrial fibrillation, previous percutaneous coronary intervention, or coronary artery bypass grafting, valvular heart disease, contralateral carotid occlusion, degree of carotid stenosis, and symptomatic status) were balanced. Fisher’s exact test showed the significant difference of primary endpoint (CEA, n=6 (1.2%) vs. CAS, n=26 (5.3%); P<0.001) and secondary endpoint (CEA, n=14(2.9%) vs. CAS, n=30(6.2%); P=0.02) between two groups. Multiple logistic regression analysis showed that CAS group was associated with higher rate of primary endpoint (OR [Odds ratio], 4.58; 95% CI [Confidence interval], 1.85-11.32; P=0.001) and secondary endpoint (OR, 2.19; 95% CI, 1.16-4.15; P=0.016) than CEA group. **(Conclusion)** In this study with propensity score matching analysis, CEA showed better 30 days outcome than CAS for revascularization of carotid artery stenosis.

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**Impact of Subclinical Coronary Artery Disease on the Clinical Outcomes of Carotid Endarterectomy**

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Minsu Noh, Hyunwook Kwon†, Youngjin Han, Tae-Won Kwon, Yong-Pil Cho*

**(Purpose)** Controversy persists regarding the optimal management of subclinical coronary artery disease (CAD) prior to carotid endarterectomy (CEA) and the impact of CAD on clinical outcomes after CEA. This study aimed to evaluate the short-term surgical risks and long-term outcomes of patients with subclinical CAD who underwent CEA. **(Methods)** The authors performed a retrospective study of data from a prospective CEA registry. They analyzed a total of 702 cases involving patients without a history of CAD who received preoperative cardiac risk assessment by radionuclide myocardial perfusion imaging (MPI) and underwent CEA over a 10-year period. The management strategy (the necessity, sequence, and treatment modality of coronary revascularization and optimal perioperative medical treatment) was determined according to the presence, severity, and extent of CAD as determined by preoperative MPI and additional coronary computed tomography angiography and/or coronary angiography. Perioperative cardiac damage was defined on the basis of postoperative elevation of the blood level of cardiac troponin I (0.05-0.5 ng/ml) in the absence of myocardial ischemia. The primary endpoint was the composite of any stroke, myocardial infarction, or death during the perioperative period and all-cause mortality within 4 years of CEA. The associations between clinical outcomes after CEA and subclinical CAD were analyzed. **(Results)** Concomitant subclinical CAD was observed in 81 patients (11.5%). These patients did have a higher incidence of perioperative cardiac damage (13.6% vs 0.5%, P<0.01), but they had similar primary endpoint incidences during the perioperative period (2.5% vs.1.8%, p=0.65) and similar estimated 4-year primary endpoint rates (13.6% vs 12.4%, p=0.76) as the patients without subclinical CAD. Kaplan-Meier survival analysis showed that the 2 groups had similar rates of overall survival (p=0.75). **(Conclusion)** Patients with subclinical CAD can undergo CEA with acceptable short- and long-term outcomes provided they receive selective coronary revascularization and optimal perioperative medical treatment.

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**Fig. 1. Result figure**
Vascular I-4

Surgical Treatment of Thoracic Outlet Syndrome

Vascular Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Korea

Young-Wook Kim*, SH Heo, KW Yun, YJ Park

(Purpose) Thoracic outlet syndrome (TOS) is a rare condition caused by compression of nerve, artery or vein at the thoracic outlet. It is not known the prevalence of TOS in Korea. We are going to share our experience of surgical treatment of TOS with video. (Methods) We retrospectively reviewed a database of TOS patients who underwent surgical treatment in a single institution from 2004 to 2016. TOS was stratified into 3 types; neurogenic, venous and arterial TOSs. We reviewed the underlying pathology, treatment procedure and treatment results. (Results) During the past 12 years, we have experienced 22 TOS patients including 4 neurogenic, 5 venous and 13 arterial TOS. All patients with venous TOS were presented with subclavian vein thrombosis and affected arm swelling. Arterial TOS was presented with ischemic pain or Raynaud’s phenomenon of the affected side hand. Neurogenic TOS was presented with chronic symptoms of motor or sensory nerve deficit at the affected arm and/or hand. For the treatment of venous TOS (n=5), catheter-directed venous thrombolysis was performed for 3 patients before surgical decompression of TOS. For TOS decompression, anterior and middle scalenectomy was performed with or without cervical or first rib resection. For patients with neurogenic TOS(n=4), scalenectomy was performed without removal of bony structure. For patients with arterial TOS (n=13), scalenectomy (n=13) was performed with (n=9) or without (n=4) cervical or first rib resection for thoracic outlet decompression. For arterial TOS, concomitant subclavian artery reconstruction (n=4) and upper extremity artery embolectomy (n=2) were performed with TO decompression. All surgical decompression of TOS was performed through the supraclavicular approach. As surgical complication, thoracic duct leakage (n=1) developed and treated with thoracic duct ligation. After surgical treatment of TOS, symptom was relieved or improved in 75%, 100% and 100% in neurogenic, venous and arterial TOS, respectively. (Conclusion) We think TOS may be under-detected in Korean society due to surgeon’s negligence in this disease and various clinical presentations. Surgical treatment of TOS resulted in good results.

Vascular I-5

Hybrid Treatment for Multilevel Revascularization in PAD Patients: Multicenter Study in Korea

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Hyuk Jae Jung1, Tae Seung Lee2, Ki Chun Hong3, Jang Yong Kim4, Jin Hyun Joh5, Jeong-Hwan Jang6, Hyung Ki Kim7, Ki Hyuk Park8, Seung-Jae Byun9, Sang Su Lee1,*

(Purpose) Recently, endovascular treatment has been alternative first-line modality for peripheral artery disease (PAD). Hybrid treatment also have been increasingly used for multilevel revascularization procedures as vascular surgeons have embraced endovascular treatment. The goal of this study to examine the clinical and hemodynamic outcomes of hybrid treatment in patients who need multilevel revascularization (Methods) 10 university hospitals in Korea enrolled PAD patients who need multilevel revascularization. A retrospective multicenter study was conducted to evaluate clinical outcomes of 137 Korean PAD patient with multilevel lesions who underwent hybrid treatment. Patients were enrolled from July 2014 to June 2015 and were follow up for 12 months (Results) The mean age was 68.8±9.93 years old and 88% were male. Patients with critical limb ischemia was enrolled 41.6%. The technical success
rate was 100%. The primary patency rate at 12 and 18 months were 77.6% and 63.9%. The primary assisted patency rate at 12 and 18 months were 90.0% and 90.0% respectively. The preoperative mean ankle brachial index (ABI) of 0.55±0.27 increased to 6 month postoperative mean ABI of 0.89± 0.35. The amputation free survival (AFS) rate was 97.1%. (Conclusion) Although the result of multilevel peripheral arterial disease has been reported as poor outcome, treatment using hybrid procedure showed feasible alternative modality of multilevel PAD patients in Korea, with satisfactory AFS and freedom from re-intervention rates.

Vascular I-6

Mid-Term Results of Directional Atherectomy

Department of Surgery, Kyung Hee University Hospital at Gangdong, Kyung Hee University School of Medicine, Korea

Jin Hyun Joh*, Ho-Chul Park

(Purpose) The percutaneous transluminal angioplasty (PTA) shows an attractive clinical outcome for the infragingual disease. However, it needs the repeated revascularization and additional stenting. Directional atherectomy (DA) with/without anti-restenotic therapy (DAART) is reported as a modality which is needed to use stent less frequently. The aim of this study was to report the mid-term outcomes of DA or DAART. (Methods) A retrospective review of consecutive patients with infragingual disease treated with PTA and DA/DAART from September 2009 to August 2016 was completed. DA was done using SilverHawk or TurboHawk Atherectomy devices (Covidien, Plymouth, MN, USA). Drug-coated balloon catheter was used for anti-restenotic therapy. Additional stent was placed in case of flow-limiting dissection and residual stenosis. Technical success was defined as the residual stenosis<30%. Primary patency was defined as the freedom from target lesion revascularization (TLR) or peak systolic velocity ratio ≤ 2.4 with follow-up duplex scanning. The independent t-test for continuous variables, and Kaplan-Meier analysis for patency rate using SPSS Ver. 22.0 (Armonk, NY) were used for statistical analysis. All P values were 2-tailed, and P<0.05 was considered to be statistically significant. (Results) One hundred forty patients were included in the study. The mean age was 71.5±10.5 years. The male patients were 102 (72.9%). Of these, 63 patients (68 limbs) were undergone DA or DAART. The mean follow-up duration was 324±288 days in DA/DAART group. Embolic protection device was used in 25 (36.8%) cases. Additional stent placement was performed in 25/77 (32.5%) in PTA group, while no patient in DA/DAART group. The primary patency rate at 12 months was 78.1% in PTA group and 89.8% in DA group, respectively (P=.125). (Conclusion) DA/DAART is a safe and effective treatment modality for the patients with infrainguinal disease. The successful revascularization with DA/DAART can be achieved without additional stenting.

Vascular I-7

The Natural History of Retrograde Pedal Access Site: is It Really Safe?

Department of Surgery, Seoul National University Bundang Hospital, Korea

Dae Hwan Kim, Hyung Sub Park, Taeseung Lee*

(Purpose) Retrograde pedal access may be an alternative technique when recanalization fails via an antegrade approach in below-the-knee (BTK) intervention. The aim of this study was to evaluate the consequences of pedal access in patients with critical limb ischemia who had undergone retrograde recanalization. (Methods) This was a retrospective study on patients who underwent retrograde pedal access for revascularization of BTK chronic total occlusions between 2014 and 2016. After failed antegrade access attempts, retrograde pedal access was performed under fluoroscopy or ultrasound guidance using a micropuncture needle. Most retrograde interventions were performed sheathless with 1.5-3.0 mm balloons. Outcomes were analyzed with special consideration on the
patency of the pedal access site after intervention. (Results) A total of 18 patients (11 men, 7 women, mean age 72) underwent retrograde access. Among these, Rutherford grade II was present in 1 (5%) and grade III in 17 (95%) patients. The length of the target vessel was 18.22 cm and moderate or severe calcification of the target vessel was found in 13 (72%) patients. Successful crossing was achieved in 66% (12 of 18) and technical success rate was 100% (14 of 14). There were 3 cases of pedal access site delayed wound healing (cutdown=2, puncture=1). Two occlusions proximal to the pedal access site were found by duplex ultrasound the next day after the procedure. Two occlusion cases occurred in the anterior tibial artery with calcification. There was no 30-day mortality and major amputation. (Conclusion) Retrograde pedal access is a useful technique for revascularization, but may cause occlusion of the access vessel site. Wound healing of the access site may also be delayed especially when retrograde revascularization fails. Therefore the risks of retrograde access should be taken into consideration and weighed against the benefits of successful revascularization.

### Vascular I-8

**Validation of WIFI Classification following Percutaneous Angioplasty for Critical Limb Ischemia**

Department of Surgery, 1Radiology, Keimyung University School of Medicine, Korea

Ui Jun Park*, Hyoung Tae Kim, Won Hyun Cho, Young Hwan Kim

(Purpose) The Society for Vascular Surgery Lower Extremity Guidelines Committee developed the Wound, Ischemia, foot Infection (WIFI) classification system to predict the amputation risk in patients with critical limb ischemia (CLI). The purpose of the study was to validate this classification system following percutaneous angioplasty (PTA) for CLI with diabetes. (Methods) From 2010 to 2015, a single center, retrospective study was performed for the patients undergoing PTA for CLI with diabetes. The limbs without tissue loss or missing grade in any WIFI component were excluded. Limbs were classified into four WIFI clinical stages based on the WIFI classification and compared with clinical results in terms of wound healing, length of hospital stay, major amputation and in-hospital mortality. (Results) One hundred five limbs in 100 patients underwent PTA for tissue loss. Median follow up was 2.7(0.2-36.6) months. Limbs were classified as very low risk in 6(6%), low risk 21(20%), moderate risk 44(42%) and high risk 34(32%). The rate of wound healing was 6(100%), 21(100%), 36(82%), and 18(53%), respectively (P=.001). The length of hospital stay were 48.3(±42.9), 46.1(±26.0), 44.1(±33.5), and 65.7(±33.7) days, respectively (P=.030). Major amputation during the hospital stay was found only in the high risk stage (n=10, P=.001). In terms of in-hospital mortality, there were no mortality in very low risk and low risk, but 3 in moderate risk and 3 in high risk (P=.001). (Conclusion) WIFI classification system was highly predictive in wound healing, length of hospital stay, major amputation and in-hospital mortality of the CLI patients with diabetes.

### Vascular I-9

**Treatment of Popliteal Artery Disease with a New Self-Expanding Interwoven Nitinol Stent**

Division of Vascular Surgery, Department of Surgery, Wonkwang University Hospital, Wonkwang University School of Medicine, Korea

Seungjae Byun*, Byungjun So

(Purpose) We examined the efficacy and durability of a new interwoven self-expanding nitinol stent system in the treatment of complex popliteal artery lesions during 5 months (Methods) We retrospectively analyzed the data gathered in 14 consecutive patients(15 limbs) presenting with popliteal arterial steno-occlusive disease, who underwent implantation of a new interwoven self-expanding nitinol stents. The patients were followed for 5 months by ABI examinations, stent roentgenograms, and estimation of Rutherford classification and ankle-brachial index (ABI). (Results) The mean age of the
patients was 72.8 years, and 71.4% were men. TASCII D lesions of SFA were present in 13 limbs (86.7%). TASCII B and C lesions of SFA were present in each one limb. A <30% residual stenosis was achieved in 93.3% of procedures except one case. During follow up, two patients were dying due to MI. The 3 primary patency rates were 100%, the primary assistance patency rates 91.7%. Between baseline and 5 months of follow-up, mean ABI increased from 0.23±0.19 to 0.86±0.23. Radiographs performed on 12 patients, at a mean of 5.5 months, confirmed the absence of stent fractures in 100% of examinations. (Conclusion) Over a 5-month observation period, the patency rate and durability of SUPERA stents implanted for popliteal artery disease were high.
Annual Congress of KSS 2016

Vascular: Scientific Session 2.
Arterial Disease II

Date. Saturday, November 5, 2016
Venue. Crystal ballroom B, 3F, Convention Center

Moderators:
Young Wook Kim (Sungkyunkwan Univ.),
Seung Huh (Kyungpook National Univ.)
Vascular II-1

Clinical Features and Natural Course of Isolated Spontaneous Abdominal Aortic Dissection (ISAAD)

Division of Vascular Surgery, 1Department of Internal Medicine, Cardiac and Vascular Centre Samsung Medical Centre, Sungkyunkwan University School of Medicine, Korea

Ji-Hee Kang, Young-Wook Kim*, Seon-Hee Heo, Shin-Young Woo, Yang-Jin Park, Dong-Ik Kim, Duk-Kyung Kim

(Purpose) Aortic dissections (ADs) usually affect thoracic aorta, garnering much attention from cardiologists and aortic surgeons. Isolated spontaneous abdominal aortic dissection (ISAAD) can be defined as an aortic dissection (AD) confined to the abdominal aorta not attributed to the traumatic or iatrogenic etiology. Contrary to thoracic AD, ISAAD is rare and has been not well known in its etiology, natural course, or an optimal management so far. We attempted to see the clinical features and natural course of ISAAD.

(Methods) To detect ISAAD, we searched patient database at a single institution with key words of “aortic dissection” or “dissection AND aorta” on the interpretation reports of the CT images performed from 2003 to 2015. Diagnosis of ISAAD was made by reconfirming a typical finding of “double lumen sign” of aorta on axial views of contrast-enhanced CT scan. ADs extended from the distal thoracic aorta or secondary to traumatic or iatrogenic cause were excluded from the study. We retrospectively reviewed demographic and clinical features, coexisting disease, aorta-related events and morphologic changes of ISAAD on CT images during the follow-up period. (Results) During the study period of 12 years, 1,958 patients with AD were detected on the primary screening. Among them, 210 ISAAD patients (median age, 69.3 years; range, 30-93 years; male, 73.8%) were enrolled for an analysis excluding trauma or iatrogenic cause (n=6). Patients were symptomatic in 12.9%, associated with hypertension in 63%, vasculitis, in 2.4% and connective tissue disease in 1.9%. ISAAD distributed at suprarenal (8.1%), pararenal (5.2%) and infrarenal (86.7%) aorta. At the initial presentation, AD tended to superior mesenteric artery in 0.9%, renal artery in 0.5% and iliac artery in 11.4%. During the follow-up period of 40 months (median, 1-158 months), there were progression of AD in 7%, false lumen enlargement in 8.5% and aortic rupture in 1.4%. The 2 aortic ruptures occurred in patients with type IV Ehlers-Danlos syndrome. Five (2.4%) elective AAA repairs (1 open repair and 4 EVARs) were performed due to enlarged aneurysm size at the initial presentation. There was no aorta-related death other than the 2 aortic rupture patients.

(Conclusion) On the follow-up examinations of CT scan, progression of AD, expansion of false lumen or visceral artery involvement is uncommon in patients with ISAAD. Aortic rupture occurred only in patients with connective tissue disease. Therefore, ISAAD can be observed with same treatment criteria with other AAA patients unless it causes symptom or underlying cause is connective tissue disease.

Vascular II-2

Evidence-Based Treatment Strategy for Patients with Spontaneous Isolated Superior Mesenteric Artery Dissection (SISMAD)

Division of Vascular Surgery, Department of Surgery, 1Department of Radiology, 2Department of Cardiology, Samsung Medical Center, Sungkyunkwan University School of Medicine, Korea

Seon-Hee Heo, S-Y Woo, Y-J Park, D-I Kim, K-B Park1, D-K Kim2, Young-Wook Kim*

(Purpose) While an optimal treatment of spontaneous isolated superior mesenteric artery dissection (SISMAD) is still in a controversy between initial interventional and conservative treatment, we attempted to determine an optimal treatment strategy for patients with SISMAD. (Methods) We retrospectively reviewed a database of patients with SISMAD collected at a single institution from 2001 through 2016. Except 5 patients who unselectively underwent an interventional treatment in an early period of this study, all patients underwent initial conservative treatment with fasting, fluid therapy with or without anti-thrombotic therapy. For the
follow-up examinations, recurrent symptom and morphologic changes on CT angiography (CTA) were periodically examined every 6-12 months. After classifying the patients into 3 groups with the initial CTA findings (group I, patent false and true lumen; group II, patent true and occluded false lumen; group III, occluded true and false lumen SMA), we compared clinical course and morphologic changes between the groups. (Results) Over the past 15 years, 111 SISMAD patients (male, 92%; mean age, 54.7±10.8 years; symptomatic 75% vs. asymptomatic, 25%) who were conservatively treated were enrolled. Clinical and CTA follow-up were available over mean 53±39 months (1-173) in 100% and 88%, respectively. Ninety-six% of symptomatic patients showed pain resolution with conservative treatment while 4% showed unrelieved pain for >1 week including 1(1.2%) patient with bowel gangrene. After initial pain relief, 20% showed recurrence of abdominal pain. Among those patients, only 2 (12%) patients required surgery for treatment of bowel stricture. On the follow-up CTAs (n=102), partial or complete remodeling (63%), no change(34%), aneurysmal change(2%), and progression(1%) of SMA dissection were identified. When we compared clinical courses and morphologic changes between 3 groups, there was no significant difference in their clinical courses between groups. (Conclusion) The majority of SISMAD patients showed clinical improvement and “no changes” or “remodeling” on CTA with conservative treatment. Regardless of angiographic types, we recommend conservative treatment as the first-line treatment for patients with SISMAD.

Effect of Clinical Suspicion by Referral Physician and Early Outcomes in Patients with Acute Superior Mesenteric Artery Embolism

Hyung-Kee Kim*, Deokbi Hwang, Sujin Park, Seung Huh, Jong-Min Lee1, Woo-Sung Yun2, Young-Wook Kim3

(Purpose) The aims of this study were to investigate the pattern of referral of patients with superior mesenteric artery embolism (SMAE) and its effect on outcomes, and to evaluate the risk factors for bowel infarction to guide the determination of treatment modality. (Methods) This retrospective study included 63 consecutive patients who were diagnosed with acute SMAE in a tertiary referral center between January 2001 and February 2016. To identify the risk factors for bowel infarction, patients were divided into two groups: those who received bowel resection (BR) at the initial operation (BR group), and those without BR (non-BR group), including those treated with surgical embolectomy or an endovascular approach without BR at the initial operation, and those given conservative treatment with anticoagulation. (Results) The average patient age was 71 years (range, 39-89 years), and 26 patients (41%) were male. Fifty-one patients were transferred from other centers, and 12 patients came directly to our hospital. Overall, 25 (49%) of 51 patients were suspected of having, or were diagnosed with, SMAE by the referring physician. The mean interval from symptom onset to presentation to our hospital was similar in patients with and without a suspected diagnosis by the referring physician (25.7 vs. 37.4 h, p=0.244). However, the mean interval from symptom onset to surgery was significantly longer in patients who did not have a
suspected or confirmed diagnosis (55.6 vs. 28.4 h, p=0.023). Fifty-four patients received surgical treatment with 30 undergoing BR, five received conservative treatment with anticoagulation, one received endovascular treatment, and the remaining three patients refused any treatment. On univariate analysis, the interval from symptom onset to surgery (P=.042), abdominal distension (P=.004), abdominal tenderness (P=.038), and level of C-reactive protein (CRP) (P=.009) were associated with BR performed because of advanced bowel infarction. (Conclusion) A high index of suspicion by the referring physician was important in reducing the time interval between symptom onset and surgery associated with BR because of progressive bowel infarction. The interval from symptom onset to surgery, abdominal distension, abdominal tenderness, and level of CRP were all associated with BR. Therefore, these factors should be considered in the management of SMAE in the current era of endovascular procedures.

Vascular II-4

The Role of Heterotopic Kidney Auto-Transplantation for Renal Artery Aneurysms

Department of Vascular Surgery, 1Department of General Surgery, University of Ulsan College of Medicine and Asan Medical Center, Korea

Jun Gyo Gwon, Duck Jong Han1, Tae-Won Kwon*, Yong-Pil Cho, Young Hoon Kim1, Young Jin Han, Min Su Noh

(Purpose) There is no study using ex-vivo repair with heterotopic auto-transplantation in renal artery aneurysms treatment. We analyzed the result of heterotopic auto-transplantation as a renal artery aneurysms treatment, by comparing its safety and efficacy with other treatments. (Methods) Total 36 renal artery aneurysm cases were analyzed from September 2005 to June 2016. Retrospectively analyzed the prospectively collected data that changes of medications number for hypertension and changes of glomerular filtration rate (GFR). And comparing the data according to three groups that divided by treatment methods. (Results) Endovascular repair group was 14 patients, in situ open repair group was 9 patients and ex vivo repair with heterotopic auto-renal transplantation was 13. There were no statistical difference of GFR (p=0.32) and number of anti-hypertension medications (p=0.33) among the three methods. three renal infarctions were diagnosed on endovascular group and one renal infarction on in situ repair group. One dialysis patient due to renal failure was on endovascular repair group. Mean follow up periods were 30.42±30.54 months. (Conclusion) Heterotopic auto-transplantation is one of the good choice for treatment of renal artery aneurysms, because this method's safety and efficacy is not bad comparing endovascular treatment or in-situ open repair of aneurysms.

Vascular II-5

Recent Results of in Situ Abdominal Aortic Reconstruction with Cryopreserved Arterial Allograft

Division of Vascular Surgery, Department of Internal Medicine, Cardiac and Vascular Centre, Division of Infectious Disease, Samsung Medical Centre, Sungkyunkwan University School of Medicine, Korea

Seon-Hee Heo, Young-Wook Kim*, Shin-Young Woo, Yang-Jin Park, Duk-Kyung Kim, Doo-Ryeon Chung

(Purpose) To evaluate treatment outcomes of in situ abdominal aortic reconstruction with cryopreserved arterial allograft (CAA) for patients with abdominal aortic infection. (Methods) A retrospective review of prospectively collected data was conducted for patients who underwent in situ aortic reconstruction using CAA for primary, secondary, or prosthetic infection of the abdominal aorta between May 2006 and July 2015, at a single institution. Clinical presentation, indications for treatment, procedural details, early postoperative mortality and morbidity, late death, and graft-related complications during the follow-up period were investigated. Patient survival and event-free survival (any death or reoperation) were calculated using the Kaplan-Meier method.
(Results) Twenty-five patients (male, n=20, 80%; mean age, 70.2±8.7 years) underwent in situ abdominal aortic reconstruction (48% aortic, 52% aorto-biiliac) with vessel size- and ABO-matched CAA for the treatment of abdominal aortic infection due to the following causes: infected abdominal aortic aneurysm (n=15), aortic prosthesis infection (n=7), aortic reconstruction with concomitant colon resection (n=2) and primary suppurative aortitis (n=1). The median follow-up period was 19.1 months (range, 1-73 months). Seven postoperative deaths including 2 (8%) early postoperative mortalities (<30 days) and 5 (20%) late deaths, as well as 3 (12%) graft-related complications including thrombotic occlusion of CAA, aneurysmal dilatation, and aorto-enteric fistula were noted. Three years after CAA implantation, patient survival was 74% and the event-free survival rate was 58%. (Conclusion) We believe that in situ abdominal aortic reconstruction with CAA is a useful option in treating primary, secondary, or prosthetic infection of the abdominal aorta.

Vascular II-6

Open Surgical Versus Endovascular Treatment for Patients with Midaortic Syndrome Due to Takayasu’s Arteritis

Division of Vascular Surgery, Thoracic Surgery, Interventional radiology, Vascular Medicine, Heart, Stroke and Vascular Institute in Samsung Medical Center, Sungkyunkwan University School of Medicine, Korea

Sung-Eun Oh, Seon-Hee Heo, Young-Wook Kim*, Ki-Ick Sung, Young-Tak Lee, Kwang-Bo Park¹, Young-Soo Do¹, Kyung-Won Yoon, Yang-Jin Park, Dong-Ik Kim, Duk-Kyung Kim²

(Purpose) To compare treatment results of midaortic syndrome (MAS) due to Takayasu’s arteritis (TA) between surgical bypass and endovascular treatment. (Methods) We retrospectively reviewed demographic, clinical data and arterial imaging of MAS patients from 2003 to 2016. For patients with MAS, 14 surgical bypasses including 6 anatomic aorto-aortic bypasses and 8 extra-anatomic bypasses (7 ascending aorta-to-abdominal aorta bypass and 1 axillo-femoral bypass) and 8 endovascular treatment of aortic lesion including 4 aortic stenting and 4 aortic balloon angioplasty were performed with or without adjuvant renal or mesenteric artery reconstructions. Patients (n=5) who underwent renal artery intervention only without treatment of aortic stenosis were excluded from the analysis. Surgical complications and post-operative events including recurrence of preoperative ischemic symptom, occlusion or critical (>70%) restenosis of the treated artery and requirement of re-intervention were investigated during the follow-up period of 84.4 mo (median, IQR; 40.4-108.4mo). Event-free survival rates were compared between the surgical bypass group and endovascular treatment group. (Results) 140 (46%) patients showed thoracic or abdominal aortic stenosis among 307 patients with TA. Among them, critical stenosis or occlusion of aorta with or without renal artery was identified in 22 patients (median age, 47.5; IQR, 32.4-59.4 years; female, 91%) who presented with leg and/or visceral ischemic symptom (73%), medically intractable hypertension (55%), azotemia (36%). There was no operative mortality in both group while procedure-related early (<30d) complication developed more often in endovascular treatment group but was not statistically significant (25% vs. 7.1%, p=0.527). Late event-free survival rates at 1yr and 2yr was superior in open surgery group (100%, 92.3% after open surgery vs. 62.5% and 50% after endovascular treatment, p=0.017). (Conclusion) Considering patient age and durability of an efficacy of the treatment, open surgical treatment either anatomic or extra-anatomic bypass is recommended for patients with MAS secondary to TA.

Vascular II-7

Clinical Significance of Early Postoperative Diarrhea after Open Surgical Repair of Abdominal Aortic Aneurysm

Division of Vascular Surgery, Department of Surgery, Samsung Medical Center, Sungkyunkwan University, Korea

Sung-Eun Oh, Kyung Won Yoon, Seon-Hee Heo, Yang-Jin Park, Dong-Ik Kim, Young-Wook Kim*

(Purpose) To determine clinical significance of ear-
ly postoperative diarrhea (EPD) after open surgical repair (OSR) of abdominal aortic aneurysm (AAA).

**(Methods)** We retrospectively reviewed database of patients who underwent OSR of AAA during the period between January 2011 and May 2016. EPD was defined as loose form stool passages >3 times a day during early (<2 week) postoperative period. To identify causes of EPD, we investigated past history of colonic disease and performed Clostridium difficile (CD) test (toxin assay with RIDASCREEN®, R-Biopharm AG, Darmstadt, Germany; CD culture in chromID™ medium, bioMérieux, Marcy l’Etoile, France) and/or colonoscopic examination. Among patients with EPD, we performed CD test when EPD persists longer than 2 days and colonoscopic examination for patients with prolonged EPD combined with left lower abdominal pain or tenderness, fever, leukocytosis and/or metabolic acidosis. **(Results)** Among 262 OSRs of AAA (213 infrarenal, 33 juxtarenal, 16 suprarenal AAAs; 229 elective and 33 urgent OSRs for ruptured AAAs), 58 (22.1%) patients developed EPD. The frequencies of EPD was not significantly different between elective (n=52) and emergent (n=6) OSR (22.7% vs 18.2%, p=.659). EPD developed at median 5 days after surgery (mean, 5.1 days±1.95). Among those patients, 26 (44.8%) patients underwent CD test and 14(24%) patients underwent colonoscopic examinations. On CD test, 8(31%) patients showed positive result including one patient showing colonoscopic findings of pseudomembranous colitis. Among 14 patients who underwent colonoscopic examinations, 4(29%) patients showed colon ischemia including 2 mucosal and 2 transmural type of colonic ischemia. Among all OSRs, 5 (2%) patients developed ischemic colitis including 1 additional patient who developed colonic ischemia without EPD after OSR of AAA for ruptured AAA with shock. **(Conclusion)** EPD was not uncommon after OSR of AAAs. The clinical significance of EPD after OSR of AAA is its implication with CD-related diarrhea or colon ischemia in 13.8% and 6.9% of patients, respectively.

**Vascular II-8**  

**Effects of Postimplantation Systemic Inflammatory Response on Long-Term Clinical Outcomes after Endovascular Aneurysm Repair of an Abdominal Aortic Aneurysm**

Department of Surgery, Hallym University Sacred Heart Hospital, Hallym University College of Medicine;  
1Division of vascular surgery, Department of Surgery, University of Ulsan College of Medicine and Asan Medical Center, Korea

Hyunwook Kwon, Youngjin Han1, Minsu Noh1, Tae-Won Kwon1, Yong-Pil Cho1,*

**(Purpose)** The aim of this study was to determine the association between postimplantation syndrome (PIS) and long-term clinical outcomes after elective endovascular aneurysm repair (EVAR) of an abdominal aortic aneurysm. **(Methods)** In this single-center, observational cohort study, a total of 204 consecutive patients undergoing EVAR were included. Primary outcome was long-term mortality from any cause; secondary outcomes included long-term mortality, systemic or implant-related complications, and secondary therapeutic procedures. **(Results)** The diagnosis of PIS was established in 64 patients (31.4%). PIS patients were more likely to receive woven polyester endografts and have a longer postoperative hospital stay and lower incidence of type II endoleaks. In multivariate analysis, PIS was significantly associated with a decreased risk of developing type II endoleaks (P=0.044). During follow-up period of 44 months, clinical outcomes showed no significant differences in mortality (P=0.876), systemic (P=0.668), or implant-related complications (P=0.847), although rates of secondary therapeutic procedure were significantly higher in non-PIS patients (P=0.037). The groups had similar rates of overall survival (P=0.761) and other clinical outcomes (P=0.562). **(Conclusion)** Patients with and without PIS had similar long-term overall survival rates and other clinical outcomes. PIS was beneficial in preventing type II endoleaks during postoperative period.
Table 1. Patient demographics, risk factors and clinical characteristics according to the presence or absence of post-implantation syndrome (PIS) after endovascular aneurysm repair (EVAR).

<table>
<thead>
<tr>
<th>Variable</th>
<th>PIS</th>
<th>Non-PIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>64 (31.4)</td>
<td>140 (68.6)</td>
</tr>
</tbody>
</table>
| Mean age (years)                | 71.7 ± 7.1 | 71.1 ± 6.1 | 0.532
| Male sex                        | 53 (82.8)  | 132 (94.3) | 0.012
| BMI (kg/m²)                     | 24.1 ± 4.3 | 26.1 ± 17.6| 0.387
| Medical History                 |            |            |
| Diabetes mellitus               | 7 (10.9)   | 21 (15.2)  | 0.514
| Hypertension                    | 45 (70.3)  | 99 (71.7)  | 0.868
| Smoking                         | 36 (56.3)  | 93 (67.4)  | 0.156
| Cancer other than skin cancer   | 13 (20.4)  | 27 (20.1)  | 0.449
| CAD                             | 16 (25.0)  | 30 (22.2)  | 0.147
| CVA                             | 10 (15.6)  | 15 (10.9)  | 0.263
| COPD                            | 25 (39.1)  | 59 (42.8)  | 0.645
| CRF                             | 2.3 (1.1)  | 9.6 (5.6)  | 0.506
| Medications                     |            |            |
| Antiplatelet agent              | 33 (51.6)  | 59 (42.9)  | 0.288
| Statin                          | 29 (45.3)  | 60 (43.8)  | 0.880
| Anatomic data (mm)              |            |            |
| Aneurysm sac diameter*          | 56.8 ± 9.7 | 56.9 ± 10.5| 0.939
| Aneurysm sac length             | 74.8 ± 20.5| 78.4 ± 22.2| 0.291
| Neck diameter                   | 23.9 ± 4.4 | 22.0 ± 3.6 | 0.600
| Neck length                     | 33.8 ± 16.6| 34.3 ± 16.1| 0.803
| Neck angle (degree)             | 48.5 ± 21.6°| 47.0 ± 25.3°| 0.686
| CIA involvement                 | 24 (40.0)  | 44 (33.6)  | 0.562
| Thrombus thickness              |            |            |
| Preoperative CTA                | 15.6 ± 14.0| 17.0 ± 11.7| 0.496
| Last FU CTA                     | 17.0 ± 11.6| 18.9 ± 10.8| 0.327
| Clinical characteristics        |            |            |
| General anesthesia              | 41 (64.1)  | 88 (62.9)  | 0.877
| Graft type                      |            |            |
| Woven polyester                 | 60 (83.8)  | 103 (73.6) | 0.001
| ePTFE                           | 4 (6.3)    | 37 (26.4)  | 0.001
| Operation time (hours)          | 2.9 ± 1.1  | 3.1 ± 1.1  | 0.369
| Postoperative endoleaks         | 4 (6.3)    | 19 (13.6)  | 0.155
| Type IA                        | 2 (3.1)    | 0 (0.0)    | 0.997
| Type IB                        | 0 (0.0)    | 6 (4.3)    | 0.113
| Type II                        | 2 (3.1)    | 18 (12.9)  | 0.040
| Type III                       | 1 (1.6)    | 0 (0.0)    | 0.314
| Postoperative hospitalization (day) | 6.0 ± 2.4 | 4.9 ± 2.2  | 0.010

Continuous data are shown as mean ± standard deviation, and categorical data as number (%).

BMI, body mass index; CAD, coronary artery disease; COPD, chronic obstructive pulmonary disease; CRF, chronic renal failure; CIA, computed tomography angiography; CVA, cerebrovascular accident; FU, follow-up; ePTFE, expanded polytetrafluoroethylene; *Maximum aneurysm diameter measured perpendicular to the flow line of the vessel with three-dimensional reconstructed CTA images.
Table 4. Long-term clinical outcomes after EVAR

<table>
<thead>
<tr>
<th>Outcome</th>
<th>PIS (n=64)</th>
<th>Non-PIS (n=140)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>All deaths</td>
<td>14 (21.9)</td>
<td>32 (22.9)</td>
<td>0.876</td>
</tr>
<tr>
<td>Cause of death</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aneurysm-related cause</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular cause</td>
<td>0 (0.0)</td>
<td>2 (1.4)</td>
<td>1.000</td>
</tr>
<tr>
<td>Cancer</td>
<td>34 (47.7)</td>
<td>10 (7.1)</td>
<td>0.505</td>
</tr>
<tr>
<td>Pneumonia or other infection</td>
<td>2 (3.1)</td>
<td>3 (2.1)</td>
<td>0.647</td>
</tr>
<tr>
<td>Other cause</td>
<td>(7.8)</td>
<td>9 (6.4)</td>
<td>0.717</td>
</tr>
<tr>
<td>Unknown cause</td>
<td>4 (6.3)</td>
<td>8 (5.7)</td>
<td>0.880</td>
</tr>
</tbody>
</table>

Secondary therapeutic procedures

<table>
<thead>
<tr>
<th>No. of patients</th>
<th>25 (17.9)</th>
<th>5 (7.8)</th>
<th>0.060</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of procedures</td>
<td>27 (19.3)</td>
<td>5 (7.8)</td>
<td>0.037</td>
</tr>
</tbody>
</table>

Systemic complications

| Percentage | 9 (14.1) | 20 (14.3) | 0.668 |

Cardiac

| Percentage | 6 (9.4) | 8 (5.7) |         |

Pulmonary

| Percentage | 3 (4.7) | 7 (5.0) |         |

Cardiovascular

| Percentage | 1 (1.6) | 6 (4.3) |         |

Renal

| Percentage | 2 (3.1) | 2 (1.4) |         |

Gastrointestinal

| Percentage | 0 (0.0) | 1 (0.7) |         |

Implant-related complications

| Percentage | 2 (3.1) | 3 (2.1) | 0.847   |

Graft infection

| Percentage | 1 (1.6) | 1 (0.7) |         |

Limb occlusion

| Percentage | 1 (1.6) | 2 (1.4) |         |

Follow-up period (months)

| Percentage | 46.14 ± 24.29 | 43.29 ± 23.60 | 0.430 |

Values are numbers of patients (%).

EVAR, endovascular aneurysm repair.

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Vascular II-9

Radiation Exposure During Endovascular Treatments using Mobile C-arm

Department of Surgery, 1Department of Medical Statistics, Daegu Catholic University College of Medicine, Korea

Jae Hoon Lee, Ki Hyuk Park*, Sang Gyu Kwak1

(Purpose) Minimally invasive endovascular treat-ments (EVT) continue to increase due to the reduction of perioperative morbidity and mortality. But only a few studies have reported the radiation exposure during EVT. We investigated the amount of radiation from C-arm during EVT and analyzed the factors affecting the amount of radiation. (Methods) From August 2015 to July 2016, dose-area products (DAP) were obtained from a retrospective study of 124 patients. Entrance surface dose (ESD) was calculated to assess the risk of skin injury. For statistical analysis, one way ANOVA, correlation analysis and two sample t-test were used. (Results) Mean age of the patients was 71.48±11.26 years. The percentage of male was 78.2%. Percutaneous transluminal angioplasty (PTA) was the main procedures in EVT (71.0%). Endovascular aneurysmal repair (EVAR) had a longer fluoroscopy time and a higher DAP compared with PTA and angiography (P=0.00, 0.00). Fluoroscopy time and DAP had a positive correlation (r=0.749, P=0.00). Higher DAP was measured in obese patients (P=0.049). Calculating the ESD in two ways, any value did not exceed 2G which could make skin injury. (Conclusion) EVT using mobile C-arm were safe in skin injury. In EVAR with a longer fluoroscopy time and in the obese patients, we should be noted the possibility of more radiation exposure.
Annual Congress of KSS 2016

Vascular: Scientific Session 3.
Venous Disease & Vascular Access

Date. Saturday, November 5, 2016
Venue. Crystal ballroom B, 3F, Convention Center

Moderators:
Byung Jun So (Wonkwang Univ.),
Hyoung Tae Kim (Kei-Myung Univ.)
Vascular III-1
Comparative Outcomes of Vascular Access in Patients Older than 70 Years

Division of Vascular Surgery, Department of Surgery, Kyungpook National University School of Medicine, Korea

Deokbi Hwang, Sujin Park, Hyung-Kee Kim*, Seung Huh

(Purpose) Arteriovenous fistulas (AVFs) are the preferred choice for hemodialysis vascular access (AV access); however, there is debate over the utility of AVFs in older patients, particularly concerning access maturation and primary patency. We reviewed our AV access experience in patients ≥ 70 years of age. (Methods) We analyzed consecutive AV access patients ≥70 years old with access operations between January 2013 and June 2016. All patients had ultrasound vessel mapping. We compared primary failure and primary patency data for our elderly patients (EP group) with those of our non-elderly patients (NP group) during the same time period. Primary failure was defined as AV access occlusion or maturation failure without occlusion, not amendable for 2 sessions of successful cannulation for hemodialysis regardless of salvage procedures. Primary patenty was defined as the time (months) with uninterrupted patency and without intervention. (Results) During the study period, 594 consecutive AV access formation was performed in 562 patients and included in this study. EP group was consisted of 193 (32.5%) AV accesses. The mean age was 75.9 years in EP group and 55.3 years in NP group. The AVFs were performed in 130 (67.4%) of EP group and 293 (73.1%) of NP group (p=0.150). Overall primary failure rate was significantly higher in EP group compared with NP group (14.8% vs. 6.5%, p=0.001). In subgroup analysis for AVFs, the primary failure rate was also significantly higher in EP group compared with NP group (16.4% vs. 5.7%, p=0.001), however, there was no difference in primary failure rate between EP and NP group after arteriovenous grafts (AVGs) (11.5% vs. 8.6%, p=0.541). Overall primary patency rates at 6 months and 1 year differed significantly by group: 73.8% and 61.7% for EP group, 83.6% and 72.0% for NP group (p=0.030). In subgroup analysis for AVFs, overall primary patency rates at 6 months and 1 year also differed significantly by group: 73.2% and 57.1% for EP group, 86.7% and 77.8% for NP group (p=0.009). However, there was no difference in primary patency for AVGs between EP and NP group (p=0.773). (Conclusion) In elderly patients receiving AVFs, the outcomes were inferior to the non-elderly patients in regard to higher primary failure and lower primary patency. Thus, liberal use of AVGs should be considered in elderly patients requiring AV access for hemodialysis.

Vascular III-2
Outcomes of Surgical Versus Hybrid Interventions in Managing Arteriovenous Graft with Thrombotic Occlusion

Division of Vascular Surgery, Department of General Surgery, Gacheon University Gil Hospital, Korea

Dai Sik Ko, Ahram Han, Jin Mo Kang*

(Purpose) Arteriovenous grafts (AVG) are prone to thrombotic occlusion than native arteriovenous fistulas, and repeated interventions are often needed to maintain the patency of thrombosed AVGs. Although hybrid approach incorporating percutaneous transluminal angioplasty (PTA) for causal stenotic lesion after manual thrombectomy is gaining popularity, whether it is superior than surgical correction in terms of patency and complication are largely unknown. (Methods) By retrospective review, we identified patients who underwent either surgical or hybrid intervention for first-time thrombotic occlusion after AVG creation at a single institution between March, 2008 and February, 2016. Primary endpoint was post-intervention primary patency of each group. Patency was defined according to the Society for Vascular Surgery recommended reporting standards and was determined from the time of the index procedure. Intervention related characteristics including time of procedure, rate of technical success, and rate of complication were also compared. (Results) During the 8 year-study period, 77 patients had thrombotic graft...
occlusion as the first time event after AVG creation. Median time from graft creation to first thrombotic occlusion was 260 (interquartile range 149-530) days. All 77 patients underwent Fogarty thrombectomy via small incision on graft. After thrombectomy, patients underwent either balloon angioplasty percutaneously (hybrid group, n=30) or surgical procedure (surgery group, n=47) to correct the underlying stenotic lesions. Both groups were comparable in age, sex, comorbidities including diabetes and hypertension, and graft age. Estimated post-intervention primary patency of hybrid group compared to the surgical group were not significantly different (75.6% versus 65.5%, 46.1% versus 53.8%, 34.5% versus 47.5% at post-intervention 3, 6, and 12 months, P=0.78). (Conclusion) Short-term functional and safety outcome associated with hybrid approach of PTA after thrombectomy in first time AVG thrombosis were comparable with conventional approach of surgical correction of stenosis after thrombectomy. As multiple interventions are frequently needed in patients with AVG, further studies on whether either approach has benefit over another in overall graft survival are needed.

(Purpose) Creating vascular access (VA) for hemodialysis is one of major job for vascular surgeon. Preferred location of VA is arm. Low extremity is less favored site and only for there are no choice on upper extremities. Even worse situation is the patient has no choice on both upper and lower extremities. (Sometimes patients with long history of dialysis and physical deformity give us tough task.) Here we present a patient who had no choice on his upper and lower extremities thereby lower abdominal prosthetic ilio-iliac arteriovenous graft was created for dialysis. (Case) He was 25-Y-O male who were born as premature and had vesicoureteral reflux which needed a number of operations including the ureteral reimplantation and eventually progressed to ESRD at the age of 17. Also he had hypoxic brain injury during delivery which made unable to cooperate during dialysis. He had been on hemodialysis through central venous catheter for 8 years with repeated revision. His hip showed flexion contracture. When he wake he usually jumps on his lower legs. Since his central vein was occluded on both sides, his contracted hip, and jumping habits prohibited VA creation on his extremities. So abdominal wall AV graft was chosen. Iliac vessel were approached via an oblique incision parallel to the inguinal ligament. The graft was brought through the incision and placed subcutaneously. (Results) Recovery was uneventful. He is on dialysis without difficulty for 3 months until now. (Conclusion) Abdominal wall prosthetic ilio-iliac arteriovenous graft is viable option for the patients who have no available vessels for vascular access creation in their extremities.
Vascular III-4

Reflex Patterns of Varicose Vein Determined by Duplex Ultrasonography

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(Purpose) The purpose of this study was to investigate the baseline characteristics of duplex ultrasonography (DUS) in Korean patients with varicose vein and to define the reflex patterns of varicose vein. (Methods) Among 916 DUS of lower extremity from Jan 2015 to Dec 2015, data from patients with varicose veins were analyzed retrospectively. A total of 429(46.8%) patients, 694 limbs were enrolled in this study. (Results) Mean age was 56.8±14.37 years and female were 63.6%. Both limbs were involved in 265 (61.8%) patients. Clinical classification of 694 limbs were C1 (17.7%), C2 (61.7%), C3 (17.9%), and C5 (2.7%). Reflux was detected in GSV (52.8%), SSV (18.7%), perforator vein (13.6%), pelvic vein (9.3%) and unknown (5.6%). Perforator reflux was found in Cockett (13.3%), Boyd (16.7%), Dodd (6.3%), and Hunterian (0.9%) perforators. Pathologic perforator (≥3.5mm) was presented in 28 limbs and Dodd perforator (39.3%, 11/28 limbs) was most common. Reflux in deep vein was accompanied in 299 (43.1%) limbs. Mean diameter and peak velocity of Rt. GSV, Lt. GSV, Rt. SSV, and Lt. SSV were 0.65±0.24, 0.65±0.24, 0.50±0.19, 0.52±0.19cm and 28.69±25.93, 26.63±19.82, 26.88±20.04, 31.22±23.19 ms⁻¹. (Conclusion) In varicose vein, multiple limb or multiple vein reflux was common. Accompanying perforator or deep vein reflux is also common. Thorough DUS examination is mandatory for optimal treatment of varicose veins. Further studies comparing the duplex parameters after treatments are needed.

Vascular III-5

Incidence, Risk Factor, and Clinical Outcomes for Endovenous Heat-Induced Thrombosis after Radiofrequency Ablation

Department of Surgery, Kyung Hee University Hospital at Gangdong, Kyung Hee University School of Medicine, Korea

Jin Hyun Joh*, Ho-Chul Park

(Purpose) Endovenous radiofrequency ablation (RFA) is a safe and effective treatment for varicose veins caused by saphenous reflux. Endovenous heat-induced thrombosis (EHIT) as an unique complication for this procedure revisited due to the introduction of non-thermal, non-tumescent procedures. The purpose of this study was to evaluate the incidence, risk factor, and clinical consequence of EHIT. (Methods) We retrospectively reviewed the data of patients with varicose veins undergoing RFA from 2009 to 2016. RFA was performed using ClosureFast catheter (Medtronic, San Francisco, CA).
Jose, CA, USA) as recommended by the instruction for use. Duplex ultrasonography (DUS) were performed within 1 week and 6 months after procedure. If the EHIT was found at the first post-procedural DUS, monthly surveillance was done. The incidence of EHIT and risk factors were analyzed. And clinical consequence was investigated. The paired t-test, independent t-test, and Fisher’s exact test using SPSS Ver. 22.0 (Armonk, NY) were used for statistical analysis. All P values were 2-tailed, and P<0.05 was considered to be statistically significant. (Results) During the study period, a total of 1,247 saphenous veins in 783 patients were performed RFA. One saphenous vein was ablated in 405 (51.7%) patients. More than 2 saphenous veins were ablated in 378 (48.3%) patients. Four hundred fifty-seven (58.4%) patients were women. The mean age was 52.9±12.4 years (range: 8-85 years). EHIT was present in 7 (0.6%) saphenous veins in 7 (0.9%) patients. EHIT was developed in 6 GSVs and 1 SSV. EHIT class I, II, and III were 3, 2, and 2 patients, respectively. The diameter of GSV ≥ 6mm was the significant risk factor for the occurrence of EHIT. Six EHITs were spontaneously resolved within 5 weeks after procedure. One EHT was resolved in 7 months after procedure. No pulmonary embolism occurred. (Conclusion) EHIT was a rare complication after RFA. Moreover, it was spontaneously resolved without any clinical squale. Thus, it is suggested against routine DUS to evaluate EHIT at post-operative period in asymptomatic patients.

Vascular III-6

Clinical Characteristics of May-Thurner’s Syndrome with Thrombus Extension to IVC

Heungman Jun*, Cheol Woong Jung

(Purpose) With an increase in lower extremity deep vein thrombosis (DVT), interest in May-Thurner’s syndrome (MTS) accompanying iliac vein compression is also on the rise. In particular, it is observed that some patients with MTS have IVC thrombosis. And if IVC thrombosis is present, mortality as well as significant complications including postthrombotic syndrome (PTS) and pulmonary thromboembolism (PTE) will rise. The purpose of this study is to find the different characteristics of MTS with thrombosis extending stenotic lesion of iliac vein into IVC, compared to MTS without IVC thrombosis. (Methods) A total of 35 patients with MTS were treated with many interventional modalities including catheter directed thrombolysis, percutaneous mechanical thrombectomy and iliac vein stent from January 2012 to December 2015. The data on the current history, the stenotic feature (stenotic size, stenotic ratio compared from the other side) and clinical outcomes (PTE, PTS) were retrospectively reviewed by dividing into groups with IVC thrombosis and without. The patency in the two groups was compared with log-rank test. (Results) Eight patients (22.85%) had thrombus extension to IVC (TEIVC) in 35 patients of MTS. The group with TEIVC showed higher measurement in stenotic size and ratio, which was statistically significant (P<0.001, P=0.001). The group with TEIVC presented more with PTE compared to the group without, which was statistically significant (P=0.007). But there were no statistical differences of PTS. In follow-up of mean 11 months, there were no statistical differences of patency in the two groups (P=0.501). (Conclusion) In MTS, TEIVC is likely to develop in cases where the iliac venous size of stenotic lesion and the stenotic ratio compared from the other side is shown to be greater. Also, PTE occurred more frequently in MTS with TEIVC. Thus, patients with MTS require thorough inspection on TEIVC, and large scale research with long term results is also necessary.
Catheter-Directed Thrombolysis Cannot Prevent Postthrombotic Syndrome

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(Purpose) Postthrombotic syndrome (PTS) is a long-term complication of deep vein thrombosis (DVT) and it lowers quality of life of the patients. Although catheter-directed thrombolysis (CDT) is suggested to prevent PTS in patients with acute iliofemoral DVT, its efficacy is controversial. The aim of this study is to identify risk factors of development of PTS in patient with lower extremity DVT.

(Methods) From 2005 Jan to 2013 Dec, 260 limbs of 228 patients were diagnosed as a first episode of a proximal DVT in the affected limb. Among them, 139 limbs of 126 patients who visited our out-patient clinic to assess Villata score were enrolled in this study. PTS was diagnosed if the Villata score was 5 or more. The patient demographic and clinical data (age, gender, body-mass index [BMI], locations of DVT, duration of symptom and risk factors of DVT) and treatments (anticoagulation therapy, CDT and iliac vein stenting) were reviewed retrospectively. To find risk factors of PTS development, multivariate analysis was performed with binary logistic regression model.

(Results) Patient median age was 62 years and 49% was male. Anticoagulation therapy was used in all patients except 3 patients. CDT was performed in 55 limbs (40%) and iliac vein stent placement was in 31 limbs (22%). During 82 months (30-136 months) of median follow-up, PTS occurred in 17 limbs (12%). On multivariate analysis, BMI (hazard ratio [HR], 1.303, 95% confidence interval [CI], 1.079-1.574; P=.006) and iliofemoropopliteal thrombosis (HR, 3.666; 95% CI, 1.093-12.296; P=.035) were identified as independent risk factors of PTS. However, CDT was not associated with PTS development (HR, 1.317; 95% CI, .367-4.728; P=.673)

(Conclusion) High BMI and extensive thrombus burden had increased risk of PTS development, whereas CDT could not reduce development of PTS.

Endovascular Treatment for Acute Iliofemoral DVT

Division of Vascular & Transplant Surgery, Department of Surgery, College of Medicine, The Catholic University of Korea, Korea

Sang Dong Kim, Ji Il Kim, Sang Seob Yun, In Sung Moon, Sun Cheol Park*

(Purpose) Endovascular treatment for acute iliofemoral DVT has been accepted to a treatment of choice. But, modalities of endovascular treatments are decided by characteristics of patients and thrombus. So, we evaluated the status of endovascular treatments for acute iliofemoral DVT in our hospital.

(Methods) Between August 2014 and August 2016, total 35 acute iliofemoral DVTs have been involved. Thrombus ages of all 35 acute iliofemoral DVTs were less than 4 weeks. Among 35 patients, IVC filter insertions, mechanical thrombectomies, and stent insertions were performed according to patients' indications. We didn't performed an overnightly continuous thrombolysis in all patients. We evaluated clinical characteristics, coagulation profiles, symptom improvements, recurrences of DVT.

(Results) 35 patients consisted of 11 in males and 24 females. Mean age was 68 years old. IVC filter insertion, mechanical thrombectomy and stent insertion were performed in 16 patients. IVC filter insertion and mechanical thrombectomy were performed in 4 patients. Only mechanical thrombectomy were performed in 2 patients. IVC filter insertion, mechanical thrombectomy and stent-graft insertion were performed in 1 patient. Only IVC filter insertions were performed in 12 patients. We didn't performed an overnightly continuous thrombolysis in all patients. After procedure, symptoms were improved in all 23 patients except 12 patients performed only IVC filter insertions. But, there were one recurrence of DVT during follow-up, and a recurrdent patient was managed by anticoagulation.

(Conclusion) Endovascular treatments for acute iliofemoral DVT were need to be performed separately by indications. And, we suggest that an overnightly continuous thrombolysis can be omitted.
Availability of Peripherally Inserted Central Catheter (PICC) in Our Hospital

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(Purpose) Peripherally Inserted Central Catheter (PICC) can be used in nearly all medical fields. So, an interest about PICC has been increased. We evaluated a status and an availability of PICC in our hospital. (Methods) Between August 2014 and August 2016, total 213 PICCs in 190 patients have been tried to insert in our hospital. We inserted via a fluoroscopic system (C-arm). We evaluated underlying disease, inserted site, inserted vein, length of catheter, and complications. (Results) 190 patients consisted of 81 in males and 109 females. Mean age was 66 years old. We inserted PICCs in 185 patients via a fluoroscopic system (C-arm) and did in bedside in 5 ICU patients. Patient's underlying diseases involved malignancy (52.1%), benign disease (34.7%), infection(10.3%), and trauma (2.8%). Technical success was 99.1%(211/213). Inserted sites were 190 (90.0%) in right side and 21 (9.9%) in left side. Inserted veins were 133 (63.0%) in right basilic vein, 53 (25.1%) in right brachial vein, 13 (6.2%) in left basilic vein, 7 (3.3%) in left brachial vein, 4 (1.9%) in right cephalic vein, and 1 (0.5%) in left cephalic vein. Lengths of catheter from puncture site to SVC were 38.97cm in right side and 43.30cm in left side. Complications involved 3 (1.4%) of artery punctures and 4 (1.9%) of infections. (Conclusion) PICC insertion is a feasible and available procedure in a medical field. So, we need to expand an indication of PICC. We think that a PICC can replace a CVC in the future.
Annual Congress of KSS 2016

Poster Exhibition

Hepato-biliary and Pancreas
**PE-001**

**Indocyanine Green-Fluorescent Pancreatic Perfusion-Guided Resection of Distal Pancreas in Solid Pseudopapillary Neoplasm**

Division of Hepatobiliary Pancreatic Surgery, Department of Surgery, Yonsei University College of Medicine, Severance Hospital, Korea

**Sung Hyun Kim, Chang Moo Kang**

**(Purpose)** Indocyanine green (ICG) is a fluorescent dye that has been approved by the Food and Drug Administration (FDA) for clinical and research use in humans since 1956. Initially, ICG was used for quantitative measurements of hepatic and cardiac function. However, due to this physiologic property and the advancement of instrumental camera technology, ICG is now widely applied in real-time imaging during abdominal surgery, plastic surgery, as well as oncologic staging and treatment. However, there are few examples of clinical applications using ICG in pancreatic surgery. We recently experienced a very interesting case supporting the potential application of ICG in pancreatectomy.

**(Methods)** A twenty-eight year-old female patient without past medical and surgical history was found to have a mass in the tail of the pancreas (Figure 1A). She had intermittent abdominal pain during 1 month. Preoperative studies showed a 5 cm mass in the pancreas tail, suggesting solid pseudopapillary neoplasm (SPN). Under the ICG-fluorescent pancreatic perfusion-guidance, we easily defined the margin of the pancreatic tumor and secured the resection margin when performing laparoscopic distal pancreatectomy in the patient (Figures 1B and 1C). To obtain the ICG-fluorescent image, 5mg of ICG (Dongindang, Shihung, Korea) was injected intravenously.

**(Results)** Final pathologic examination reported that the tumor was a 4.5 cm SPN of the pancreas. (Figure 1D) No lymph node metastasis was noted. No clinically relevant complications, including postoperative pancreatic fistula, were noted.

**(Conclusion)** To the best of our knowledge, this brief report is the first ICG-based real-time intraoperative visualization to determine the appropriate resection margin of the pancreas. Further experiences and clinical applications of ICG-fluorescent-based pancreatic surgery need to be accumulated.

**Fig.** (A) Preoperative image: 4.5 cm mass in the tail of pancreas (B) Before pancreas resection (bare eye view), (C) Before pancreas resection (ICG-fluorescent pancreatic perfusion-guidance view), and (D) Immediate postoperative specimen (ICG-fluorescent pancreatic perfusion-guidance view) P: Pancreas parenchyme, T: Tumor, White arrow: Resection margin, and White arrowhead: Perfusion margin

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**PE-002**

**Clinicopathological Features and Post-Resection Prognosis of Double Primary Hepatocellular Carcinoma and Intrahepatic Cholangiocarcinoma**

Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine, Korea

**Shin Hwang**, Dong-Hwan Jung, Ki-Hun Kim, Young-Joo Lee, Chul-Soo Ahn, Deok-Bog Moon, Tae-Yong Ha, Gi-Won Song, Gil-Chun Park, Sung-Gyu Lee

**(Purpose)** Simultaneous double primary hepatocellular carcinoma (HCC) and intrahepatic cholangiocarcinoma (ICC) (dpHCC-ICC) is very rare. This study investigated the clinicopathological features and post-resection prognosis of dpHCC-ICC.
**(Methods)** We identified 10 patients with dpHCC-ICC through an institutional database search. Three control groups with HCC, ICC and combined HCC-cholangiocarcinoma (cHCC-CC) were selected (each n=120) using propensity score matching. **(Results)** The incidence of dpHCC-ICC was 0.23%. The mean age was 57.4±11.7 years and 8 were male. Hepatitis B virus infection was associated with 8 patients. All dpHCC-ICC were diagnosed incidentally from surgical specimens. Only two patients demonstrated simultaneous elevation of alpha-fetoprotein/des-γ-carboxy prothrombin and carbohydrate antigen 19-9. All patients underwent macroscopic curative resection. The HCC component was classified as stage I in 7 and II in 3; and ICC component was classified as stage I in 5, II in 2 and IV in 3. Tumor recurrence and patient survival rates were 30.0% and 90.0% at 1 year and 52.0% and 77.1% at 3 years, respectively. Tumor recurrence rates were not different between the dpHCC-ICC and the three control groups (p=0.505). The overall and post-recurrence patient survival rates were similar between the dpHCC-ICC and cHCC-CC groups (p >0.2); however, these were inferior to those in the HCC group but comparable with those in the ICC group. **(Conclusion)** The post-resection prognosis of dpHCC-ICC was more dependent on the tumor stage of the ICC component than the HCC component. Therefore, they can be clinically regarded as ICC with concurrent HCC.

**Fig.** Tumor recurrence (a) and overall patient survival curves (b) in patients with double primary hepatocellular carcinoma (HCC) and intrahepatic cholangiocarcinoma (ICC) (dpHCC-ICC), HCC, ICC and combined HCC-cholangiocarcinoma (cHCC-CC).
Expression of MicroRNA-221 and MIR-18A in Patients with Hepatocellular Carcinoma and Its Clinical Significance

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(Purpose) The aim of this study was to evaluate the clinical significance of microRNA-18a, 221 (miR-18a, 221) expression in hepatocellular carcinoma (HCC) formalin-fixed paraffin-embedded (FFPE) tissue. (Methods) MiR-18a and miR-221 expressions were assessed by reverse transcription and real-time PCR (RT-PCR) in 50 pairs of FFPE HCC and the adjacent noncancerous liver tissues. And the relationship between miR-18a,221 level and clinicopathological data and survival rates were analyzed. (Results) At first, miR-221 expression and miR-18a was up-regulated in HCC tissue as compared with their adjacent noncancerous liver tissue (P<0.001). Then the miR-221 expression was found to be correlated with larger tumor size (p=0.048). MiR-18a expression was correlated with modified UICC stage (p=0.05). After that, survival analysis found that the overall survival (p=0.02) of HCC patients with high miR-221 expression was significantly poorer compared to those patients with low expression. Multivariate analyses demonstrated that miR-221 may be a poor prognostic factor of HCC patients. However, miR-18a was not correlated with survival. (Conclusion) Expression of miR-221,18a in FFPE tissues could provide significance for prognosis of HCC patients. More larger study and functional study will be needed.

Actual 5 Year Survival of T1, T2 Pancreatic Ductal Adenocarcinoma

San Hyup Han, Jin Seok Heo*, Sung Ho Choi, Dong Wook Choi, In Woong Han, Sunjong Han, You Young Hun

(Purpose) Long term survival is uncommon for patients with pancreatic ductal adenocarcinoma. This study aimed to evaluate the survival rates and prognostic factors after resection for pancreatic ductal adenocarcinoma. (Methods) Retrospective analysis of 366 patients with pancreatic ductal adenocarcinoma underwent resection at Samsung medical center between september 1995 and December 2010 was performed. Actual 5 year survival rates and prognostic factors were analyzed. (Results) Multivariate analysis showed that positive resection margin(HR=2.207, 95% CI=1.637-2.977, p<0.001), poor differentiation (HR=1.822, 95% CI=1.418-2.340, p<0.001), large tumor size over 3cm (HR=1.468, 95% CI=1.147-1.877, p=0.002) and T3,4 (HR=3.116, 95% CI=1.281-7.580, p=0.012) were independent prognostic factors on overall survival. Actual 5-year survival rate of T1,2 is 72.7%, in contrast T3,4 is 19.7%. Actual 5-year disease-free survival rate of T1,2 is 58.3%, in contrast T3,4 is 18.8%. (Conclusion) In this study, Actual 5-year survival rate and disease-free survival rate of T1,2 is 72.7% and 58.3%. T1,2 pancreatic ductal adenocarcinoma show the good survival outcome. To identify this, further evaluation and multicenter study is required.
**PE-006**

Survival outcome and Prognostic Factors of 308 Patients Undergone Surgery with Hepatic Resection in Hilar Cholangiocarcinoma

Division of Hepatobiliary and Pancreatic Surgery, Department of Surgery, Ulsan University College of Medicine and Asan Medical Center, Korea

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**Purpose**
Although survival outcome and prognostic factors of hilar cholangiocarcinoma have reported through the various studies, only few studies reported survival outcome and prognostic factors analyzing over three hundred patients who underwent surgery with hepatic resection in hilar cholangiocarcinoma. This study was designed to figure out survival outcome and prognostic factors of hilar cholangiocarcinoma after surgery with hepatic resection. **Methods**
Between January 2000 and December 2013, 477 patients with hilar cholangiocarcinoma underwent surgery with curative intent. Among them, 308 patients underwent surgery with hepatic resection for treating hilar cholangiocarcinoma in the division of Hepatobiliary and pancreatic surgery, Asan Medical Center, University of Ulsan College of Medicine. Prognostic factors were analyzed with Cox proportional hazard models. **Results**
Of 308 patients, mean age of patients was 62.01 (±8.63) and 205 patients were male (66.6%). 145 patients (47.1%) were stage II by AJCC 7th. And 103 patients (33.4%) were stage III-B. Right hepatectomy with caudate lobectomy was performed in 156 patients (50.6%) and Left hepatectomy with caudate lobectomy was performed in 69 patients (22.4%). R0 resection performed 207 patients (67.2%) and R1 resection performed 101 patients (32.8%). Combined portal vein resection was carried out in 28 patients (9.09%) and hepatic artery resection was carried out in 3 patients (0.97%). Adjuvant chemotherapy was performed in 138 patients (44.8%) and among them, 69 patients underwent concurrent chemoradiation therapy (CCRT). There were 5 mortality cases (1.0%) due to bleeding or liver failure after surgery. The overall 1-, 3-, and 5-year survival rate were 85.4, 42.8 and 28.2% in the R0 group and 81.2, 44.4 and 30% in the R1 group. There were no significant difference in overall survival rates between R0 group and R1 group. (p=0.946). Five-year disease-free survival rate was 18.3% after resection. Multivariate analysis showed lympho-vascular invasion (p=0.014) and histologic differentiation (p<0.001) were independent prognostic predictors of patient survival. **Conclusion**
The surgery with hepatic resection including major hepatectomy in hilar cholangiocarcinoma was feasible and showed satisfactory survival outcomes. Considering age and medical condition of patients, it could be performed safely with the higher possibility of curative resection.

**PE-007**

Comparison of outcome of Deceased Donor Liver Transplantation for Cirrhosis Due to Alcoholic Liver Disease Versus Hepatitis B Virus

Department of Surgery, Seoul National University College of Medicine, Korea

Suk Kyun Hong, Nam-Joon Yi*, Hyo-Sin Kim, Sung-Woo Ahn, Kyung Chul Yoon, Jin Yong Choi, Hyeyoung Kim, Kwang-Woong Lee, Kyung-Suk Suh

**Purpose**
Few studies have focused on the comparison of post-liver transplant (LT) outcome between hepatitis B virus (HBV) and ALD in an Asian country where HBV is endemic and there no strict regulation of pre-transplant abstinence for alcoholic liver disease (ALD). The aim of this study is to evaluate the efficacy of DDLT in patients with ALD comparing post-transplant outcome with HBV. **Methods**
We retrospectively analyzed data from patients who received DDLT at Seoul National University Hospital from January 2010 to December
2014. **(Results)** 107 patients underwent primary DDLT for HBV and 38 patients for ALD. ALD patients had higher serum gamma glutamyltransferase (GGT) level at post-LT 1 year (39.9 vs. 90.5 IU/L, respectively; \(P=0.025\)). The major complication was infection which was more frequent in ALD group (19.6% vs. 43.8%; \(P=0.018\)). There was no significant difference in the overall survival rate between the two groups (1-, 3-year survival rates of 90.7% and 82.1%, respectively vs. 92.1% and 82.3%, respectively; \(P=1.000\)). By multivariate analysis, independent prognostic factor was a high serum GGT level on post-LT 1 year (≥70 IU/L). **(Conclusion)** In conclusion, outcome of DDLT for ALD and HBV in Korea was comparable without pre-transplant strict application of abstinence as selection criteria of DDLT.

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### PE-008

**Surgical Outcomes following Pancreatic Resection At a Low-Volume Center**

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Kwang Yeol Paik*

**(Purpose)** The relationship between hospital procedure volume and surgical outcomes has been a topic of considerable interest. Pancreatic resection (PR) are complex and associated with a high risk of complications. Hospitals with a higher volume of PR have been shown to have better post-operative outcomes than lower-volume hospitals. However, PR previously reserved for severe complication has evolved into a common and safe procedure performed by many surgeons today. This study aimed to investigate outcome of PR in low volume center through short term surgical results. **(Methods)** 60 patients with PR were enrolled during a 3-year periods. Clinically significant complications were defined as Clavien-Dindo grade III-V complications. Pancreatic fistula (PF) and post-pancreatectomy hemorrhage (PPH) were scored and graded according to standard international consensus definitions. Clinically significant PF (CR-POPF) was defined grade B or C. The main outcome measures in this study were rates of CR-POPF, clinically significant complications, 90-day mortality, 90-day readmission and reoperation. **(Results)** There was 30 pancreatodudodenectomy (PD), 22 Left sided pancreatectomy (LP), 6 total pancreatectomy (TP), and 2 central pancreatectomy (CP). There was one in hospital mortality (1.67%). Overall CR-POPF rate was 6.6% (n=4), PPH rate was 8.3% (n=5) and clinical significant complication rate was 13.3% (n=8). 8 patients (13.3%) were hospitalized again after index discharge and 2 patients (3.3%) had to get surgery again. There were no significant differences in clinically significant complication rates (20.7% vs. 4.5%, vs 16.7% \(p=0.37\)), CR-POPF (10.3% vs. 4.5% vs 0% \(p=0.68\)), or reoperation rates (6.9% vs. 0% vs 0% \(p=0.54\)) between PD, LP and TP groups, respectively. Clinically significant complication was associated with more CR-POPF (\(p=0.0001\)). **(Conclusion)** PR can be achieved at a low volume center with acceptable results. To improve surgical quality of PR in low volume center, it will be needed to compare to those of high volume centers and long term results in future.

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### PE-009

**Clinicopathologic Analysis of Ampulla of Vater Cancer after Curative Resection with Actual Long-Term Follow-Up**

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**(Purpose)** To find actual survival duration after curative surgery in patients with ampulla of Vater (AoV) cancer and to investigate the risk factors affecting recurrence **(Methods)** From December 1994 to August 2010, a total of 300 patients, with AoV cancer after curative resection, were reviewed retrospectively in Samsung Medical Center. Clinicopathologic factors, disease-free and overall survival were analyzed. **(Results)** Curative resections consisted of pancreatodudodenectomy (n=81, 27%), pylorus-preserving pancreatoduodenectomy (n=216,
72%), transduodenal ampullectomy (n=2, 0.7%) and pancreaticoduodenectomy with total pancreatectomy (n=1, 0.3%). Median follow-up duration was 49 (0.3-240) months. Recurrence occurred in 128 patients (42.7%). The 3- and 5-year disease-free survival rates were 61.6% and 58.9%, and overall survival rates were 64.3% and 55.7%, respectively. Multivariable analysis showed that an advanced T stage (HR=3.058, 95% CI 1.774-5.272, p<0.001), the presence of lymph node metastasis (HR=3.636, 95% CI 2.214-5.938, p<0.001), especially involvement over 3 (HR=6.111, 95% CI 3.017-12.381, p<0.001), perineural invasion (HR=3.59, 95% CI 1.358-9.489, p=0.01), lymphovascular invasion (HR=3.971, 95% CI 1.514-10.416, p=0.005) and pancreatobiliary subtype of histology (HR=2.778, 95% CI 1.077-7.164, p=0.035) significantly increased the risk of recurrence. (Conclusion) An advanced T stage, nodal metastasis especially over 3, perineural and lymphovascular invasion, pancreatobiliary subtype were found to be independent predictors of recurrence in patients with AoV cancer after curative resection. Well-designed prospective study or nationwide retrospective study will be needed for evaluation of prognostic effect on the number of metastatic lymph node or pancreatobiliary subtype of histology after curative resection in patients with AoV cancer.

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**PE-010**

Clinical Outcomes of Radical Surgery for Periampullary Lesions (With a Focus on Postoperative Complications)

Department of Surgery, Kyung Hee University Hospital at Gangdong, Kyung Hee University School of Medicine, Korea

Yoona Chung, In Sik Jang, Sun Hyung Joo*

(Purpose) To evaluate the occurrence of postoperative morbidity and mortality of pancreaticoduodenectomy (PD) and total pancreatectomy (TP) in a single hospital over the course of 10 years (Methods) 91 patients who underwent pancreaticoduodenectomy or total pancreatectomy due to periampullary tumor or trauma at Kyung Hee University Hospital at Gangdong between October 2006 and August 2016 were retrospectively analyzed. The routine pancreaticojejunostomy (P-J) method was done by duct-to-mucosa with insertion of a long internal stent passed the choledochojejunostomy (C-J). Postoperative complications, hospital mortality and overall survival were the main focus of investigation (Results) The median age was 63 years and male to female ratio was 52:39. Eighty patients (87.9%) had malignant diseases, nine (9.9%) had benign diseases and two (2.2%) patients were diagnosed with pancreas head trauma. Median operation time was 382 minute (range: 252-660). Median hospital stay after surgery was 21 days (range: 12-67). The P-J was done by the duct-to-mucosa method in all of the cases except one case of trauma which was done by Dunking method. Surgery related postoperative complications were delayed gastric emptying occurred in ten (11%) patients, loculated fluid collection in four (4.4%), pancreatic leakage in two (2.2%), ileus in two (2.2%), chyle leakage in one (1.1%), bleeding in one (1.1%), intussusception in one (1.1%), wound infection in one (1.1%), and enterocutaneous fistula in one (1.1%). Four (4.4%) patients underwent re-operation due to one case of bleeding, one case of intussusception, and two cases of mechanical ileus. The hospital mortality within 30 day was zero. However, one patient (1.1%) expired on the postoperative day (POD) 54 due to complications of an episode of CVA, pneumonia after re-operation for mechanical ileus. Mean overall survival time of all patients with malignancies was 71.6 month (59.3-84.1) and 5 year survival rate was 52.4%. (Conclusion) Postoperative pancreatic fistula is a major complication which is potentially serious, life-threatening. Although there are limitations to this study such as the retrospective nature and the small number of cases, duct-to-mucosa method of P-J with insertion of a long internal stent passed the C-J will be an option to reduce the complications associated with pancreatic leakage.
PE-011

Clinicopathological Correlation of Hepatic Angiomyolipoma: A Series of 23 Resection Cases

Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine, Korea

Shin Hwang*, Dong-Hwan Jung, Young-Joo Lee, Ki-Hun Kim, Chul-Soo Ahn, Deok-Bog Moon, Tae-Yong Ha, Gi-Won Song, Abdulwahab A Alshahrani, Sung-Gyu Lee

(Purpose) Angiomyolipomas are rare neoplasms of mesenchymal origin and derived from perivascular epithelioid cells. They usually develop in the kidney and rarely in the liver. Due to their rarity, most hepatic angiomyolipomas have been misinterpreted as hepatocellular carcinoma (HCC) or other hypervascular liver tumors on imaging studies. We aimed to assess the clinicopathological correlation of hepatic angiomyolipoma. (Methods) We identified 23 patients with hepatic angiomyolipoma through an institutional database search. (Results) Twenty-three (0.4%) of 5680 cases of primary liver tumors had angiomyolipomas (mean age, 43.6±12.4 years; 16 female patients). Hepatitis B virus infection was noted in 4 patients, whereas a liver mass was incidentally detected on routine health screening in 13 patients. The preoperative diagnoses, before liver biopsy, included HCC in 14, angiomyolipoma in 6, focal nodular hyperplasia in 2, and hepatic adenoma in 1 patient. Eventually, the preoperative diagnoses were changed to HCC in 12 and hepatic angiomyolipoma in 11 patients. The tumor size was 5.3±4.6 cm, and 22 patients had a single tumor. All tumors exhibited positive findings for human melanoma black-45 and smooth muscle actin staining. During a follow-up period of 52.2±23.7 months, none of the patients exhibited tumor recurrence or death. (Conclusion) Hepatic angiomyolipoma is a rare form of primary liver tumor and is often misdiagnosed as other hypervascular tumors. Although angiomyolipoma is benign in nature, it also has malignant potential, hence resection is indicated if the tumor grows or malignancy cannot be excluded. Surgical resection is a definitive curative treatment of hepatic angiomyolipoma.

PE-012

Clinicopathological Features and Prognosis of Intrahepatic Cholangiocarcinoma following Liver Transplantation and Resection

Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine, Korea

Shin Hwang*, Dong-Hwan Jung, Gi-Won Song, Chul-Soo Ahn, Deok-Bog Moon, Ki-Hun Kim, Tae-Yong Ha, Gil-Chun Park, Wan-Jun Kim, Woo-Hyoung Kang, Seok-Hwan Kim, Sung-Gyu Lee

(Purpose) Intrahepatic cholangiocarcinoma (ICC) can be incidentally diagnosed after liver transplantation (LT). We investigated the clinicopathological features of LT recipients with ICC and compared prognosis with that of control group. (Methods) We identified 16 recipients with ICC in our institutional database. Propensity score-matched control group comprised 100 ICC patients who underwent hepatic resection (HR). (Results) ICC incidence was 0.5% in all adult LT patients and 1.2% in adult recipients with primary liver cancer. Mean age was 58.0±4.8 years and 15 were male. All ICCs were diagnosed incidentally in the explanted livers. Mean ICC tumor diameter was 2.5±1.1 cm and 14 recipients had a single tumor. Tumor stages were I in 9, II in 5, and IV in 2. Concurrent second primary liver cancer was detected as hepatocellular carcinoma in 7 and combined hepatocellular carcinoma-cholangiocarcinoma in 1. Tumor recurrence and patient survival rates were 56.2% and 81.3% at 1 year and 78.1% and 52.4% at 5 years, respectively. Presence of second cancer did not affect tumor recurrence (p=0.959) or patient survival (p=0.737). All three patients with very early ICC did not show ICC recurrence. Compared with control group, tumor recurrence rate was higher following LT (p=0.024), but this difference disappeared after analysis was confined to recipients with ICC alone (p=0.121). Post-recurrence survival was not different after HR and LT (p=0.082). (Conclusion) ICC is rarely diagnosed following LT and half of such patients have second liver cancer. Post-transplant prognosis of ICC is poor except very early ICC, thus strict surveillance is mandatory.
**PE-013**

**Improved Perioperative Outcomes of Laparoscopic Distal Pancreatosplenectomy by Modified Lasso Technique**

Department of Surgery, Yonsei University College of Medicine, Korea

Sung Hwan Cha, Ho Kyoung Hwang, Chang Moo Kang*, Woo Jung Lee

(Purpose) When performing laparoscopic distal pancreatosplenectomy (LDPS), simultaneous division of splenic artery, splenic vein, and pancreas parenchyma is known as lasso technique, which is expected to be easy and simple. However, original lasso technique harbors potential risk of postoperative bleeding from splenic artery. We modified the original lasso technique for technical safety, and evaluated the perioperative outcomes of modified lasso technique in LDPS, comparing with conventional LDPS (c-LDPS). (Methods) From August 2006 to July 2016, 30 patients underwent c-LDPS and 31 patients underwent LDPS using modified lasso technique (ml-LDPS) for less than 50% distal pancreatectomy. Perioperative outcomes were compared between two groups. (Results) ml-LDPS showed shorter operation time (288±198 min vs. 181±63 min, p<0.01), lesser estimated intraoperative blood loss (243±262 ml vs. 61±70 ml, p<0.01), shorter length of postoperative hospital stay (15.9±9.6 days vs. 8.5±2.9 days, p<0.01) and lesser incidence of clinically relevant POPF (26.7% vs 6.5%, p=0.04) compared with c-LDPS with significant statistical difference. (Conclusion) ml-LDPS was beneficial in terms of operation time, intraoperative bleeding, postoperative morbidity, and the length of postoperative hospital stay. ml-LDPS is simple, easy, safe, and effective procedure in planned LDPS.

**PE-014**

**The Role of Needlescopic Grasper Assisted Single Incision Laparoscopic Cholecystectomy in Obtaining Rate of Critical View of Safety**

Department of Surgery, Uijeongbu St. Mary’s Hospital, College of Medicine, The Catholic University of Korea, Korea

Kee-Hwan Kim*, Soo Ho Lee

(Purpose) Single incision laparoscopic cholecystectomy (SILC) has some technical problems. Our group has performed needlescopic grasper assisted SILC (nSILC) to overcome these problems. In this study, we introduce our technique and evaluate the safety and feasibility of this technique comparing with the conventional laparoscopic cholecystectomy (CLC) (Methods) We analyzed the medical records of the patients who underwent nSILC and CLC for benign gallbladder disease between January 2011 and December 2015. A needlescopic grasper was used in nSILC, which was inserted through a direct puncture on right upper quadrant of abdomen. The scope and other instrument were inserted through umbilical port. Three trocars were used in CLC, 11mm trocar for scope was inserted on umbilicus and two more 5mm trocars were inserted on right middle quadrant and epigastric area. (Results) Totally 1221 patients underwent laparoscopic cholecystectomy during the period. Among them, 577 patients underwent nSILC and 644 patients underwent CLC. The critical view of safety (CVS) obtaining time and main procedure time (skin incision to gallbladder removal time) for nSILC was significantly longer than that of CLC. But, in terms of CVS obtaining success rate is more higher in nSILC group. However, there was no significant difference in operation time (skin incision to skin incision), and postoperative hospital stay (operation time: 57.9±38.0 vs. 50.7±30.8 minutes; P=0.388, postoperative hospital stay: 2.5±3.8 vs. 2.5±1.6 minutes; P=0.99). There was no significant differences difference in the incidence of intraoperative and postoperative complications between two groups. (Conclusion) There were some significant differences in CVS time and main proce-
dure time, however there were no significant differences in total operation time and the incidence of complication. We can get high success rate of accurate CVS obtaining rate in nSILC. So, nSILC can be a reasonable surgical procedure that reducing BDI in patient with benign gallbladder disease.

**Table 1. Clinical outcomes between nSILC group and TPLC group**

<table>
<thead>
<tr>
<th></th>
<th>nSILC (n = 577)</th>
<th>TPLC (n = 644)</th>
<th>p</th>
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</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>47.8 ± 14.5</td>
<td>55.5 ± 15.6</td>
<td>0.054</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
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<tr>
<td>Female</td>
<td>404 (70.0%)</td>
<td>334 (51.9%)</td>
<td>&lt;0.001</td>
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<tr>
<td>Male</td>
<td>173 (30.0%)</td>
<td>310 (48.1%)</td>
<td></td>
</tr>
<tr>
<td>BMI (Kg/m²)</td>
<td>25.5 ± 5.6</td>
<td>25.5 ± 4.1</td>
<td>0.141</td>
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<tr>
<td>ASA score</td>
<td>1.5 ± 0.5</td>
<td>1.8 ± 0.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Postoperative HD</td>
<td>2.5 ± 3.8</td>
<td>2.5 ± 1.6</td>
<td>0.99</td>
</tr>
<tr>
<td>CVS time (min)</td>
<td>19.8 ± 13.5</td>
<td>13.4 ± 10.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Main procedure (min)</td>
<td>33.4 ± 30.1</td>
<td>23.7 ± 16.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Operation time (min)</td>
<td>57.9 ± 38.0</td>
<td>50.7 ± 30.8</td>
<td>0.388</td>
</tr>
<tr>
<td>EBL (ml)</td>
<td>3.0 ± 2.6</td>
<td>31.9 ± 143.3</td>
<td>0.059</td>
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</table>

**Table 2. Critical View of Safety(CVS) obtaining rate between nSILC group and TPLC group.**

<table>
<thead>
<tr>
<th></th>
<th>Operation Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>nSILC (n = 577)</td>
</tr>
<tr>
<td></td>
<td>p</td>
</tr>
<tr>
<td>CVS</td>
<td>523 (90.6%)</td>
</tr>
<tr>
<td>Non-obtained</td>
<td>54 (9.4%)</td>
</tr>
</tbody>
</table>

**Postoperative Serum Carbohydrate Antigen 19-9 Level and Lymph Node Status as Prognostic Factors in Patients Receiving Adjuvant Chemotherapy for Pancreatic Cancer**

Pancreatobiliary Cancer Clinic, Department of Surgery, Gangnam Severance Hospital, Yonsei University Health System, Korea

**Jin Hong Lim, Joon Seoung Park, Dong Sup Yoon**

**(Purpose)** The aim of this study was to determine the predictive value of postoperative carbohydrate antigen 19-9 level in patients receiving adjuvant chemotherapy after curative resection for pancreatic cancer. **(Methods)** Between January 2006 and December 2014, 112 patients with pancreatic adenocarcinoma received adjuvant chemotherapy after surgery at Gangnam Severance Hospital, Seoul, Korea. Univariate and multivariate analyses were performed to evaluate the relationship between clinicopathologic factors and oncologic outcomes. **(Results)** Overall median survival was 26.0 months. Overall disease free survival was 9.0 months. On multivariate analyses, elevated postoperative serum carbohydrate antigen 19-9(Ca 19-9) level and lymph node metastasis were associated with shorter disease free survival (p=0.002 and p=0.035, respectively) and overall survival (p=0.004 and p=0.023, respectively). **(Conclusion)** Both elevated postoperative serum Ca 19-9 level and lymph node metastasis were significant predictors of poor oncologic outcomes in resected pancreatic cancer patients receiving adjuvant chemotherapy.
**PE-016**

Prognostic Factors of Patients with Intrahepatic Cholangiocarcinoma after Hepatic Resection: 438 Cases for 10 Years

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(Purpose) Hepatic resection for intrahepatic cholangiocarcinoma (IHCC) is regarded as the treatment of choice, but recurrence is common after curative resection. This study is aimed to assess clinical-pathological factors associated with recurrence and survival of IHCC patients. (Methods) Between January 2003 and December 2012, a single-institution cohort of 438 patients who underwent hepatic resection for ICC were reviewed retrospectively. Surgical results, recurrence and survival were deduced and univariate and multivariate analyses were performed to identify prognostic factors. (Results) The median age was 60 years (range 31-83) and male was dominant (69.6%). Solitary and mass-forming type of tumor were 89.5% and 69.2%, respectively. Median tumor size was 5.42cm and lymphnode metastasis was identified in 20.3%. R0 resection were obtained in 79.0% accompanied by extrahepatic bile duct resection in 17.1%. 57.3% and 42.7% of patients were treated with postoperative chemotherapy and radiotherapy, respectively. The overall 1-, 3-, and 5-year survival rate of patients were 76.5, 44.1 and 33.3%, respectively, and disease free 1-, 3-, and 5-year survival rate were 51.1, 31.0 and 28.3%. Multivariate analysis showed intradictal grow type (P=0.025, OR=0.479), bile duct resection (P=0.009, OR=1.703), lymphovascular invasion (P=0.006, OR=1.555) and perineural invasion (P=0.026, OR=1.429) were independent factors associated with overall survival considering recurrence. (Conclusion) The prognosis of ICC was determined primarily by tumor factors and bile duct resection was estimated to affect survival outcome. Postoperative chemotherapy and radiotherapy did not show a significant improvement in survival rate after hepatic resection.

**PE-017**

Clinical Feasibility of Total Laparoscopic Pancreaticoduodenectomy

Department of Surgery, Kyungpook National University School of Medicine, Kyungpook National University Hospital, Korea

Heon Tak Ha, Jae Min Chun, Ho Ryun Gong, Hyung Jun Kwon, Sang Geol Kim, Yoon Jin Hwang, Young Seok Han*

(Purpose) Laparoscopic pancreaticoduodenectomy (LPD) represents one of the most advanced abdominal operation due to the complex dissection and enteric reconstruction. With the evolution of laparoscopic technology and various laparoscopic experiences, the feasibility of LPD has been established in appropriately selected patients. (Methods) We evaluated a computed tomography, magnetic resonance imaging, endoscopic ultrasonography and/or endoscopic retrograde cholangiopancreatography for the proper patient selection, preoperatively. We excluded patients with the involvement of major vessels, the definite enlargement of regional lymph nodes, and the inability to withstand prolonged anesthesia from preoperative evaluation. LPD was performed with 5 ports and the specimen was removed through the extension of infra-umbilical port site. (Results) Six patients received a LPD for the treatment of various periampullary tumor from April 2016 up to now. Two of 6 patients had a prior abdominal operation; left nephrectomy and extended cholecystectomy without bile duct resection. But, none of the cases required open conversion. The operation time was within 9 hours and the blood loss was minimal. Postoperatively, there were no major complications and only one patient had bile leakage and recovered after conservative treatment. (Conclusion) Conclusively, our initial experiences suggest that LPD is a useful and feasible treatment modality for various periamputillary tumors. Hence, it is very important to share and accumulate experiences of LPD.
Comparative Study of Pure Laparoscopic Living Donor Right Hepatectomy Versus Conventional Open Living Donor Right Hepatectomy

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(Purpose) To compare the outcomes of pure laparoscopic living donor right hepatectomy (LLDRH) versus conventional open living donor right hepatectomy (OLDRH). (Methods) All consecutive cases of LLDRH between November 2014 and July 2016 in a tertiary referral hospital and 1:2 case matched OLDRH during same period were enrolled in this retrospective cohort study. All surgical procedures were performed by one surgeon. The LLDRH and OLDRH groups were compared in terms of donor demographics, preoperative data, clinical perioperative outcomes, and recipient perioperative outcomes. (Results) LLRDLH group (n=15) had a significantly shorter postoperative hospital stay than the OLDRH group (n=30) (7.27±1.22 vs 11.13±2.31 days, P<0.001) and less intravenous pain medication than OLDRH group (1.73±1.75 vs 4.30±2.26 vials, P<0.001). In LLDRH group, there were no post operative complication such as transfusion, wound infection, or bleeding. Furthermore, there were no open conversion during LLDRH procedure. (Conclusion) LLDRH was a safe and feasible procedure for selected donors. It required shorter hospital stay and resulted in less analgesic requirements. The authors suggest that LLDRH could be a reasonable operative option for selected donors.

Laparoscopic Treatment of Massive Intraperitoneal Hemorrhage Caused by An Acute Gallbladder Perforation

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Seok Youn Lee*, Jung Nam Kwon, Keun Young Kim

(Purpose) A 2 to 11% of the patients with acute cholecystitis that will develop gallbladder perforation and massive intraperitoneal hemorrhage as a result of perforation will rarely be seen. Massive intraperitoneal hemorrhage associated with the transhepatic perforation is very uncommon. The importance of early diagnosis comes from the fatality of any delay in the diagnosis. (Methods) We present a case of a 58-year-old male presenting to the emergency department with clinical symptoms of acute cholecystitis. Computed tomography with IV contrast showed a large hematoma in the peritoneal cavity, with active extravasation of IV contrast and gallstones spillage in the gallbladder fossa. (Results) The patient was taken to the operating room for urgent laparoscopic cholecystectomy. There was no perioperative complication. (Conclusion) To our knowledge it is a first reported case in the literature of a free intraperitoneal bleeding caused by acute gallbladder perforation which was treated successfully at laparoscopic cholecystectomy.
**Pancreatic Acinar Cell Carcinoma with Stomach and Pericolic Adipose Tissue Invasion: A Case Report**

Department of Surgery, Soonchunhyang University Cheonan Hospital, Korea

**Hyoung Uk Lee, Hae Il Jung, Sang Hyun Park, Sang Ho Bae***

**(Purpose)** Acinar Cell Carcinoma of pancreas is a uncommon malignant neoplasm that about 1~2% of pancreatic neoplasms. This case report is about acinar cell carcinoma of the pancreas with stomach and pericolic adipose tissue invasion. **(Methods)** A 73-year-old man was visit the local clinic with a 2-month history of epigastric pain and 5kg weight loss for 1-month. Abdomen USG was done at the local clinic. that shown about 12cm pancreatic tail mass. The patient visit the outpatients department and admit. Abdomen Pancreas & Biliary 2Phase 3D CT c CE revealed A huge, 12cm, solid and partly necrotic mass is in the anterior aspect of the pancreas body-tail, extending to the gastric serosal surface, suggesting malignant tumor arising from the pancreas; R/O neuroendocrine tumor, solid pseudopapillary tumor, GIST etc.(Fig. 1) Biliary & Pancreas Dynamic MRI c CE revealed different diagnosis for Neuroendocrine tumor, R/O Ductal cell adenocarcinoma variant, R/O Stomach origin mass. (Fig. 1) GFS and EUS showed a extrinsic compression lesion from the upper body to posterior wall of lower body of stomach. The mass lesion contained multiple cystic portion. (Fig. 1) CFS did not come into effect. **(Results)** Distal pancreatectomy, gatric wedge resection, colonic segmental resection were performed, and considered to be curative resection. Result of immunohistopathological and special stain showed Acinar cell carcinoma, 12.0*12.0*8.0cm, pancreatic tail to body with invasion to stomach and pericolic adipose tissue, no involvement of spleen. (Fig. 2) The patient is observation without chemotherapy because old age. **(Conclusion)** Acinar Cell Carcinoma of pancreas is a uncommon malignant neoplasm. Chemotherapies such as 5-fluorouracil, capecitabine, or gemcitabine combined with radiation have been used with some success. Some activity has been noted with 5-fluorouracil, and paclitaxel. Because of the small number of cases, it is difficult to draw definitive conclusions regarding the best approach to systemic therapy. We present a rare case of acinar cell carcinoma of pancreas with stomach and pericolic adipose tissue invasion.

Fig. 1. Imaging study

Fig. 2. Immunohistopathological and special stain
PE-021

Hematochezia Can be a Sign of Undifferentiated Carcinoma of Gallbladder

Cheon Soo Park*, Kun Moo Choi, Hyuk-Jai Jang, Myeong Sik Han, Jin Ho Kwak, Eun Hwa Park, Jae Young Kwak, Ji Hoon Kim

(Purpose) Most of hematochezia is a sign of lower gastrointestinal (GI) bleeding; colorectal tumors, hemorrhoids, colitis, diverticular diseases, necrotizing enterocolitis. Herein, we will present case of undifferentiated carcinoma of GB (UCGB) with massive hematochezia. (Methods) A 79-year-old man was admitted to emergency room of our hospital complaining of massive hematochezia and symptom of anemia. He underwent gastric surgery, 40 years ago because of gastric ulcer. His vital sign was unstable; blood pressure was 87/57 mmHg, heart rate was 107 beats/minute, respiratory rate 22/minute, but no fever. Laboratory tests revealed that hemoglobin was 6.9 g/dL, hematocrit was 21.2%. First, he received red blood cells transfusion and had gastroscopy, colonoscopy. The gastroscopy revealed no other problem, but complete colonoscopy was failed because much blood clots was in descending colon, scope could not advance to other colonic site. We checked computed tomography (CT) scan, CT scan revealed that distended GB with active bleeding from cystic artery associated ruptured GB cancer with liver, hilum and colon invasion. (Results) We underwent exploratory operation. The operative findings were severely distended ascending and transverse colon with much blood clots and air, distended and hard GB was abutted to colon and bile duct. Focus of bleeding was cystic artery injured by GB cancer. We underwent palliative cholecystectomy, segmental colectomy and bleeding control because vital sign was unstable during operation and hepatectomy was too risky for patient. The pathologic finding reported that UCGB with invasion with entire colonic wall. (Conclusion) Massive hematochezia can be a sign of UCGB with colon invasion.

PE-022

Biliary Tree Variation Detected after Laparoscopic Cholecystectomy

Seung Keon Shin, Eun-Young Kim, Eun Jeong Ahn, Jong-Min Park, Sei Hyeog Park*

(Purpose) Although the biliary tree variation occurs rarely, it is important because bile duct can be injured unexpectedly. Recently, we had a case of laparoscopic cholecystectomy of 47-year-old male who was diagnosed as acute cholecystitis accompanied by biliary tree variation. We are reporting this case to share our interesting experiences. (Methods) We performed a laparoscopic cholecystectomy on the patient with acute cholecystitis. (Results) 40-year-old male with fever and RUQ abdominal pain was admitted to Department of Surgery and also, he had been treating with human immunodeficiency virus (HIV) in Department of Infectious diseases, National Medical Center. Gall stones with sludge, r/o emphysema of gall bladder were shown on USG and also, abdominal CT Fig.1 revealed gall stones with acute inflammation, minimal ascites in pelvic cavity. Operative findings were hard adhesion between GB and CBD due to rapid progressive inflammation under the immunocompomised state, like Mirizzi’s syndrome and laparoscopic cholecystectomy was performed as a usual manner. Bile leakage and biliary tree variation were observed by MRCP Fig.2 at POD#1. In addition, biliary tree variation was also observed by ERCP Fig.3 at POD#2. Based on these findings, we diagnosed the patient as “Type A4 of Huang’s trifurcation anomaly classification”. After confirming that, bile leakage from an aberrant drained duct of RPHD on liver side was sutured during reoperation. The bile leakage continued for a while postoperatively and controlled with PCD, resulted in improving the number of CD4+ T cells and decreasing the titer of HIV-RNA. Finally, the patient was discharged with PCD, then has been closely observed at follow-up in an outpatients department. (Conclusion) Several classification methods for bile
tree variation have been reported. According to the Huang classification which is composed of 5 types of variation including type A1 (normal right and left hepatic duct junction), type A2 (common junction of RAHD, RHPD and LHD), type A3 (aberrant drainage of RPHD to left main duct), type A4 (aberrant drainage of RPHD to main hepatic duct) and type A5 (aberrant drainage of RPHD to cystic duct), our case correspond to type A4. Unexpected bile injury can be prevented by detecting these bile tree variations before or during the operations.

**Fig. 1.** Abdominal CT image showing gall stones with acute inflammation, minimal ascites in pelvic cavity.

**Fig. 2.** MRCP image showing a cholecystectomy state with possibility of underlying variation in union of RPHD, adhesive narrowing, proximal dilatation, and bile leakage from the transition. (r/o injury at the point)

**Fig. 3.** ERCP image showing that RPHD was not identified. (It was seemed that RPHD was connected to the cystic duct due to anatomic variation on CT scan and surgical finding) Surgical clips were noted at the cystic stump. There was no bile leakage. Huang’s classification of trifurcation anomaly.

**PE-023**

**Primary Retroperitoneal Mucinous Cystadenoma Mimicking Pancreatic Mucinous Tumor**

Department of Surgery, Hanyang University College of Medicine, Korea

*Sung Hwan Hwang, Han Joon Kim, Hwon Kyum Park*

**(Purpose)** We experienced a rare primary retroperitoneal mucinous cystadenoma mimicking the pancreatic mucinous tumor. **(Methods)** 37-year-old female patient was incidentally diagnosed as huge cystic abdominal mass for the health examination by CT scan. She was referred to our hospital as the
pancreatic mucinous tumor. We further examined the mass by MRI and the preoperative radiologic diagnosis of this 24x15 cm mass was probable giant mesenteric cyst. Laboratory findings and tumor markers were within reference ranges. **(Results)** A midline laparotomy was performed. The mass was easily removed from the pancreas, the left kidney and the left-sided colon. The initial pathologic diagnosis by frozen section was pancreatic mucinous tumor. The final pathologic diagnosis by immunohistochemistry was primary retroperitoneal mucinous cystadenoma with low grade dysplasia. **(Conclusion)** There are several theories explaining the origin of primary retroperitoneal cystadenomas, including origination from a teratoma, ectopic ovary, or mucinous metaplasia of the mesothelial lining. Thus there are no pathognomonic clinical or radiologic findings for this disease, an accurate preoperative diagnosis with standard imaging modalities is nearly impossible. Differential diagnoses should be include cystic teratoma, cystic mesothelioma, Mullerian cyst, epidermoid cyst, pancreatic pseudocyst, lymphocele, and urinoma. Complete surgical excision of the tumor has been the treatment of choice, although laparotomy or laparoscopic approach should be made depending on the surgeon’s expertise and tumor factors affecting the possibility of safe resection (eg, tumor size, location, possible malignancy).

PE-024

**Splenic Artery Embolization for Treatment of Gastric Variceal Bleeding Secondary to Splenic Vein Thrombosis in Necrotizing Pancreatitis: Application of Theory of Warshaw Operation**

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Hee Joon Kim, Enu Kyu Park, Young Hoe Hur, Yang Seok Koh, Chol Kyooon Cho*

**(Purpose)** In the setting of splenic vein thrombosis (SVT), gastric variceal bleeding (GVB) can be occurred and it is sometimes lethal. However, in postoperative state of Warshaw operation, GVB was not observed because splenic artery is also ligated. And some literatures have reported effectiveness of splenic artery embolization (SAE) for treatment of GVB secondary to SVT. Herein, we report a case of GVB secondary to SVT in severe necrotizing pancreatitis, successfully managed by SAE. **(Methods)** A 42-year-old man was referred to our hospital for treatment of a necrotizing pancreatitis. Despite of endoscopic transgastric internal drainage and percutaneous drainage, abdominal pain and fever was not subsided. An emergency operation; necrosectomy and external drainage; was performed. In operative field, severe adhesion and bleeding tendency due to inflammation was seen. On postoperative day 13, hematemesis was noted and his hemoglobin level decreased from 11.2 g/dL to 7.6 g/dL. An abdominal CT angiogram demonstrated bleeding from gastric fundus and perigastric venous engorgement. The splenic vein was not seen on CT scan. Endoscopist tried endoscopic hystasis, but failed. An emergency angiogram was performed. An arteriography showed no extravasation from arterial system. The splenic artery was embolized with vascular plug at just proximal to branching point of left gastroepiplic artery; similar to the ligation point of distal splenic artery in Warshaw operation. **(Results)** No more fresh blood was drained via nasogastric tube from the next day of SAE, and F/U CT showed no more bleeding from gastric fundal varix. At present, 4 months following the SAE, no recurrent GVB was observed. **(Conclusion)** Splenic artery embolization is a safe and feasible option instead of splenectomy to manage GVB secondary to SVT, especially in hostile abdomen.

![Fig. A](image1.png) After the Warshaw operation, spleen is supplied by short gastric arteries and left gastroepiploic artery, and drained by short gastric veins and left gastroepiploic vein. No gastric variceal bleeding was observed after the operation over 20 years of observation period. **B** After splenic artery...
embolization, pressure within short gastric veins is decreased. The blood flow of spleen is maintained similar to post-operative circumstance of the Warshaw operation. Abbreviations: PV, portal vein; SMV, superior mesenteric vein; CV, coronary vein; IMV, inferior mesenteric vein; SA, splenic artery; SV, splenic vein; LGEA, left gastroepiploic artery; LGEV, left gastroepiploic vein; SGA, short gastric artery; SGV, short gastric vein; GVB, gastric ver-}

icle bleeding.

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**PE-025**

**The Impact of Clinically Significant Portal Hypertension on Surgical Outcomes for Hepatocellular Carcinoma in Patients with Compensated Liver Cirrhosis: A Propensity Score Matching Analysis**

Department of Surgery, Kyungpook National University Medical Center, Kyungpook National University School of Medicine, 1Department of Surgery, Kyungpook National University Hospital, Kyungpook National University School of Medicine, Korea

Hyung Jun Kwon, Horyon Kong, Heontak Ha¹, Young Seok Han¹, Jae Min Chun¹, Sang Geol Kim, Yun Jin Hwang*

(Purpose) Hepatic resection for hepatocellular carcinoma (HCC) is potentially curative treatment for selected patients. The outcome of hepatectomy in cirrhotic patients has improved remarkably in the recent year. However, the roles of portal hypertension on the postoperative course are still uncertain. The aim of this study was to evaluate surgical outcomes of hepatectomy in these patients with portal hypertension. (Methods) Data of 152 cirrhotic patients who underwent hepatectomy for hepatocellular carcinoma from January 2000 to December 2010 in our hospital were collected retrospectively. Patients were divided into two groups according to preoperative presence of portal hypertension (PHT): 44 patients with PHT and 108 without it. Propensity score matching (PSM) analysis was used to compare postoperative results. (Results) There were no difference in postoperative morbidity (56.8% vs. 51.9%, P=0.578) and 90-days mortality (4.5% vs. 4.6%, P=0.982) did not differ between patients with and without PHT. Posthepatectomy liver failure (PHLF) was not significantly different between the two group (43.2% vs. 35.2%, P=0.356) regardless of presence of PHT. Patients without PHT had better disease-free survival (DFS) compared to those with PHT, although the difference did not reach statistical significance (P=0.081): One-, 3-and 5-year disease-free survival rates in the patients with PHT were 61.3%, 29.4%, and 17.2% respectively versus 64.3%, 41.8%, and 30.9% in those without PHT respectively. Overall survival (OS) were not significantly different between the PHT group and non-PHT group at 1 year (88.6% vs. 79.6%), 3 year (61.2% vs. 65.7%), and 5 year (46.6% vs. 54.9%) (P=0.724). Repeat analysis after PSM showed similar rates of morbidity (59.0% vs. 56.4%, P=0.819), mortality (2.6% vs. 7.7%, P=0.305), PHLF (46.2% vs. 41.0%, P=0.648), DFS (P=0.241), and OS (P=0.619). Presence of PHT was not associated with short-term and long-term poor surgical outcome. (Conclusion) Portal hypertension has been reported as a negative prognostic factor and a contraindication to liver resection. However, in this study, Child-Pugh class A and B patients with portal hypertension have short-term and long term surgical outcomes similar to those without portal hypertension. Presence of portal hypertension was not independent factor of poor surgical outcomes. Total bilirubin level and perioperative transfusion were the factors related to PHLF. Therefore, presence of portal hypertension should not be considered as a contraindication for hepatic resection in cirrhotic patients. In selected cirrhotic patients with portal hypertension, hepatic resection for Hepatocellular carcinoma (HCC) could be safely preformed and also potentially curative treatment.
PE-026

Clinical Experience of Everolimus after Liver Transplantation

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Yang Won Nah*, Hyung Woo Park, Eun Ae Byun

(Purpose) This study was done to assess our experience with the use and management of everolimus-based regimens post-liver transplantation since National Health Insurance permitted EVER usage for liver transplantation (LT) on June 2015 in Korea. (Methods) Among 146 patients who underwent liver transplantation at UUH from Mar. 2002 to Aug. 2016, 16 patients received Everolimus in addition to Tacrolimus (Tac). The reasons of EVER addition included potential renal dysfunction, malignancy, neurologic complication, immunologic events and hyperkalemia. The primary end point of this study was to see the reversal of the indication of EVER. The adverse effects and the reasons for discontinuation were investigated. (Results) EVER was added to Tac 1 ~ 105 (mean, 36.1) months after LT in this study. Among 8 patients with potential renal dysfunction 2 patients discontinued EVER and 4 patients showed slight improvement in kidney function. 1 patient with steroid-resistant rejection with deep jaundice responded gradually over 4 week-period. 1 patient with acute cellular rejection and interface hepatitis on biopsy showed marginal response. 1 patient with metastatic HCC and 1 with de novo testicular lymphoma were under remission for 20 months and 6 months after multimodality therapy including EVER addition respectively. 1 patient with metastatic HCC did not show any oncologic response. 1 patient with ataxia did not show any improvement and discontinued EVER 4 weeks later. The reasons to discontinue EVER were additional surgery (2), drug interaction with antifungal drug (1) and no response to the neurologic indication (1). 1 patient with pancytopenia managed well with dose adjustment. (Conclusion) EVER introduction even long after LT could improve renal function. Effect of EVER on steroid resistant rejection deserve additional attention. More experience and study on EVER usage are needed to establish its role in liver transplantation.

PE-027

Neuroendocrine Carcinoma of Unknown Primary Mistaken for Hepatic Sarcoma

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Junho Sohn, Jong Hoon Park*

(Purpose) Introduction: Neuroendocrine tumor (NET) can occur at any parts of the body where endocrine cells exist but most NETs arise from gastrointestinal tracts and lungs. Primary hepatic NET is very rare disease and it holds only 0.3% of all NETs. We experienced a case of huge hepatic mass which was growing very fast and clinical features of the hepatic mass resembled a hepatic sarcoma. Final diagnosis of the case was neuroendocrine carcinoma of unknown origin and result was not successful. We present our unusual and unhappy case. (Case Report) A 52-year old man was admitted to our hospital suffering from back pain for 4 days. He had laparoscopic cholecystectomy for acute cholecystitis 6 months ago and there were no abnormal findings of hepatic parenchyma at abdominal CT scan at the time of diagnosis. Laboratory findings showed mild elevation of AST/ALT/ALP levels (80U/L / 59U/L / 226IU/L) and high AFP levels (784.2ng/ml). Other tumor markers were within normal ranges. Abdominal CT scan and MRI showed a 12cm sized huge low attenuated mass with peripheral enhancement which resembled a embryonal sarcoma of the liver. Needle biopsy was performed and pathologic result was small cell carcinoma with positive in chromograin A and synaptophysin. PET scan showed no evidence of distant metastasis. En bloc resection including right hepatectomy with diaphragm resection and right hemicolectomy was performed but we could not achieve R0 resection because of peritoneal metastasis. Gross findings showed the tumor was located at not liver parenchyma but external surface of the liver. Microscopic findings showed the tumor was large cell neuroendocrine carcinoma with high mitotic count
Patient died of surgical complications on 14th post-operative day. **(Conclusion)** Conclusion: Primary hepatic NET is very rare disease and it is very difficult to diagnosis and management because of lack of knowledge about the disease. Hepatic sarcoma is very aggressive disease with poor prognosis and en bloc resection is necessary to get a chance to cure the disease. We mistook the hepatic mass for hepatic sarcoma in view of the clinical experiences and the result was large cell neuroendocrine carcinoma of unknown primary. It was necessary to do thorough studies about the origin of the tumor and we had to make a precise medical plan to get a better result. Because of lack of knowledge, further studies should be necessary about this rare disease.

**PE-028**

*Isolated Metastasis to the Pancreas From Renal Cell Carcinoma Managed by Laparoscopic Pylorus Preserving Pancreatoduodenectomy: A Case Report*

Department of Surgery, Kyungpook National University School of Medicine, Kyungpook National University Hospital, Korea

Heon Tak Ha, Jae Min Chun, Ho Ryun Gong, Sang Geol Kim, Hyung Jun Kwon, Yoon Jin Hwang, Young Seok Han*

**(Purpose)** Metastatic cancer of the pancreas from another primary site is rare and accounts for 2~4% of malignant lesion in the pancreas. Among the various sites the primary origin such as renal cell cancer, colorectal cancer, sarcoma, and melanoma etc., renal cell carcinoma is the most commonly reported site of the metastases to the pancreas. Because pancreatic metastasis from renal cell carcinoma are frequently the only metastatic site, they can be surgically resectable. The follow up results of the many studies of resection for metastasis to the pancreas show a satisfactory outcome. **(Methods)** We report a 60-year-old woman with 2 masses in the pancreas following left radical nephrectomy performed 5 years previously for renal cell carcinoma. The patient presented in our department without typical symptoms. During routine follow up for the renal cell carcinoma, she was found to have 2 masses that were a 4.4cm sized low density mass in the uncinate process of the pancreas and a 1.5cm sized low density mass in the neck of the pancreas. Her CEA and CA 19-9 before surgery were all with in normal limits. It was difficult to differentiate the lesion between pancreatic adenocarcinoma and metastasis to pancreas from renal carcinoma because the lesion of the CT scan didn’t show typical contrast enhancement characteristics that was observed in the metastatic tumor from the renal cell carcinoma. We performed laparoscopic pylorus preserving pancreatoduodenectomy with possibility that the lesion could be metastasis from renal cell carcinoma or pancreatic adenocarcinoma in mind. **(Results)** She had no postoperative complications and was discharged on 16th post operative day. The gross findings of the resected specimen revealed a 4.5x3.5cm sized mass in the head of the pancreas. The mass was soft, pale yellow and homogeneously occupied by tumor cells. Microscopic findings revealed a metastatic renal cell carcinoma, clear cell type with Fuhrman grade 3. Immunohistochemically, the tumor was positive for CD10 and vimentin. **(Conclusion)** It should be considered that the pancreatic mass may be metastatic tumor of the renal cell carcinoma, which were successfully treated many years ago. And laparoscopic pylorus preserving pancreatoduodenectomy can be a useful technical option to patient with metastatic tumor of the pancreas.

**PE-029**

*Primary Hepatic T-Cell Lymphoma Mimicking Hepatocellular Carcinoma: A Case Report*

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Hanlim Choi, Yanjie Xu, Jae-Woon Choi, Dong Hee Ryu*

**(Purpose)** Primary hepatic lymphoma is rare type of non-Hodgkin’s lymphoma(NHL). Among them, peripheral T-cell type is extremely rare. Herein we
describe a case of a previously healthy 50 year old man who developed primary hepatic T-cell type of NHL. \(\textbf{(Methods)}\) The patient had abnormal carcinoembryonic antigen (CEA) level (5.7 ng/mL). On abdomino-pelvic computed tomography for evaluation, the 7cm sized heptic mass on segment 5 was found. Because there was no lymphadenopathy, splenomegaly or bone marrow involvement, primary diagnosis was hepatocellular carcinoma. We performed right hemichepatectomy. \(\textbf{(Results)}\) The final pathologic report confirmed peripheral T-cell NHL by histopathological examination with immunohistochemical staining of the tissue. After surgery, the patient has been treated chemotherapy for 6 cycle and followed up out-patient clinic with no recurrence. \(\textbf{(Conclusion)}\) Primary hepatic T-cell lymphoma is rare disease which is difficult to diagnose with imaging, clinical and biochemical markers. Because histology can confirm differential diagnosis, surgical resection should be considered in case of isolated hepatic mass.

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\textbf{PE-030}

\textbf{Gastrinomas Associated with MEN-1 Syndrome: 2 Cases}

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Hyuk Jai Jang*, Chun Soo Park, Gun Moo Choi, Jin Ho Kwak

\(\textbf{(Purpose)}\) Zollinger-Ellison syndrome (ZES) is a clinical syndrome caused by excessive gastric acid secretion by gastrinoma, characteristically causing peptic disease and/or gastroesophageal reflux disease. Approximately one third of patients with gastrinoma have multiple endocrine neoplasia type 1 (MEN-1). \(\textbf{(Methods)}\) We experienced two cases of gastrinomas associated with MEN-1 syndrome \(\textbf{(Results)}\) 42 and 56-year-old man was admitted for abdominal pain and diarrhea. The endoscopic findings revealed severe reflux esophagitis and multiple ulcers at the bulb and second portion of the duodenum. They were diagnosed as ZES based on typical clinical features such as markedly elevated fasting gastrin level (≥1,000 pg/mL) and findings from a CT scan and somatostatin receptor scan. Pathologic findings after the operation revealed malignant gastrinoma. He was confirmed to have parathyroid adenoma and MEN-1. We diagnosed this patient using immunohistochemical studies and treated the patients by tumor resection with distal pancreatectomy. The patients are alive and in a good condition without recurrence for 10 months and 9 years. \(\textbf{(Conclusion)}\) MEN-1 syndrome should always be considered in pts with ZES. A precise preoperative localization of all pancreaticoduodenal lesions, in combination with a surgical exploration and management by experienced surgeons, seems to be curative in patients.

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\textbf{PE-031}

\textbf{Incidentally Found Cholecysto-Gastric Fistula During Cholecystectomy for Mimicking Gallbladder Cancer: A Case Report}

Departments of Surgery, Chungbuk National University College of Medicine, Korea

Hanlim Choi, Yanjie Xu, Jae-Woon Choi, Dong Hee Ryu*

\(\textbf{(Purpose)}\) Cholelithiasis is a common surgical disease and only few patients (around 1-3%) develop rare complications such as cholecystoenteric fistula. Cholecystoduodenal fistula is the most common form (53%) while cholecystogastric fistula is the rarest (3%). Herein we describe an uncommon case of incidentally found cholecysto-gastric fistula during open cholecystectomy for mimicking gallbladder cancer. \(\textbf{(Methods)}\) A 78-year-old woman was visited to Emergency Department with right-upper quadrant pain radiating through to her back. She had no rebound tenderness. Initial laboratory and radiologic findings implied gallbladder cancer with possible liver invasion. At surgery, hepatic hilar area had severe inflammation and gallbladder had fistula formation through antrum of stomach. As frozen pathology after simple cholecystectomy with primary closure for fistula confirmed just inflammation, we did not perform further procedure. \(\textbf{(Results)}\) The final pathology confirmed chronic
cholecystitis with no evidence of malignancy. The patient has been followed-up for a four weeks without any complaints. **(Conclusion)** Although many imaging modality and laboratory studies described gallbladder cancer, the final diagnosis was cholecystitis with cholecysto-gastric fistula. Cholecystitis severe enough to form a fistula should be considered that to be confused with gallbladder cancer.

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**PE-032**

**Primary Hepatic Carcinosarcoma: Report of a Case**

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Soo Ho Lee*, Chai Won Kim, Kee Hwan Kim

**(Purpose)** Primary hepatic carcinosarcoma is defined as a malignant tumor containing an intimate mixture of carcinomatous and sarcomatous elements, and is very rare disease. Here, we report the case of a 60-year-old male who developed hepatic carcinosarcoma with a hepatitis B virus carrier. **(Methods)** He visited emergency room for whole abdominal pain with distension. Abdominal CT scan showed 9.6×7.0×7.6 cm sized hypodense mass in the right hemiliver with peripheral soft density lesion. Intraoperative findings showed large amount of complex (hypodense and hyperdense portions) was in the right subphrenic, subhepatic spaces, and right paracolic gutter, and tumor was ruptured and spreaded to the intraperitoneal space with hemoperitoneum. Serum tumor marker study demonstrated normal level of alpha-fetoprotein (AFP) and carbohydrate antigen 19-9 (CA 19-9), and the Child-Pugh score was A. He was underwent transarterial emolization (TAE) immediately because of an active bleeding is going at the ruptured site. Five days later, he was underwent right hepatectomy with surrounded soft tissue and hematoma was evacuated. However, he was died of hepatic failure at postoperative 21st day. **(Results)** Microscopically, many kinds of immunohistochemistry were performed to diagnose, and the tumor had both carcinomatous and sarcomatous components. The carcinomatous component was positive for hepatocyte, pan cytokerain and vimentin, but negative for cytokeratin 7 and 19. The sarcomatous component was positive for desmin, and vimentin. **(Conclusion)** In conclusion, the diagnosis of hepatic carcinosarcoma is very difficult to confirm, preoperatively, because of the characteristics of imaging study is not clear, and many differentiated heterologous feature is found in the histologic examination. The prognosis of hepatic carcinosarcoma is very poor and the radical resection in the early stage is recommended to improve the prognosis.

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**PE-033**

**Availability of the Bovine Pericardial Patch in the Diaphragm Repair and Vena Cava Patch Venoplasty**

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**(Purpose)** The bovine pericardium patch (BPP) demonstrated high tensile strength, elasticity, and was easy to manipulate. It has good biocompatibility, allowing ingrowth of natural tissue and minimal risk of infection. It had been used in the diaphragm defect or hernia such as radical tumor resection or transplantation. Furthermore, it was frequently used in the vascular surgery or heart valvular surgery for replacement of vessels or heart valves. We reported cases about diaphragm repair after resection of hepatocellular carcinoma (HCC) invaded to diaphragm and lung and IVC wall repair after resection of right renal cell carcinoma with tumor thrombus invaded to IVC wall. **(Case 1)** A 61-year-old male patient had admitted for the operation of HCC invaded to the diaphragm and right lung. He had a history of chronic hepatitis B and HCC (segment 7) 12 years ago. He experienced 19th TACE, and HCC was invaded to diaphragm and feeders were changed to omental
arteries and diaphragm during TACE. At last, TACE was not efficient and so the operation was decided. The adhesion and collaterals were severely developed around the tumor and especially, diaphragm and lung were fixed on tumor. At first, parenchymal dissection was done and the tumor was removed with diaphragm and lung with energy device. The margin of the lung was repaired until air-leak was not detected and the defect of the diaphragm was repaired with BPP instead of any other artificial mesh such as gore-tex graft for avoiding the graft infection. During postoperative course, the infected fluid collection was detected, but finally, BPP withstood infection. (Case 2) A 57-year-old male patient had admitted for resection of right RCC. On surveillance CT, RCC was invaded to right renal vein and tumor thrombus was ingrowing to infrahepatic IVC and near total obstruction with the passive benign thrombus in IVC and collaterals around IVC. Before resection, left renal vein, upper and lower IVC were isolated and clamped. The en-bloc resection of whole gerota’s fascia combining to tumor thrombus and its IVC wall was performed. The defect of IVC was repaired with BPP to avoid IVC stenosis. The postoperative course was good without any thromboembolic events. (Conclusion) The BPP was the useful graft for repair of the large defect of a diaphragm or various vascular surgeries. The more experiences and researches were needed to maintain the long-term stability.

PE-034

Inverted Cystic Tubulovillous Adenocarcinoma Involving Non-Ampullary Area of Duodenum

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Young Ki Kim, Seong Woo Hong*

(Purpose) Adenocarcinoma of the non-ampullary area of duodenum are rare. Furthermore, adenocarcinoma arising from duodenal tubulovillous adenomas are more usual. We present this unusual case of duodenal tubulovillous adenocarcinoma with an inverted cystic growth pattern. (Methods) Usually microscopic feature of tubulovillous adenoma has frond-like projection of mucosa with branching papillary structure, and it generally grows upward into the lumen. We describe a 76-year-old woman who had a duodenal tubulovillous adenocarcinoma with unusual inverted cystic growth pattern. Unfortunately, endoscopic feature of this lesion was considered as benign adenomatous polyp. Endoscopic resection was difficult and impossible, because duodenal diverticulum was located just below of this lesion. (Results) At first, we decided to do transduodenal excision to confirm its origin and rule out intrinsic malignancy. After frozen biopsy, we could not rule out the invasive carcinoma. Then, we performed pylorus preserving pancreaticoduodenectomy. Final diagnosis was well differentiated adenocarcinoma arising in inverted tubulovillous adenoma. This is the first case of inverted cystic growth tubulovillous adenocarcinoma not involving papillary area of duodenum. (Conclusion) In this case, we want to report this successful diagnosis and treatment of adenocarcinoma arising from tubulovillous adenomatous lesion with a diverticulum at 2nd portion of duodenum and unusual inverted cystic growth pattern.
Annual Congress of KSS 2016

Poster Exhibition

Thyroid and Endocrine
Predictive Factors of Levothyroxine Supplementation after Thyroid Lobectomy and Natural Course of Thyroid Hormone

Department of Surgery, College of Medicine, The Catholic University of Korea, Korea

Chang Jong Kim, So Hee Lee*

(Purpose) Hypothyroidism after thyroid lobectomy remains an unpredictable complication. The incidence and risk of postoperative hypothyroidism remains unclear. The purposes of this study were to assess the predictive factors of postoperative hypothyroidism and natural course of thyroid hormone. (Methods) From January 2009 to December 2015, data of 229 patients who underwent surgery due to benign nodules were retrospectively reviewed. We stratified to 2 groups by levothyroxine supplementation; the patients who have not prescribed even once (group 1) and the patients who prescribed at once (group 2). We compared the thyroid function, autoantibodies and clinicopathologic factors between 2 groups and analyzed the risk factor of postoperative hypothyroidism. (Results) Among 229 patients 76 (33.2%) were prescribed levothyroxine, 8 of 76 (3.5%) were ceased medication during follow up. The overall follow up period of total patients was 24.5 months. The mean age was older in medication group [45.65±12.73 (Group 1) and 50.24±12.41 (Group 2) respectively, p value=0.01]. In univariate analysis, preoperative TSH (2.85±2.11 >1.60±0.94, p value <0.001) and thyroglobulin (Tg) (44.92 >23.84, p value=0.045) levels were higher in Group 2. And histologically proven Hashimoto’s thyroiditis was also significant (p=0.039). However, in the multivariate analysis, only age (p=0.025) and TSH level (p<0.001) turned out to be independent factors for levothyroxine supplementation. We performed the risk-scoring system by using 3 factors (Age, TSH level and Hashimoto’s thyroiditis). Age >55 and positive Hashimoto’s thyroiditis were measured as 1. The score was stratified from 0 to 3 by TSH level (<1.51, 1.51-2.50, 2.50-4.05, >4.05). A risk-scoring system performed by summing the score of 3 factors (Age, Hashimoto’s thyroiditis and TSH level) showed the incidence of levothyroxine supplementation is highest at score 4, 5 (56.0 and 50.0%, respectively). (Conclusion) Patients with age >55 and higher preoperative TSH level tend to supplement levothyroxine after thyroidectomy.

Endoscopic Thyroidectomy Via Cervico-Axillary Approach for Thyroid Cancer: An Initial Experience in a Single Institute

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(Purpose) Cervico-areolar approach (CAA) endoscopic thyroidectomy has shown cosmetic excellence and higher patients’ satisfaction. The aim of the present study was to evaluate the feasibility, safety, and surgical outcomes of CAA endoscopic thyroidectomy. (Methods) From October 2009 to April 2012, a total of 100 patients with papillary thyroid cancer underwent CAA endoscopic thyroidectomy. Patient demographics, pathologic features, and operative outcomes including complications and recurrence were collected and investigated. (Results) CAA endoscopic thyroidectomy was successful in all patients, and none required conversion to open thyroidectomy. All patients underwent ipsilateral thyroid lobectomy with or without central compartment neck dissection. Mean tumor size was 1.0±0.6 cm (range, 0.5-1.6), and 12.0% of patients showed lymph node metastasis. The mean number of harvested LNs was 4.1±4.4. The mean operative time, intraoperative blood loss, and hospital stay were 175.2±50.4 min, 42.5±69.2 ml, and 3.3±0.6 days, respectively. Postoperative transient hypocalcemia and vocal cord palsy occurred in 5 and 8 cases. No permanent complication or postoperative bleeding
was found. During the median follow-up period of 63.7 months, there was no recurrence of thyroid cancer in all patients. (Conclusion) CAA endoscopic thyroidectomy is feasible and safe procedure for low-risk thyroid cancer, with excellent cosmesis. It can be recommended as an alternative option for selected patients with low-risk thyroid cancer.

**PE-037**

**Yonsei Experience of 5,000 Transaxillary Robotic Thyroidectomies**

Department of Surgery, Severance Hospital, Yonsei Cancer Center, Yonsei University College of Medicine, Korea

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(Purpose) Since the use of robot system in the thyroid surgery was first introduced by Professor Chung in 2007, we have advanced a novel method of robotic thyroidectomy using a gasless transaxillary approach (TAA) and herein report our experience with this new technique and detail the surgical outcome of 5000 patients. (Methods) From October 2007 to May 2016, 5000 patients with thyroid tumor underwent robotic thyroidectomy using a gasless transaxillary approach (TAA) at Yonsei University Health System. Of all patients, 4804 patients (96%) had thyroid cancer and the remaining 196 patients (4%) had benign thyroid tumor. Of the 4804 thyroid cancer patients, 2941 patients (62%) underwent less than total thyroidectomy (LTT) and 1517 patients (32%) underwent bilateral total thyroidectomy (BTT). And in the remaining 331 patients (6%) who had lateral neck node metastases, robotic modified radical neck dissection (MRND) was performed including TT. (Results) Among thyroid cancer patients, the most common subtype was papillary cancer (98%). In the 196 benign tumor patients, robotic thyroidectomy was performed for adenomatous hyperplasia (52%), follicular adenoma (21%), and Graves’ disease (15%). The mean operation time was 113.9±29.7 minutes in LTT and 142.9±33.9 minutes in TT respectively. In robotic MRND, the mean operation time was 284.2±52.6 minutes, and the mean number of retrieved central and lateral node were 6.1±5.0 and 31.1±12.1 respectively. Regarding TNM staging, Staging I was found in 85.4% patients, stage II 0.2%, stage III 12.9%, and stage IV 1.5%. The most common surgical complication was symptomatic hypocalcemia, of which 45.2% cases were transient and 1.4% permanent. The technique-related complications, which were never seen in conventional open thyroidectomy, were axillary skin flap perforation (0.2%), and traction injury of the arm on the side the lesion was located (0.08%). There was no disease-specific mortality during the follow-up period. Locoregional recurrence was observed in sixteen patients (0.3%), 12 in the LTT group and 4 in the TT group. (Conclusion) During last 9 years we have tried to improve robotic thyroid surgery by the rapid evolution of robotic surgical techniques and training program to assess our oncological outcomes, safety and functional outcomes including patient satisfaction. Now, our efforts make the technique of robot-assisted endoscopic thyroid surgery using a gasless transaxillary approach prove to be a feasible, safe, and effective method for selected patients with thyroid cancer. The ultimate goals of robotic thyroid surgery are to achieve the best possible oncologic outcomes and to enhance patient quality of life after surgery.

**PE-038**

**Bilateral Papillary Thyroid Cancer Increases the Risk of Lymph Node Metastasis than Unilateral Multifocal Cancer**

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(Purpose) Papillary thyroid cancer (PTC) has a strong propensity for lymph node metastasis. PTC often present as multifocal tumors, which can be unilateral or bilateral. Few studies investigated the
different impacts of bilaterality or unilateral-multifocality on lymph node metastasis in PTC, and the role of central-compartment neck dissection in the management of PTC remains controversial. This study evaluated the risk of lymph node metastasis by multifocality and bilaterality of PTC, in order to inform surgical decision making better.

(Methods) Patients with PTC who underwent total or hemi-thyroidectomy plus ipsilateral central lymph node dissection in Kyungpook National University Medical Center between January and December 2013 were included (N=819). We divided the patients into 4 groups according to multifocality and bilaterality: group 1 with unilateral solitary PTC (N=511), group 2 with unilateral multifocal PTCs (N=98), group 3 with bilateral solitary PTCs (N=93) and group 4 with bilateral multifocal PTCs (N=117). We analyzed the differences of clinicopathologic features among these groups and relationship between the number of PTC foci and lymph node metastasis.

(Results) There was an association between the number of PTC foci and central lymph node metastasis (p=0.002) and lateral lymph node metastasis (P<0.001). Lymph node metastasis was associated with number of foci (P<0.001), bilaterality (P<0.001), extrathyroidal extension (P<0.001) and size of the largest focus (P<0.001). The incidence of lymph node metastasis was significantly different among four groups (P<0.001). The data showed bilateral PTC had significantly highest rate of lymph node metastasis than unilateral PTC. The differences of lymph node metastasis were not statistically significant between unilateral solitary PTC and unilateral multifocal PTCs. (Conclusion) There is a significant association between bilateral PTC and lymph node positivity, increasing proportionally with the number of foci. Bilateral solitary or multifocal PTCs were associated with a tendency of more aggressive features, such as greater primary tumor size, more frequent extrathyroidal extension and regional lymph node metastasis. In addition, bilateral PTCs rather than unilateral multifocal PTCs was an indicator of disease aggressiveness, seen by a higher tendency for spread to the regional lymph node.
Thyroid Function after Hemithyroidectomy - Risk Factors for Postoperative Hypothyroidism

Joon-Hyop Lee, Yoo Seung Chung, Young Don Lee*

(Purpose) No previous study regarding the correlation between post-operative thyroid function and clinicopathologic features for both benign and malignant thyroid lesions has been published. In this study, we assessed the relationship between post-operative thyroid function after lobectomy and multiple factors for patients with both benign and malignant thyroid lesions. (Methods) From January 2008 to June 2009, all patients who underwent unilateral thyroid lobectomy were enrolled. Patients with benign lesions and a follow-up period less than 6 months, and thyroid cancer patients with a follow-up period less than 3 years were excluded. All cancer patients were of low risk category according to the American Thyroid Association guideline and thyroid stimulating hormone (TSH) suppression was maintained for 3 years. Postoperative hypothyroidism was defined as subclinical hypothyroidism or need for levothyroxine supplementation for benign patients and inability to withdraw from thyroid stimulating hormone suppression for cancer patients. Operation methods (open or minimally invasive video assisted thyroidectomy), direction of the lesion (right or left), central dissection, contralateral enucleation, thyroiditis on pathologic report, specimen weight, body mass index, age, previous thyroid medication, and preoperative TSH level over 4.15 were the variables analyzed in relation to postoperative hypothyroidism. (Results) A total of 144 patients underwent hemithyroidectomy and were followed up for a median period of 42 months. While 51 (58%) patients required no thyroxine supplementation and had no subclinical hypothyroidism, the remaining 37 (42%) either started thyroxine supplementation or had subclinical hypothyroidism. Pathologic thyroiditis was the only factor that was significantly related to postoperative hypothyroidism among the benign patients (p=0.013). Cancer patients were followed-up for a median period of 86.5 months and all received TSH suppression therapy which was intended to last for 3 years. After 3 years 22 (39%) were able to discontinue with the treatment while the remaining 34 (61%) could not taper off the levothyroxine. (Conclusion) The study results demonstrated that while high BMI was related to post-operative hypothyroidism for all patients, pathologic thyroiditis was the more significant factor in the benign patient subgroup.

Prediction of Transient and Permanent Hypoparathyroidism after Total Thyroidectomy using the Postoperative Serum Parathyroid Hormone Test: When is the Best Time to Check?

Hyeong Won Yu, Hyunjoo Kim, In Eui Bae, Jong-Kyu Kim¹, Chan Yong Seong¹, Jin Wook Yi¹, Joon-Hyop Lee², Su-Jin Kim², Young Jun Chai², June Young Choi*, Kyu Eun Lee¹

(Purpose) The usefulness of serum intact parathyroid hormone (iPTH) levels for predicting hypocalcemia after total thyroidectomy is well established. This retrospective cohort study aimed to identify the best time iPTH levels should be checked, thus helping to determine when early discharge is safe. (Methods) All consecutive patients...
who underwent total thyroidectomy in 2013-2015 were identified, retrospectively. iPTH was measured at 2 hours after thyroidectomy, and on postoperative days 1 and 2, and 12 months after surgery. (Results) In total, 730 patients were included. Their iPTH levels on postoperative day 2 correlated better with postoperative day 1 levels (Pearson’s R=0.915) than with iPTH levels at 2 hours after total thyroidectomy (R=0.786). Fourteen patients had normal iPTH levels at 2 hours after thyroidectomy but abnormal levels on postoperative days 1 and 2. On the other hand, 38 patients had abnormal iPTH levels at 2 hours after thyroidectomy but normal values on postoperative days 1 and 2. Receiver operating characteristic analysis showed that the iPTH value of 3.05 pg/mL best predicted permanent hypoparathyroidism (sensitivity=92.9%, specificity=99.7%). The safe cutoff value was 9.65 pg/mL (sensitivity=70.9%, specificity=100%). (Conclusion) A single measurement of iPTH on postoperative day 1 predicted patients at risk of transient hypocalcemia more accurately than measurements at 2 hours after surgery, and thus, can serve widely as a predictor of permanent hypoparathyroidism.

PE-042

Clinical Features of Tall Cell Variant Papillary Thyroid Carcinoma Without Lymph Node Metastasis

Department of Surgery, Seoul National University Bundang Hospital, Korea

In Eui Bae, Hyeong Won Yu, June Young Choi*

(Purpose) To verify the clinical characteristics related to the recurrence of tumor in TCPTC and assess the prognostic behavior of TCPTC without lymph node involvement. (Methods) From February 2003 to September 2015, patients underwent thyroidectomies with central lymph node dissection and diagnosed of TCPTC in SNUBH have been enrolled. The definition of TCPTC encloses PTC harboring over 50% of tall cells. Retrospectively, patients’ clinicopathologic characteristics, complications, and long-term results have been reviewed. (Results) Out of 154 patients diagnosed with TCPTC within the study period, a total of 97 patients had involved lymph node metastasis, and 9 patients experienced relapse or remnant of tumor. (62.6% and 5.8% respectively) Patients experienced recurrence or remnant tend to present tumors with size over 2cm, lymphatic invasion, and lymph node metastasis. (P=0.003, 0.011, and 0.027, respectively) The odds ratio of tumor size over 2cm was 8.82 (CI 2.07-37.49), and lymph node metastasis was 1.10. (CI 1.03-1.18) Disease-free survival period of recurrent patients on both tumor size over 2cm and lymph node metastasis were significantly shorter. (P=0.001 and P=0.017, respectively) (Conclusion) Poor prognosis of TCPTC is closely related to larger tumor size, lymphatic invasion and Lymph node metastasis. For TCPTC patients with these features are required aggressive treatments, such as total thyroidectomy with through lymph node dissection, and RAI ablation therapy. On contrary, patient with small TCPTC without lymph node metastasis may be more appropriate for lesser aggressive treatments.

PE-043

Malignancy in Pheochromocytoma or Paraganglioma: Integrative Analysis of 176 Cases in TCGA

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Yong Joon Suh*, Hyoun-Jong Moon, Kyu Eun Lee1

(Purpose) Attentions need for diagnosing malignant pheochromocytoma (PC) or paraganglioma (PG). However, there are no reliable histopathologic criteria to distinguish between benign and malignant PCPG. The recent genomic analysis of The Cancer Genome Atlas (TCGA) leads to understanding disease entity. Therefore, we investigate the genomic expression differences and mutational differences of malignant PCPG in TCGA. (Methods) As of December 2014, TCGA had acquired multigenomic analysis of 176 PCPG samples.
Clinical information, mutation status, and 20,531 gene mRNA expression dataset of normalized RNA-sequencing mRNA read counts were downloaded from TCGA. The dataset was integrated into a table. There were 162 samples with benign behavior and 14 samples with malignant behavior in the dataset. These two groups were compared in mRNA expression and mutation. Statistical analysis was performed in R 3.1.0 (R Foundation for Statistical Computing, Vienna, Austria) and GSEA 2.1.0 (Broad Institute, Cambridge, MA). (Results) In 176 surgically retrieved specimens of TCGA, there were 96 female samples. The mean age was 47.6 years [19, 83]. In demographics, there was no significant difference between two groups. However, the Kaplan Meier analysis showed the significantly different disease-free survival (log-rank p<.001). The mRNA expression of malignant PCPG was up-regulated in 5 pathways of cell cycle (BUB1, BUB1B, CCNB2, CDC2, ESPL1), calcium signaling (CCNB2, CDC2, PRKCB1), regulation of actin cytoskeleton (DIAPH3, FGFI8, IQGAP3), gap junction (CDC2, PRKCB1), and phosphatidylglycerolinositol (PRKCB1, TTK). In PCPG samples of TCGA, the most frequent somatic mutation was missense mutation (8701/14,240, 61%). Significant correlations were observed between malignancy and mutational genes, such as RP11-798G7.5, HERC2, SETD2, TGDS, TRHDE, FKB49, and BMS1. (Conclusion) TCGA shows the differences of mRNA expression and mutations between benign and malignant behavior in PCPG. These understanding can help to perform the proper diagnosis and treatment of PCPG.

**PE-044**

**Significance of Micrometastases in the Calculation of the Lymph Node Ratio for Papillary Thyroid Cancer**

Department of Surgery, Korea University College of Medicine, Korea

Young Woo Chang, Hwan Soo Kim, Seung Pil Jung, Hoon Yub Kim, Jae Bok Lee, Jeoung Won Bae, Gil Soo Son*

(Purpose) The lymph node ratio (LNR) is an important prognostic factor in papillary thyroid carcinoma (PTC), but micrometastases in cervical lymph nodes (LNs) are not of great clinical importance. In this study, we analyzed the accuracy of prediction of the prognosis depending on whether micrometastases were included in the number of metastatic LNs when calculating LNR. (Methods) The study included 353 PTC patients who underwent total thyroidectomy with neck LN dissection, and calculated LNR by 2 methods according to whether micrometastases were included in the number of metastatic LNs: Method 1 did not and Method 2 did include. To compare the predictive values of LNR by the 2 methods, correlation coefficients and receiver operating characteristic (ROC) curves were analyzed. (Results) Positive correlations were found between LNR and pre-ablation stimulated thyroglobulin (sTg) levels in both methods, but the correlation between Method 1 LNR and pre-ablation sTg level was significantly stronger than that for Method 2 (Fisher’s z=1.7, p=0.045). The areas under these 2 independent ROC curves were analyzed; the prognostic efficacy of Method 1 LNR was more accurate than that of Method 2 LNR, and the difference was statistically significant (p=0.0001). (Conclusion) Regional recurrence of PTC can be predicted more accurately by not including micrometastases in the number of metastatic LNs when calculating LNR.

**Fig. 1.** Scatterplots illustrating the correlation between Method 1 (left panel) and Method 2 (middle panel) LNR (axis x) and pre-ablation sTg level (axis y). Significant positive correlations are found in both the methods (Method 1 r=0.4392 p<0.0001, Method 2 r=0.3302 p<0.0001), but the correlation between Method 1 LNR and pre-ablation sTg level is stronger (right panel, Fisher’s z=1.7, p=0.045).

**Fig. 2.** ROC curves for Method 1 LNR (left panel)
and Method 2 LNR (middle panel). ROC curves comparing Method 1 and Method 2 LNR (right panel). In this plot, the Method 1 LNR significantly increased the area under the ROC when compared to the Method 2 LNR.

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**PE-045**

**Co-Occurrence of Metastatic Papillary Thyroid Carcinoma and Salmonella Induced Neck Abscess in a Cervical Lymph Node: A Case Report**

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**Jae-Myung Kim, Ju-Yeon Kim*, Eun Jung Jung†, Eun Jin Song, Dong Chul Kim‡, Chi-Young Jeong, Young-Tae Ju, Young-Joon Lee, Soon-Chan Hong, Sang-Kyung Choi, Woo-Song Ha**

**(Purpose)** The co-occurrence of a metastasis from papillary thyroid carcinoma (PTC) and a bacterial infection is rare. We aimed to present a rare case of 76-year-old woman with a cervical lymph node metastasis from PTC, and Salmonella infection of the same lymph node. **(Methods)** A 76-year-old woman presented with painful swelling in her left lateral neck region for 15 days, and neck ultrasonography and computed tomography showed a cystic mass along left levels II-IV. Ten months earlier, she underwent total thyroidectomy with bilateral central cervical lymph node dissection due to PTC, followed by radioactive iodine therapy. The cystic mass was suspected of being a metastatic lymph node, modified radical neck dissection was performed. **(Results)** Histopathological examination confirmed the presence of PTC in the resected node and laboratory examination of the combined abscess cavity confirmed the presence of Salmonella typhi. Following antibiotic sensitivity testing of the cultured Salmonella typhi, she was treated with proper antibiotics. **(Conclusion)** Cystic lesions in lymph nodes with metastatic cancer may indicate the presence of co-occurring bacterial infection. Thus, culturing of specimen can be option to make accurate diagnosis and to provide proper post-operative management.

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**Fig. 1.** Ultrasonography showing a large heterogeneously echoic mass.

**Fig. 2.** Computed tomography showing a 3.3x5.6 cm sized thick-walled cystic lesion
Papillary Thyroid Cancer Metastases to Axillary Lymph Nodes; A Case Report

Department of Surgery, Konkuk University Medical Center, Korea

Sang Eun Nam, Young Bum Yoo*, Jung Hyun Yang

(Purpose) Papillary thyroid cancer is the most common type of thyroid cancer. PTC usually metastasizes to regional cervical lymph nodes which are common through central, lateral and superior mediastinal compartment. We report a rare case of Axillary Lymph nodes metastasis of Papillary thyroid cancer. (Case Presentation) A 81-year-old female diagnosed in 2006 with PTC underwent total thyroidectomy and bilateral modified radical neck dissection. Pathology was classical papillary carcinoma, 5.0cm sized mass with lymph node metastasis in 19 out of 42 lymph nodes. During an annually follow up, the patient received radioiodine ablation and one time ipsilateral supraclavicular lymph node dissection in 2013. 10 years after total thyroidectomy, on clinical examination, left palpable axillary mass was found. Fine-needle aspiration biopsy demonstrated metastatic PTC. The patient underwent axillary node dissection, with metastatic papillary carcinoma in 3 out of 5 lymph nodes. (Conclusion) Axillary metastasis is a rare finding in the classic type of papillary carcinoma. Palpable Axillary Lymph node mass in patient underwent total thyroidectomy with history of thyroid cancer should be considered metastatic from thyroid cancer.

Renal Cell Carcinoma Metastasis to Thyroid Tumor, Presenting Like Non-Toxic Goiters

Department of Surgery, Inje University College of Medicine, Seoul Paik Hospital, Inje University, Korea

Haengjin Ohe, Yeo Gu Chang*

(Purpose) Metastatic disease of renal cell cancer (RCC) is frequently involves the lung, bone, brain, liver and adrenal glands. The Thyroid represents a very uncommon site of metastatic disease. We report the patient presenting with neck discomfort & engorgement who had diagnosed metastatic renal cell cancer to lung. (Methods) A 61-year-old female presented with neck discomfort and engorgement diagnosed months after metastatic lung cancer of RCC. Twelve years ago the patient undergone right radical nephrectomy and left partial nephrectomy for clear cell carcinoma. On physical examination, there was no abnormalities without diffusely engorged neck. Thyroid function test was all normal. Thyroid ultrasonography revealed multiple masses in both thyroid glands, and fine needle aspiration did not reveal any malignancy. Subsequently biopsy taken from her thyroid underwent total thyroidectomy, which revealed clear cell histology. Subsequently, it was a diagnosis of metastasis of renal cell carcinoma in thyroid which was similar with non-toxic goiter. (Results) Generally, thyroid metastasis arises from breast, lung, skin and colon cancer. The thyroid is a rare site of RCC secondary involvement. Most of thyroid metastases from renal carcinoma may cause problems in differential diagnosis with primary thyroid tumors because they may occasionally arise many years or decades after its surgical removal. RCC metastases to the thyroid are normally asymptomatic and do not affect thyroid function, even if the literature reports cases of emergency treatments for acute respiratory compromises. In other hand, some reports for isolated metastatic cancer to the thyroid, surgical treatment should be considered in order to avoid potential morbidity of tumor recurrence in the neck, even if the prognosis remain poor. (Conclusion) Diagnosis and therapeutic manage-
ment of thyroid metastases from renal carcinoma represents a challenge for the clinician.

![Image of a patient presenting with neck discomfort](image1)

**Fig. 1.** A photo of the patient who presents with neck discomfort

![Image of surgically removed thyroid](image2)

**Img. 1.** Specimen of surgically removed thyroid

Encapsulated Follicular Variant of Papillary Thyroid Carcinoma: Invasive vs. Non-Invasive

Department of Surgery, Departments of Pathology, Chungbuk National University Hospital, Korea

Dongju Kim, Seung-Myoung Son¹, Jin-Woo Park*

(Purpose) Encapsulated follicular variant papillary thyroid carcinoma (EFVPTC) was well known as indolent tumor and it was treated as conventional thyroid carcinoma. Furthermore, the diagnosis and treatment of non-invasive EFVPTC have become the object of controversy. The aim of this study is to identify the characteristics of non-invasive EFVPTC compared with invasive EFVPTC. (Methods) From Jan. 1st 2007 to Dec. 30th 2013, 1593 patients received operation with papillary thyroid carcinoma. Among them patients with EFVPTC were 59. We reviewed the slides and classified them with invasive FVPTC (group 1) and non-invasive FVPTC (group 2). We compared and analyzed the characteristics and prognoses of them. (Results) Of 59 FVPTC, invasive FVPTC was 14 (23.7%) and non-invasive FVPTC was 45 (76.3%). The mean age of group 1 and 2 were 51.1 and 51.6, respectively (p=0.91). The distribution of gender was not different between group 1 and 2. The mean tumor size of group 1 and group 2 were 17.8 mm and 18.3 mm, respectively. It was not statistically significant (p=0.90). Extra-thyroidal extension was observed 1 case in group 1 and 5 cases in group 2, but it was no statistically significant (p=0.56). Lymph node metastasis was observed 2 cases in group 1 and 5 cases in group 2, and it was no significant either (p=0.53). The recurrence was found 1 case and it was in group 2 and it was not statistically significant. (Conclusion) Although EFVPTC has a good prognosis, especially non-invasive FVPTC is indolent tumor obviously, it was confirmed not to be different from invasive FVPTC. The diagnosis and treatment of the non-invasive FVPTC need to be careful.
**PE-049**

**Thermal Injury of the Recurrent Laryngeal Nerve by THUNDERBEAT OPEN FINE JAW During Thyroid Surgery: Findings From Continuous Intraoperative Neuromonitoring in a Porcine Model**

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*(Purpose)* Recurrent laryngeal nerve (RLN) palsy is the most common and serious complication of thyroid surgery. The use of energy-based devices (EBDs) has replaced handtying methods in many institutions. However, EBD use proximal to the RLN presents risks related to lateral thermal spread and associated nerve damage. THUNDERBEAT OPEN FINE JAW (TB OFJ) is one of the most widely used EBDs. This study aimed to test the safety of TB OFJ during thyroidectomy. *(Methods)* Three piglets weighing 30-40 kg experienced thyroidectomy while continuous electrophysiologic monitoring (continuous intraoperative neuromonitoring) occurred, using an electromyography endotracheal tube and NIM 3.0 response system. Total 5 RLNs were evaluated during thyroid surgery. TB OFJ was applied at various distances from the RLN, and we assessed the safety of the protocols. *(Results)* Adverse electromyography events did not occur at any distances from the RLN. No decrease of Amplitude and increase of latency were noted even if TB OFJ was 0 mm from the RLN. *(Conclusion)* TB OFJ can be used safely at any distance from the RLN. This is the first report assessing the safety of TB OFJ, and findings indicate that TB OFJ can be used safely during thyroid surgery.

**PE-050**

**Skip Metastasis to Lateral Neck Lymph Nodes in Papillary Thyroid Carcinoma**

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*(Purpose)* Skip metastases, leaping metastasis to lateral neck lymph node (LN) without central LN metastasis, are uncommonly observed in papillary thyroid cancer (PTC). There is still rare evidence of effect between skip metastasis and disease-free survival (DFS). We conducted this study to evaluate the clinicopathological features and DFS according to skip metastases in PTC. *(Methods)* We retrospectively reviewed the records of 154 patients who underwent total thyroidectomy, central lymph node dissection, and ipsilateral modified radical neck dissection between June 2006 and December 2010. *(Results)* The median follow-up was 69 months. Skip metastases were found in 35 patients (22.8%). The lateral lymph node metastases ratio was lower (0.29±0.18 vs. 0.19±0.19, p=0.003) and the frequency of single lateral neck level involvement was higher (32.8% vs. 60.0%, p=0.007) in the patients with skip metastases. In univariate and multivariate logistic regression analyses, significant factor related to skip metastasis were age more than 45 years (odds ratio 3.48, p=0.004; odds ratio 3.60, p=0.005) and tumor size >1cm (odds ratio 0.46, p=0.048; odds ratio 0.40, p=0.03) respectively. There was no significance between skip metastasis and DFS. *(Conclusion)* Skip metastases can occur frequently in PTC patients. Nevertheless, there were no difference of recurrence according to skip metastasis.
Modified Dynamic Risk Stratification and Its Application on Papillary Thyroid Microcarcinomas

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Joon-Hyop Lee, Yoo Seung Chung, Young Don Lee*

(Purpose) A new risk stratification system has been proposed to more accurately estimate the risk of recurrence in patients with papillary thyroid carcinoma in which the response to initial therapy is taken into consideration. Previous publications have dealt with the application of this modified dynamic risk stratification system to papillary thyroid carcinomas but not to papillary thyroid microcarcinomas (PTMC) that are 1 cm or shorter in diameter. Since the incidence of PTMC is very high in Korea, we analyzed the validity of the modified dynamic risk stratification system for assessing the risk of recurrence in patients with PTMC. (Methods) Patients who underwent total thyroidectomy with radioiodine remnant ablation due to PTMC between 2008 and 2010 at Gachon Gil medical center were included. All patients who were followed-up for less than 24 months were excluded. We classified patients according to the initial stratification proposed by the American Thyroid Association (ATA) guideline into 3 groups, and then into four groups based on the response to the initial therapy ('excellent', 'acceptable', 'biochemical incomplete', and 'structural incomplete' response) in accordance to the modified dynamic risk stratification proposed by Jeon et al. (Results) The median follow-up period of 175 patients with PTMC was 56 months. Seven (4%) of them experienced recurrence. When the initial risk stratification of the ATA guideline was applied, 50 (28.6%), 80 (4.7%), and 45 (34.7%) patients were categorized into the low, intermediate, and high risk group respectively. One patient from the biochemical incomplete and 6 from the structural incomplete group had experienced recurrence. From the initial low risk group, only 1 (2%) patient was re-categorized into either biochemical incomplete or structural incomplete group whereas from the intermediate and high risk groups, 4 (5.1) and 11 (23.4%) respectively fell into those groups. (Conclusion) Our study validates the usefulness of the modified dynamic risk stratification system for the use in PTMC patients.

Association Between Diet and Risk of Recurrence of Papillary Thyroid Cancer According to the Risk Stratification System

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(Purpose) Diet may play a role in the initial formation of thyroid cancer, but an association with recurrence of thyroid cancer has not been studied. We investigated the hypothesis that dietary intake is associated with risk of recurrence of papillary thyroid cancer (PTC). (Methods) Patients at risk of recurrence of PTC were divided into intermediate- (n=228) and low-risk groups (n=136) using the American Thyroid Association risk stratification
system. **(Results)** The intermediate-risk group consumed significantly more grains, meat, dairy products, energy, lipids, animal lipids, protein, and animal protein than the low-risk group (p<0.05). Multivariable-adjusted regression analysis also showed that the risk of recurrence of PTC was positively associated with intake of animal lipids (OR 2.193; 95% CI 1.04-4.62 P=0.025), meat (OR 1.866; 95% CI 1.05-3.31; p=0.056), and dairy products (OR 2.027; 95% CI; 1.11-3.71; p=0.048) after adjusting for confounders. Intake of meat was positively associated with aggressive clinicopathological features of PTC such as tumor size >1 cm (OR 2.083; 95% CI 1.10-3.96; p=0.010) and lymph node metastasis (OR 1.954; 95% CI 1.04-3.68; p=0.044) after adjusting for confounders. Meat intake was positively associated with advanced tumor stage (p=0.028) and absence of thyroiditis (p=0.040) in obese patients but not in non-obese patients. **(Conclusion)** The present study is the first report showing a positive association between risk of recurrence of PTC and intake of animal lipids from meat in patients with PTC, particularly obese PTC patients.

**PE-053**

**Nodal Recurrence in the Lateral Neck Nodes after Total Thyroidectomy with Prophylactic Central Neck Dissection for Papillary Thyroid Cancer**

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**So Eun Ahn, Han Sung Kim, Sang Hwa Kim, Jae Won Lee, Hojin Chang, Lee Su Kim**

**(Purpose)** When there is no suspicion of metastatic disease to lymph nodes on imaging or palpation, prophylactic or elective central neck dissection is a matter of debate. Although regional lymph node recurrence is common in patients with thyroid cancer, clinicopathological predictors are unclear. Prophylactic central neck dissection together with prophylactic lateral neck dissection is regarded controversial and is rarely attempted. The aim of this study is to examine the predictive factors for nodal recurrence in the lateral neck nodes in patients with papillary thyroid carcinoma who underwent total thyroidectomy and prophylactic central neck dissection. **(Methods)** This is a retrospective study of patients with papillary thyroid carcinoma who underwent total thyroidectomy and prophylactic central neck dissection. Data of all the patients surgically treated between January 2006 and September 2011 at the division of Breast and Endocrine Surgery, Hallym Sacred Heart Hospital were reviewed. Gender, age at diagnosis, pathologic T stage, multiplicity, location of tumor, extrathyroidal extension, TNM stage, number of positive level VI lymph nodes, ratio of positive lymph node, rate of radioactive iodine treatment were analysed. The primary outcome was prevalence of nodal recurrence in the lateral neck within 5-year follow-up after initial surgery. Predictors of nodal recurrence in the lateral neck were determined in the univariable and multivariable analysis. Statistical analyses were performed using SPSS version 18.0 (SPSS, Inc., Chicago, IL) **(Results)** The number of patients with lateral neck node recurrence was 17(2.24%) among 760 patients during 5-year postoperative follow-up. The median age of patients was 46.9±15.6 years. 677(89.1%) patients were female. Regarding the risk of lateral neck node recurrence, we found that male gender, age ≥ 45 years, T3(tumor size >4cm in the greatest dimension limited to the thyroid or any tumor with minimal extrathyroid extension), ratio of positive lymph nodes are significant risk factors. T3 (P<0.001; odds ratio=2.57, 95%CI) and the ratio of positive lymph nodes (p<0.001; odds ratio=11.4, 95%CI) were the strongest predictors of lateral neck lymph node recurrence. **(Conclusion)** We found achievable risk factors for recurrence of lateral neck nodes in papillary thyroid cancer patients. We suggested that clinicopathological features such as male gender, age ≥45 years, larger tumor size, extrathyroid extension, and ratio of positive central compartment LNs were considered as predictive factors of lateral neck node recurrence.
**Progress of Adrenalectomy in Single Center From Conventional Open Adrenalectomy to Laparoscopic Adrenalectomy Concurrently**

Division of Breast Endocrinology Surgery, Hallym University Sacred Heart Hospital, Korea

**Jaewon Lee, Leesu Kim*, Hansung Kim, Sanghwa Kim, Soeun Ahn**

**Purpose** Adrenalectomy divided into conventional open adrenalectomy and laparoscopic adrenalectomy. In the past open adrenalectomy was mostly done. Nowaday laparoscopic adrenalectomy is standard technique. So we analysis our center adrenalectomy last 10 years to see progress in adrenalectomy.

**Methods** We review 59 patient retrospectively who underwent adrenalectomy from 2006.09 to 2016.07. There were 42 cases of laparoscopic surgery, 14 cases of open surgery, 3 cases of open conversion. There were 5 malignancy cases. In pathology, There were 27 cases of cortical adenoma. 10 cases of pheochromocytoma, 9 cases of cushing syndrome, 6 cases of primary aldosteronism, 1 ganglioneuroma case, 1 ganglioblastoma case. **Results** No surgical related mortality case was observed in both OA and LA group There were 2 expired cases that was metastatic carcinoma as HCC and adenocarcinoma from lung. In 2007, 10 cases of adrenalectomy was all open adrenalectomy. From 2008 most adrenalectomy was done with laparoscopy. There were no significant surgical complication. **Conclusion** Laparoscopic adrenalectomy has many good point compared with open adrenalectomy. Although metastatic malignancy cases, relatively small size like 2.5cm, laparoscopic adrenalectomy was success method.
Annual Congress of KSS 2016

Poster Exhibition

Endoscopic and Laparoscopic
Totally Laparoscopic Living Donor Left Hepatectomy for Liver Transplantation in a Child

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Seok-Hwan Kim, Ki-Hun Kim*

(Purpose) Minimally invasive strategies have been proposed to perform living donor liver heptectomy for adolescent recipients with less morbidity. Laparoscopic donor heptectomy can reduce the major concerns about pain, morbidity associated with open surgery and a slow return to normal functioning of donors. Herein we present one case of totally laparoscopic living donor heptectomy including the middle hepatic vein (MHV). (Methods) A 37 y.o mother volunteered to donate to her 3 y.o son with atresia of bile ducts (PELD score 7). Total donor liver volume was 833 cm3 and left liver, including MHV, was 290 cm3. Graft to recipient weight ratio was 2.07. The left hepatic artery and portal vein were dissected and encircled with a piece of vessel loop. Pringle maneuver was used during parenchymal division. The transection of the liver was performed using an alternating combination of laparoscopic ultrasonic aspirator and THUNDERBEAT™ (Olympus). The MHV was identified and transection was performed following its right side. Several small tributaries from segments V and VIII were identified and divided. Finally, left bile duct was found and divided after performing intraoperative cholangiography with a mobile C-arm. (Results) Totally laparoscopic living donor left heptectomy was performed successfully without intraoperative complications and transfusions. The operation time was 371mins, and the estimated blood loss was less than 250ml. Graft weights were 314g. Oral intake was resumed on the first postoperative day (POD). On POD 4, CT scan showed no pathological findings. The patient was discharged on POD 7 without complications. (Conclusion) The authors recommend that the laparoscopic donor left heptectomy is safe and feasible for living donor liver transplantation, but should be performed in selected cases with a favorable anatomy.
(Purpose) For choledochal cyst, complete excision of cyst with Roux-en-y hepaticojejunostomy is the treatment of choice. Nowadays as it extended along the area of robotic surgery, there is a trend to increase robot-assisted resection of choledochal cyst with Roux-en-y hepaticojejunostomy. This report introduces single center experience of robot-assisted resection of choledochal cyst with Roux-en-y hepaticojejunostomy. (Methods) Between January 2014 and August 2016, the authors performed robot-assisted choledochal cyst excision for 8 patients. All the patients except one were women, and the mean age was 27 years (range, 16-34 years). According to the Todani classification, there were four type Ia cases, three type Ic cases, and one type IVa case. Choledochal cyst excision and Roux-en-Y hepaticojejunostomy were performed using da Vinci Surgical System. We used da Vinci system with 4~5ports. After the cyst was dissected down from the hepatic hilum to the intrapancreatic portion of the common bile duct, the distal portion of the choledochal cyst near the pancreatic duct was safely ligated and divided by using Hemolok or endo stapler. After the specimen was removed, the jejunum at 40 cm distal to the Treitz ligament was exteriorized through periumbilical port site. A Roux-en-y jejunojejuno anastomosis was performed extracorporeally. The da Vinci system was continued after the bowel was repositioned into the peritoneal cavity. Hepaticojejunostomy using the da Vinci surgical system was performed. Of these cases, the perioperative outcome and short-term postoperative morbidity were evaluated. (Results) The mean operation time was 286 min (range, 168-340 min). No operative or postoperative transfusion was required. The median length of hospital stay was 7.5 days (range, 5-59 days). There were two postoperative complications, bile leakage and necrotizing pancreatitis without mortality. No patient had a delayed complication or adverse event, as determined by clinical or laboratory evaluation during a 1- to 17-month follow-up period. During the same period, 20 cases of laparoscopic choledochal cyst excision were performed in the same center. Mean operation time was 249 minutes. And median hospital stay was 8 days. There was one postoperative complication, acute pancreatitis treated with conservative care and jejunal branch bleeding. The patient that had bleeding was treated with highly selective embolization. (Conclusion) In summary, robot-assisted resection of choledochal cyst with Roux-en-y hepaticojejunostomy is safe and feasible and its short-term results are comparable to laparoscopic surgery. Compared to laparoscopic surgery, the robot-assisted technique has definite advantage in intracorporeal suture and good 3D visual field. So, it can be a good surgical alternative for choledochal cyst.
rectal cancer by using a single-port robotic approach with an additional conventional robotic port.

**(Methods)** A 78-year-old woman with rectal cancer had a biopsy-proven adenocarcinoma within 7 cm of the anal verge. The patient underwent totally robotic total mesorectal excision using Da Vinci Single-Site® platform with dual docking technique. Two single-ports were used through the umbilical skin incision and the right lower quadrant area. For distal bowel resection, robotic linear staplers were introduced through the additional port in the right lower and this port site was used for pelvic drain placement. The tumor specimen was extracted through the umbilical incision and end-to-end intracorporeal anastomosis was carried out with a double stapling technique.

**(Results)** Total procedure time was 195 minutes. The patient was discharged on postoperative day 9 uneventfully. Pathologic examination of the specimen showed a 3.5×2.0 cm sized moderately differentiated T3N0M0 adenocarcinoma without circumferential margin involvement. The total number of lymph nodes harvested was 16 and the proximal and distal resection margins were 12.0 and 1.0 cm, respectively.

**(Conclusion)** Based on the present case, reduced-port robotic TME for rectal cancer using the single-port access appears to be feasible and safe. This approach could overcome some limitations of the single-port laparoscopic rectal surgery.

**Fig. 1.** Access port setup for reduced-port robotic rectal surgery.

**Fig. 2.** Reduced-port robotic robotic total mesorectal excision for rectal cancer in pelvic phase (A) Posterior rectal dissection (B) Lateral rectal dissection (C) Anterior rectal dissection (D) Endostapling using the robotic stapler through the additional port.

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**PE-059**

**Duodenal Obstruction after Ladds Procedure - A Rare Complication following Single-Port Ladds Procedure**

Department of Surgery, Daejeon St. Mary’s Hospital, College of Medicine, The Catholic University of Korea, Korea

**Won Jun Jeong, Byung-jo Choi, Sang Chul Lee**

**(Purpose)** An internal hernia is the protrusion of the bowel loops through abnormal orifice in the peritoneum or mesentery. Internal hernias are reported to cause 0.2% to 5.8% of all cases of small bowel obstruction. Among internal hernias, paraduodenal hernia is the most common. To date, laparoendoscopic single site repair of a right paraduodenal hernia has never been described. In this report, we performed laparoendoscopic single port Ladd’s procedure **(Methods)** A 22-year-old female presented with intermittent epigastric pain associated with nausea and emesis. Physical examination was normal. On CT scan, radiologist’s result was negative but small bowel was on the
right side of the abdomen and colon on the left. Small bowel series showed malrotation of the small bowel. Laparoendoscopic access was obtained through the transumbilical incision. The hernia sac was opened laterally to avoid injury to the superior mesenteric vessels. The small bowel was then released from the sac into the peritoneal cavity. The entire bowel was examined and no other abnormalities were noted. **(Results)** Laparoendoscopic single port (LESS) Ladd’s procedure was successfully completed without conversion or perioperative complications. Postoperatively, the patient tolerated a soft diet on postoperative day 1, and was discharged home on postoperative day 2. During follow-up, she visited hospital for cramping pain after eating a large, heavy meal. Plain radiographs of the abdomen reveal severe distension of the stomach. Esophagogastroduodenoscopy showed luminal obstruction at the second portion of the duodenum. She had LESS gastrojejunostomy 3 weeks after 1st operation. She discharged in a week. **(Conclusion)** Right paraduodenal hernia with minor symptom can be treated with laparoendoscopic approach safely. Postoperative duodenal obstruction following Ladd’s procedure can be treated with LESS G-J stomy.

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**PE-060**

**A Case of Peritoneal Cystic Mesothelioma Misdiagnosed as a Gastric Subepithelial Tumor**

Department of Surgery, Wonkwang University Sanbon Hospital, Wonkwang University School of Medicine, Korea

Seok Youn Lee*, Jung Nam Kwon, Whan Bong Lee

**(Purpose)** Benign peritoneal cystic mesothelioma (BPCM) is a rare tumor of unknown origin, most frequently encountered in women of reproductive age. Etiology is unknown, definitions and terminology are confusing, and preoperative diagnosis is difficult. **(Methods)** A 57-year-old women visited to our hospital presented as a gastric subepithelial mass that was found incidentally. Endoscopy demonstrated a 2.5 cm sized mucosal elevated lesion at the mid body anterior wall of the stomach. Computed tomography (CT) and magnetic resonance imaging (MRI) of abdomen revealed a stomach exophytic subepithelial cystic lesion. **(Results)** On laparoscopy, the cystic mass was found to be located at parietal peritoneum of abdominal wall. The stomach was

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**Fig. 1.** pre OP Abdomen CT- SMA

**Fig. 2.** pre OP small bowel series

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normal. **(Conclusion)** The diagnosis was established following a laparoscopic peritoneal mass excision and histological studies of the excised tissue. In this report, we present a case of a BPCM that was initially suspected to be a gastric subepithelial mass.

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**PE-061**

**Development of Real-Time Capable Radio Frequency IDentification (RFID) Transmission Module Detector, for Rapid and Precise Detection of Tumor Location During Micro-Invasive Surgery in Early Gastric and Colon Cancers**

Department of Surgery, Dongnam Institute of Radiological & Medical Sciences, Clinical Research, Research Center, Dongnam Institute of Radiological & Medical Sciences, Medical Physics Team, Division of Heavy-ion Clinical Researches, Korea Institute of Radiological & Medical Sciences, Medical Image Science Graduate School, Radiation Image Laboratory, Inje University, Research & Development Integrated Medical Technology Team, Medical Device Development Center in Osong Medical Innovation Foundation, Korea

Jae Seok Min*, Sun Young Kim, Kyu Heo¹, Yong Keun Song², Kyo Tae Kim³, Seung A Lee⁴, Ha Chul Jung⁴, Jin Woo Ahn⁴, Jin Hee Moon⁴

**(Purpose)** Because of recent health screening effective, it has been increasing discovery of early-staged cancer. Accordingly, a micro-invasive surgery for early gastric and colon cancers is actively enforced. During totally laparoscopic or robotic surgery, it is difficult to detect by palpation directly to tumor or marked metal clips. Therefore, it is desired to develop a technique for detecting the position of clips around tumor in real time accurately and easily. **(Methods)** We developed the Radio Frequency IDentification (RFID) mechanism system consisting of RFID tags, RFID laparoscopic detector probe, and signal processing instrument to match the micro-invasive surgery as a basic research for intra-operative tumor localization. In swine models, endoscopic clips attached by RFID tags were fixed in the mucosal layer of stomach and colon. Afterwards, the RFID laparoscopic detector probe was utilized to find the location of endoscopic clips. **(Results)** The size of RFID Tags was within 3 to 7 mm. RFID sensitivity appeared to vary depending on angle of RFID antenna to tags. When the distance to desired considering the thickness of gastric wall, detection area was within 45 to 135 degree of angle. Totally 22 endoscopic clips attached by RFID tags were used. Among them, 15 clips were trying to fix in stomach, consequently 9 clips (60%) were placed successfully. Also, 7 clips were trying to fix in colon, 5 clips (71%) were placed successfully. Distance between endoscopic clips and RFID detection site was about 10.3 mm. **(Conclusion)** We will perform further research to minify size of tags, also to elevate accuracy of detection, such as applying both active and passive tags, ultra-wide band impulse signal, and so on. **Acknowledgement:** This work is supported by grant no.10060137 from Technology Innovation Program of Ministry of Trade, Industry and Energy.

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**PE-062**

**A Case of Retroperitoneal Bronchogenic Cyst**

Department of Surgery, Chung-Ang University College of Medicine, Korea

Byung Wook Park, Seung Eun Lee*, Yoo-Shin Choi

**(Purpose)** Bronchogenic cysts are usually benign and asymptomatic mass. We present a case of the asymptomatic retroperitoneal mass and gallbladder polyp. **(Methods)** We reviewed the imaging findings, lab, and histopathology of the patient with retroperitoneal bronchogenic cyst. **(Results)** A 54-year-old female underwent physical health examination. 9 cm-sized retroperitoneal mass at left
para-aortic area, 1 cm sized gallbladder polyp and multiple stones were detected. Preoperative diagnosis was suggested a benign mass such as mucinous tumor or neurogenic tumor. The patient underwent laparoscopic mass excision for retroperitoneal mass and cholecystectomy. Pathologically, the retroperitoneal mass was diagnosed the bronchogenic cyst, and gallbladder polyp was tubular adenoma. **(Conclusion)** The present study presents a rare case of a retroperitoneally localized bronchogenic cyst as an unusual differential diagnosis of a retroperitoneal tumor. Making a preoperative diagnosis of heterotopic bronchogenic cyst is very difficult, only a histological analysis can currently provide a definite diagnosis.

**PE-063**

**Laparoscopic Excision of Splenic Artery Aneurysm: A Case Report**

Department of Surgery, Presbyterian Medical Center, Korea

_Woo Young Kim*, Yu Ni Lee_

**(Purpose)** Splenic artery aneurysm(SAA) is one of the most visceral aneurysm, and patients with this type of aneurysm often present without symptoms. However, when rupture occurs, it can be a catastrophic event. A symptomatic aneurysm, an aneurysm of any diameter in a pregnant woman or a woman of childbearing age, and an aneurysm >2cm are all strong indications for surgery because of a significantly increased risk for splenic artery rupture Although most of these aneurysms can be treated with percutaneous embolization instead of laparotomy, marked tortuosity of the splenic artery or near splenic hilar located aneurysm may not be suitable for endovascular management. **(Methods)** A 75-year-old man with left upper quadrant discomfort for 3 months or more was found to have a SAA on medical examination. Computed tomogram scan reveal a 3.5cm SAA near the splenic hilum. Celiac angiography demonstrated the presence of a 2.5cm aneurysm distal splenic artery with severe tortuosity. So we decided laparoscopic SAA excision **(Results)** He underwent laparoscopic excision of SAA with preserving spleen. His postoperative course was uneventful. Follow up computed tomogram scan showed somewhat infarction of spleen but his splenic function was well maintained. **(Conclusion)** SAA requires prompt attention for patients at increased risk for rupture. Endovascular management is the least invasive and most applied therapy. Hower, for more complicated cases, laparoscopic surgery should be considered as the next best option.

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**PE-064**

**Gallstone Bezoar Treated with Intragastric Laparoscopy**

Department of Surgery, Chung-Ang University College of Medicine, Korea

_Han Kyul Shin, Jung Min Park*, Kyung Chun Chi_

**(Purpose)** To report a case of gallstone bezoar which obstructed pyloric outlet of stomach by the approach of intragastric laparoscopy. **(Methods)** 69 years-old male patient with vomiting was diagnosed as an impaction of gallstone bezoar. Diagnostic laparoscopy was done. Severe adhesion & Bile duct to duodenal fistula was seen. We decide to remove the gallstone via intragastric laparoscopy. Gastrostomy & suction of gastric contents was done by laparoscopy. Global ballooning port was used. Then we inserted scope & laparoscopic instruments into the stomach. The gallstone was discovered in the pyrolus. Crushing & plucking out of the gallstone was done. **(Results)** The patients discharged at POD 9th. No acute complication such as fever, wound infection, acute upper gastrointestinal bleeding has been occurred. **(Conclusion)** Gastric outlet mechanical obstruction, such as bezoar, and if the conventional laparoscopic approach is laborious, intragastric laparoscopic approach also could be an alternative choice of treatment.
Gallstone Ileus of the Duodenum Causing Gastric Outlet Obstruction

Department of Surgery, Chung-Ang University College of Medicine, Korea

Han Kyul Shin, Kyong-Choun Chi, Joong-Min Park*

(Purpose) Gallstone ileus occurs when a gallstone passes from cholecystoduodenal fistula or choledochoduodenal fistula into the gastrointestinal tract and causes obstruction. We report a case of gallstone ileus of duodenum causing gastric outlet obstruction treated with the approach of intragastric laparoscopy. (Methods) Sixty-nine year-old male patient presenting vomiting was diagnosed as gallstone ileus of the duodenum on abdominal CT scan. MRCP revealed the cholecystoduodenal fistula. On the laparoscopic inspection, severe adhesion around the gallbladder was seen. We decided to remove the gallstone by intragastric laparoscopy. Gastrotomy and suction of gastric contents was done by laparoscopy. A glove port was placed in the stomach through the left upper abdomen. We used a flexible scope and conventional laparoscopic instruments to extract gallstones in the 1st and 2nd portion of duodenum. Gastrotomy site was closed with linear stapler laparoscopically. Cholecystectomy was not performed. (Results) He was started on normal diet at the day after surgery. The postoperative course was not eventful. (Conclusion) For the treatment of gallstone ileus of the duodenum causing gastric outlet obstruction, if the conventional laparoscopic or endoscopic approach is not possible, intragastric laparoscopic approach could be an alternative choice of treatment.
The Effects of Early Enteral Nutrition in Patients: A Role of Nutrition Support Team

Department of Nutrition and Dietetics, 1Surgery, 2Pharmacy, 3Nursing, Nutrition Support Team, Gangneung Asan Hospital, University of Ulsan College of Medicine, Korea

Kye Wol Park, Hee Ryoung Son, Ji Hoon Kim1*, Myoung Hee Kim2, Eun Jin Choi3

(Purpose) The study examines the effects of early enteral nutrition on patients’ length of stay in an intensive care unit (ICU), length of stay and mortality rate. (Methods) We employed a retrospective design with a total of 461 patients (mean age=69.96±15.6; 253 males; 208 females) They were divided into two groups according to when they received enteral feeding: an “early enteral nutrition” (EEN) group of 148 (32%) patients who received enteral feeding within 48 hours of their arrival at the hospital and a “delayed enteral nutrition” (DEN) group of 313 (67%) patients who received enteral feeding at some point after 48 hours of their arrival at the hospital. The EEN group and the control group were similar in terms of age, sex, BMI and underlying diseases. (Results) The EEN group’s total length of stay in the hospital was shorter (23.29±27.19 days) than that of the control group (36.74±32.24 days); the difference was significant (P<.001). The EEN group also showed a shorter length of stay in the ICU (13.67±22.77 days) than the DEN group (17.46±21.02 days) and a lower mortality rate (17.6%) than the control group (18.8%), although these differences were not significant. (Conclusion) The study found that early enteral nutrition treatment significantly reduced total length of stay in the hospital. The findings suggest that early enteral nutrition treatment plays an important role in patients’ recovery and prognosis.
Annual Congress of KSS 2016

Poster Exhibition

Colorectal
Comparison of Prone vs. Lithotomy Position During Laparoscopic Assisted Abdominoperineal Resection for Rectal Cancer

Section of Colon and Rectal Surgery, Department of Surgery, Soonchunhyang University College of Medicine, Soonchunhyang University Bucheon Hospital, Korea

Dae Ro Lim, Jung Kul Kuk, Tae Hyung Kim, Eung Jin Shin*

(Purpose) Lithotomy positions are routinely used for abdominoperineal resection (APR) for low rectal cancer. The present study compared the clinical and oncologic outcomes of prone vs. lithotomy position during laparoscopic assisted APR for rectal cancer.

(Methods) Between Jan 2009 and Dec 2014, 30 patients who underwent laparoscopic assisted APR for low rectal cancers after were retrieved from a prospective database. Lithotomy positions were performed 14 patients (group I) and prone positions were performed on 14 patients (group II) during perineal resection after laparoscopically resection at abdomen phase. They were compared with respect to patient’s demographics, perioperative morbidity, pathologic and oncological outcomes.

(Results) With a median follow up of 43.2 months, patient characteristics were not significantly different between the two groups. Mean operation time for group I and II was 291.4min and 276.3min respectively (p=0.636). Mean blood loss was 392.9ml and 340.6ml respectively (p=0.072). Mean time soft diet was 5.29 days and 5.13 days (p=0.870). Postoperative complications were not significantly different between the two groups. Mean hospital stay was 20.2 days and 17.9 days respectively (p=0.791). The 5-years overall survival rate for group I and group II was 74.3% and 86.7% respectively (p=0.923). The 5-years disease free survival rate was also comparable, 67.5% (group I) vs. 62.9% (group II) (p=0.418).

(Conclusion) Based on present data, there was no difference between the lithotomy and prone position during perineal resection for rectal cancer. Large scaled prospective well designed study will be needed for further validation.

Oncologic Outcomes of Complete Mesocolic Excision with Central Vascular Ligation for Ascending Colon Cancer: Single Institution

Section of Colon and Rectal Surgery, Department of Surgery, Soonchunhyang University College of Medicine, Soonchunhyang University Bucheon Hospital, Korea

Sung Woo Jang, Dae Ro Lim, Jung Chul Kuk, Tae Hyung Kim, Eung Jin Shin*

(Purpose) The aim of present study is to analyze peri/postoperative outcomes and long term oncologic outcomes after complete mesocolic excision (CME) with central vessel ligation (CVL) for ascending colon cancer.

(Methods) Between Jan 2000 and Dec 2011, 168 patients who underwent CME with CVL for ascending colon cancers were retrieved from a prospective database. They were analyzed to patient’s demographics, perioperative morbidity, pathologic and oncological outcomes.

(Results) With a median follow up of 63.6 months, mean operation time was 198.5min and mean blood loss was 476.5ml. Mean length of hospital stay was 18.8 days. Mean time to soft diet was 7.8 days. Ileus was in 17(10.1%), wound infection was in 15 (8.9%) and other complication was not occured. Mean number of total harvested lymph node was 30.8. The 5-years cancer specific survival rate (CSS) was 79.7% and 5-years disease free survival rate (DFS) was 77.4%. In stage I, DFS and CSS both were 100%. In stage II, DFS was 91.1% and CSS was 91.3%. In stage III (a,b,c), DFS was 54.6% and CSS was 64.9%. In stage IIia, DFS and CSS both were 100%, 70.1% and 92.1% in stage IIib, and 19.4% and 44.0% in stage IIic (P<0.01). In stage IV, DFS was 25.6% and CSS was 29.0%. Local recurrence rate was 5.4% and systemic recurrence rate was 17.9%.

(Conclusion) Based on present data, CME with CVL for ascending colon cancer is feasible and safe procedure. The concept of CME with CVL which can lead to a better oncologic outcomes for ascending colon cancer surgery.
PE-069

Outcomes and Safety of Multivisceral Resection for Locally Advanced Primary Colorectal Cancer

Section of Colon and Rectal Surgery, Department of Surgery, Soonchunhyang University College of Medicine, Soonchunhyang University Bucheon Hospital, Korea

Dae Ro Lim, Jung Cheol Kuk, Taehyung Kim, Eung Jin Shin*

(Purpose) Multivisceral resection is often required in the treatment of locally advanced colorectal cancer. The present study is analysis of perioperative and oncological outcomes of multivisceral resection for locally advanced primary colorectal cancer. (Methods) Between Jan 2001 and Dec 2013, 58 patients who underwent multivisceral resection for locally advanced colorectal cancers after were retrieved from a prospective database. Multivisceral resection of organ was bladder, uterus, ovary, small bowel, stomach and so on. Confirmed positivity of invasion or metastasis in pathologic finding after surgery was in 22 patients (T3: n=6, T4: n=16) (group I) and just adhesion at near organ without confirmed positivity of invasion or metastasis after surgery was in 36 patients (T3: n=33, T4: n=3) (group II). (Results) With a median follow up of 47.7 months, patient characteristics were not significantly different between the two groups. Mean operation time for group I and II was 253.3min and 261.8min respectively (p=0.720). Mean blood loss was 531.4ml and 631.8ml respectively (p=0.505). Mean length of hospital stay was 15.9days and 18.1days (p=0.049). Mean time to soft diet was 7.53 days and 7.41 days (p=0.407). Morbidity was not significantly different between the two groups. The 5-years overall survival rate for group I and group II was 62.9% and 38.0% respectively (p=0.100). The 5-years disease free survival rate was also comparable, 61.9% (group I) vs. 36.8% (group II) (p=0.200). Local recurrence rate was 5.6% vs. 4.5% (p=0.278) (Conclusion) Multivisceral resection for locally advanced colorectal cancer has acceptable perioperative, oncologic outcomes and is safe, feasible surgery.

PE-070

Clinicopathological Features and Surgical Options for Synchronous Colorectal Cancer

Division of Colon & Rectal Surgery, Department of Surgery, University of Ulsan College of Medicine and Asan Medical Center, Korea

Byoung Chul Lee, Chang Sik Yu*, Jong Lyul Lee, Chan Wook Kim, Yong Sik Yoon, In Ja Park, Seok-Byung Lim, Jin Cheon Kim

(Purpose) This study was conducted to investigate the clinicopathological features of synchronous cancers and treatment options according to their locations. (Methods) Records of 8,368 patients with colorectal cancer treated at our center between July 2003 and December 2010 were analyzed retrospectively. All synchronous colorectal cancer patients who underwent surgical treatment were included. (Results) Synchronous cancers were identified in 217 patients (2.6%). Seventy-nine patients underwent either total colectomy, subtotal colectomy, or total proctocolectomy; 116 underwent one regional resection, including local excision; and 22 underwent two regional resections. The mean age was 62 years, 3 years higher than that for the single-cancer patients. Synchronous cancers were more common in male patients, more frequently located in the left colon, and showed more advanced stage than single cancer. Extensive resection was mainly performed for synchronous cancers located in both the right and left colon. Two regional resections were performed for cancers in the right colon and rectum. There were no differences in complication rates or the occurrence of metachronous cancer between the two-region resection and extensive resection groups. Eight years postoperatively, the mean number of daily bowel movements for these two groups were 1.9 and 4.3, respectively. (Conclusion) We found that synchronous cancer was different from single cancer in terms of age, gender, location, and pathologic features. Synchronous colorectal cancer requires different treatment strategy according to the distribution of lesions. Comparison between the two regional resections and extensive resection approaches suggests that two regional resections is preferable.
Table 1. Characteristics of synchronous colorectal cancer patients.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Single cancer</th>
<th>Synchronous cancer</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of patients</td>
<td>7984</td>
<td>217</td>
<td></td>
</tr>
<tr>
<td>No. of cancers</td>
<td>7984</td>
<td>459</td>
<td></td>
</tr>
<tr>
<td>Sex [n (%)]</td>
<td></td>
<td></td>
<td>0.001</td>
</tr>
<tr>
<td>Male</td>
<td>4886 (61.2)</td>
<td>156 (71.9)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>3098 (38.8)</td>
<td>61 (28.1)</td>
<td></td>
</tr>
<tr>
<td>Age (years, mean±SD)</td>
<td>59.8±11.05</td>
<td>62.3±10.40</td>
<td>0.001</td>
</tr>
<tr>
<td>Location [n (%)]</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Right colon</td>
<td>1739 (21.8)</td>
<td>152 (33.1)</td>
<td></td>
</tr>
<tr>
<td>Left colon</td>
<td>2711 (34.1)</td>
<td>192 (41.9)</td>
<td></td>
</tr>
<tr>
<td>Rectum</td>
<td>3511 (44.1)</td>
<td>115 (25.0)</td>
<td></td>
</tr>
<tr>
<td>AJCC Stage [n (%)]</td>
<td></td>
<td></td>
<td>0.007</td>
</tr>
<tr>
<td>0</td>
<td>450 (5.6)</td>
<td>5 (2.3)</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>1599 (20.0)</td>
<td>27 (12.4)</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>2551 (32.0)</td>
<td>84 (38.7)</td>
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<tr>
<td>III</td>
<td>2286 (28.6)</td>
<td>69 (31.8)</td>
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<tr>
<td>IV</td>
<td>1098 (13.8)</td>
<td>32 (14.7)</td>
<td></td>
</tr>
<tr>
<td>Differentiation [n (%)]</td>
<td></td>
<td></td>
<td>0.285</td>
</tr>
<tr>
<td>Good</td>
<td>1033 (12.9)</td>
<td>19 (8.8)</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>6444 (80.7)</td>
<td>186 (85.7)</td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>432 (5.4)</td>
<td>10 (4.6)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>75 (0.9)</td>
<td>2 (0.9)</td>
<td></td>
</tr>
<tr>
<td>Lymphovascular invasion [n (%)]</td>
<td>1840 (23.0)</td>
<td>56 (25.8)</td>
<td>0.341</td>
</tr>
<tr>
<td>Present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>6411 (77.0)</td>
<td>161 (74.2)</td>
<td></td>
</tr>
<tr>
<td>Perineural invasion [n (%)]</td>
<td></td>
<td></td>
<td>0.700</td>
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<tr>
<td>Present</td>
<td>1176 (14.7)</td>
<td>34 (15.7)</td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>6808 (85.3)</td>
<td>183 (84.3)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Differences between index and concurrent tumors in synchronous cancers.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Index lesion</th>
<th>Concurrent lesions</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of lesions</td>
<td>217</td>
<td>242</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Size (cm, mean±SD)</td>
<td>5.2±2.2</td>
<td>2.0±1.8</td>
<td></td>
</tr>
<tr>
<td>Location [n (%)]</td>
<td></td>
<td></td>
<td>0.032</td>
</tr>
<tr>
<td>Right</td>
<td>73 (33.6)</td>
<td>79 (32.6)</td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>79 (36.4)</td>
<td>113 (46.7)</td>
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</tr>
<tr>
<td>Rectum</td>
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</tr>
<tr>
<td>Wall penetration [n (%)]</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Tis</td>
<td>6 (2.8)</td>
<td>79 (32.6)</td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td>12 (5.5)</td>
<td>58 (24.0)</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>19 (8.8)</td>
<td>41 (16.9)</td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>170 (78.5)</td>
<td>62 (25.6)</td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td>10 (4.6)</td>
<td>2 (0.8)</td>
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<tr>
<td>Differentiation [n (%)]</td>
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<tr>
<td>Good</td>
<td>19 (8.8)</td>
<td>82 (33.9)</td>
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</tr>
<tr>
<td>Moderate</td>
<td>186 (85.7)</td>
<td>145 (59.9)</td>
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</tr>
<tr>
<td>Poor</td>
<td>10 (4.6)</td>
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<tr>
<td>Mucinous</td>
<td>1 (0.5)</td>
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<tr>
<td>Signet ring cell</td>
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<td>1 (0.4)</td>
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Table 3. Comparison between two regional resections and extensive resection for synchronous colorectal cancer.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Two Regional Resections</th>
<th>Extensive Resection</th>
<th>P-value</th>
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<tr>
<td>No. of Patients</td>
<td>22</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>Age [years, mean (range)]</td>
<td>64 (41-77)</td>
<td>66 (52-86)</td>
<td>0.785</td>
</tr>
<tr>
<td>Hospital days (median)</td>
<td>9 (6-29)</td>
<td>10 (5-69)</td>
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<tr>
<td>Adenoma (median)</td>
<td>2 (0-18)</td>
<td>2 (0-27)</td>
<td>0.420</td>
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<tr>
<td>Sex</td>
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<tr>
<td>Male</td>
<td>19 (86.4)</td>
<td>56 (70.9)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>3 (13.6)</td>
<td>23 (29.1)</td>
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</tr>
<tr>
<td>Follow-up period</td>
<td></td>
<td></td>
<td>0.796</td>
</tr>
<tr>
<td>Median (Months)</td>
<td>58 (8-115)</td>
<td>57 (1-145)</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td></td>
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</tr>
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<td>0</td>
<td>5 (6.3)</td>
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</tr>
<tr>
<td>Left</td>
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<tr>
<td>Right and left</td>
<td>6 (27.3)</td>
<td>44 (55.7)</td>
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<td>Right and rectum</td>
<td>14 (63.6)</td>
<td>13 (16.5)</td>
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<tr>
<td>Left and rectum</td>
<td>2 (9.1)</td>
<td>7 (8.9)</td>
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<tr>
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<td>AJCC Stage</td>
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<td>1 (4.5)</td>
<td>0</td>
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<tr>
<td>I</td>
<td>5 (22.7)</td>
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<td>II</td>
<td>8 (36.4)</td>
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<td>T Category (concurrent)</td>
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<td>9 (40.9)</td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td>7 (31.8)</td>
<td>14 (17.7)</td>
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<tr>
<td>T2</td>
<td>0</td>
<td>22 (27.8)</td>
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<td>T3</td>
<td>6 (27.3)</td>
<td>33 (41.8)</td>
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<tr>
<td>T4</td>
<td>0</td>
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<tr>
<td>Metachronous cancer</td>
<td>0</td>
<td>1 (1.8)</td>
<td>1.000</td>
</tr>
<tr>
<td>Complication</td>
<td>5 (22.7)</td>
<td>15 (19.0)</td>
<td>0.697</td>
</tr>
<tr>
<td>Bowel movement per day</td>
<td>1.9</td>
<td>4.5</td>
<td>&lt;0.001</td>
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</tbody>
</table>

Fig. 1. Distribution of synchronous cancers and several types of operation was performed according to the distribution.
Hemilevator Excision Through Intersphincteric Plane in Lower Rectal Cancer: A Novel Technique for Anal Sphincter Preservation and Short Term Outcomes for 13 Consecutive Patients

Department of Surgery, Yonsei University College of Medicine, Korea

Gyoung Tae Noh, Jeonghee Han, Chinock Cheong, Yoon Dae Han, Min Soo Cho, Hyuk Hur, Byung Soh Min, Kang Young Lee, Nam Kyu Kim*

(Purpose) Rectal cancer at the level of anorectal junction had been required total levator-ani muscle excision to achieve adequate CRM. However, unless the tumor invaded levator-ani muscle circularly or over hemicircularly around the rectum, involved levator-ani muscle can be removed and contralateral side of it can be preserved. The proportion of patients in this categorization might be limited, but the consideration of possible sphincter preservation would be important for this challenging field. With this hemi-levator excision (HLE) technique followed by ISR and CAA, preservation of anal sphincter function while obtaining oncologic clearance and avoiding permanent colostomy are achievable for those patients. This study aimed to evaluate the surgical outcomes and feasibility of this procedure.

(Methods) We retrospectively collected data on 13 consecutive patients who underwent HLE for pathologically proven low rectal cancer. All 13 patients presented low rectal cancer at the level of anorectal ring, which were suspected to invade or abut to ipsilateral side of levator-ani muscle and/or pelvic floor muscles on pelvic magnetic resonance imaging (MRI) even after preoperative chemoradiation. (Results) For all cases, securing resection margin from tumor was achieved, especially in circumferential resection margin. Anastomotic leakage was experienced by two patients, which required percutaneous drainage. During the follow-up period, 3 patients underwent tumor recurrence. Two patients showed systemic recurrence and one patient presented local recurrence at anastomotic site. After index operation, 6 patients underwent reversal of diverting ileostomy. Among the patients already underwent stomal closure, 2 patients complained fecal incontinence. One patient showed 2-3 times of bowel movement per day and required pad for incontinence. The other patient showed frequent bowel movement more than 10 times in a day but not required pad. Other 4 patients without fecal incontinence showed less than 10 times of bowel movement in a day, which was in improving state. (Conclusion) HLE is a novel sphincter-preserving technique that can be an alternative option for low rectal cancer invading levator-ani muscle, which has been an indication for APR or extralevator APR. To confirm the validity of this procedure, long-term oncologic and functional outcomes still need to be assessed.

Fig. Schematic of hemi-levator excision. A: Axial view of extent of resection for hemi-levator excision including rectum and invaded levator-ani muscle, B: Coronal view of extent of resection for hemi-levator excision through intersphincter plane and sleeve fashioned distal rectum resection, C: Dissection plane for hemi-levator excision through intersphincter plane and outer to levator-ani muscle in cadaveric model.
PE-072

Risk Factors of Recurrence in Stage III Colorectal Cancer

Department of Surgery, Colorectal Cancer Center, Konkuk University Medical Center, Konkuk University School of Medicine, Korea

Eun-Joo Jung, Chun-Geun Ryu, Jin-Hee Paik, Chun-Geun Ryu, Dae-Yong Hwang*

(Purpose) This study was designed to evaluate the risk factors to predict recurrence in stage III colorectal cancer. (Methods) In 190 patients receiving radical operation for stage III colorectal cancer, 30 patients with recurrence was enrolled between Nov. 2009 and June 2013, Ninety patients without recurrence during the same period were enrolled in this study for a case-controlled study. (Results) In recurrence group, disease free interval (DFI) was 21.4 months (7-36 months), and overall survival period was 50.1 months (14-92 months). In N stage, 17 cases (56.7%) with recurrence were in N2 stage and 39 cases (43.4%) without recurrence in N2 stage (Odds ratio (OR) 2.077, 95% Confidence interval (CI) 1.013-7.029, P=0.058). The number of retrieved lymph nodes was 28.2 in recurrence group and 26.1 in no-recurrence group (P=0.617). The number of positive lymph nodes was 5.7 in recurrence group and 4.2 in no-recurrence group (P=0.073). There was no significant difference between two groups for lymphatic (P=0.139, OR 1.864, 95% CI 1.027-2.202), neural (P=0.345, OR 1.650, 95% CI 1.261-4.699), and vascular tumor cell invasion (P=0.418, OR 1.692, 95% CI 1.279-4.122). (Conclusion) In stage III CRC, N2 stage would be a risk factor of recurrence.

PE-073

Prognostic Factors of Locally Recurrent Rectal Cancer Patients: Focused on Predictive Factors to Achieve Curative Resection

Division of Colorectal Surgery, Department of Surgery, Colorectal Cancer Clinic, Severance Hospital, Yonsei University College of Medicine, Korea

Youn Young Park, Yoon Dae Han, Min Soo Cho, Hyuk Hur, Byung Soh Min, Kang Young Lee, Nam Kyu Kim*

(Purpose) This study is aimed to evaluate factors affecting R0 resection of locally recurrent rectal cancer (LRRC) and associated factors with prognosis after local recurrence. (Methods) We retrospectively reviewed medical records of 56 patients presenting isolated LRRC without any systemic recurrences who underwent their first curative resections between January 2003 and October 2015. Clinicopathologic data were collected including symptoms and CEA levels at the time of diagnosis of LRRC, location, fixity (F0, not fixed; F1, fixed at one site; F2, fixed to two sites; F3, fixed to three or more sites), treatment strategies and oncologic outcomes of LRRC. (Results) The median follow-up duration and the median duration between the first curative resection and the diagnosis of LRRC were 47 (9-117) and 15 (1-61) months, respectively. Among the patients, 19, 29, 4 and 4 patients respectively underwent no surgery, R0, R1 and R2 resections. In addition, 36 patients were treated with multimodal therapies for LRRC. In the multivariate analysis of factors affecting R0 resection, the level of the primary tumor was the only independent affecting factor for R0 resection of LRRC (p=0.019). In the multivariate analysis of prognostic factors for overall survival (OS) after LRRC diagnosed, higher p/ypTNM stage of the primary tumor (HR 4.507 (95% confidence interval (CI) 1.127~14.600), p=0.032), CEA level (HR 1.047 (95% CI 1.001~1.084), p=0.047) and existence of any symptoms (HR 4.408 (95% CI 1.718~11.312), p=0.002) at the time of LRRC diagnosis were poor prognostic factors. As for progression-free survival (PFS), the patients with less fixed LRRC (F1, HR
2.938 (95% CI 0.868~6.628); F2, HR 1.592 (95% CI 2.193~8.757); F3, 13.858 (95% CI 2.193~87.575), p=0.033) or R0 resection (HR 0.350 (95% CI 0.157~0.782), p=0.011) showed better PFS after recur. Among 37 patients who underwent surgical resection for LRRC, 20 patients showed second recur, and most of them, except 5 patients with accompanying systemic recur, presented only local recur. (Conclusion) We could find that the patients with upper rectal cancer had a high probability of R0 resection for LRRC. Furthermore, this study revealed that initial pathologic stage and symptoms and CEA level at the time of LRRC diagnosis were the independent prognostic factors of OS. It implies that early detection of LRRC by frequent physical exams with regular colonoscopy and imaging follow-ups within 2 years after the primary tumor resection is important for prognosis of patients with advanced primary rectal cancer. Despite that R0 resection was not an independent prognostic factor of OS for the LRRC patients, but it was an independent good prognostic factor of PFS. Therefore, an effort for R0 resection for LRRC is still needed in the light of patients’ quality of life.

**PE-074**

**Metastatic Ovarian Cancer From Colorectal Cancer**

Department of Surgery, Colorectal Cancer Center, Konkuk University Medical Center, Konkuk University School of Medicine, Korea

Chun-Geun Ryu, Eun-Joo Jung, Jin Hee Paik Dae-Yong Hwang*

(Purpose) Metastatic ovarian cancer from colorectal cancer (CRC) are uncommon and occur about 3% of all colorectal cancer patients. The purpose of this study was to analyzing clinicopathologic variables including survival and prognostic factors for ovarian metastasis from CRC. (Methods) Between Aug. 2008 and Aug. 2016, Total 26 cases were enrolled. Following factors were analyzed whether primary tumor resection, oophorectomy or not and extent of resection (R0 or >R1), postoperative chemotherapy after oophorectomy, combined metastasis, KRAS mutation of primary tumor and serum CEA level. (Results) 26 patients were enrolled in this study. The median age at diagnosis of metastatic ovarian cancer from CRC was 49 years (range: 35-69 years). 21 patients (80.8%) underwent primary tumor resection, and 25 patients (96.2%) received oophorectomy. 8 patients (30.8%) of the 25 patients underwent complete (R0) resection at the time of oophorectomy. Synchronous metastasis was in 15 cases (57.7%). 15 patients (57.7%) had shown unilateral metastasis of ovary. Serum CEA level was elevated in 24 patients (92.3%). 25 patients (96.2%) received chemotherapy with (16 patients, 61.5%) or without targeted agent combined. 23 patients (88.5%) had simultaneous metastasis at the time of diagnosis of metastatic ovarian cancer. The most common combined metastasis was peritoneal carcinomatosis (17 patients, 65.4%). KRAS mutation examination of the primary tumor was available in 22 patients. 12 patients (54.5%) were shown Kras wild type. Median overall survival and median survival after the diagnosis of metastatic ovarian cancer were significantly longer in the primary tumor resection with oophorectomy group (47 vs. 25 months, P=0.005 and 40 vs. 15 months, P=0.001, oophorectomy vs. non-oophorectomy). In subgroup analysis, prognostic factors affecting survival were primary tumor resection (P=0.01), oophorectomy (P=0.08), R0 resection including metastatic ovarian cancer (P=0.03), normal serum level of CEA at the time of diagnosis of metastatic ovarian cancer (P=0.04). (Conclusion) Primary tumor resection and metastatic ovarian cancer resection with complete tumor (R0) resection might be prolonged survival in metastatic ovarian cancer from CRC. Thus aggressive approaches to metastatic ovarian cancer would be beneficial to the patients’ survival.
Short-Term Results of Minimally Invasive Stomas: 10 Year Experience in a Single Center

Department of Surgery, University of Ulsan College of Medicine, Institute of Innovative Cancer Research and Asan Medical Center, Korea

Seung-Seop Yeom, Chan Wook Kim*, Sungwoo Jung, Se Heon Oh, Junho Lee, Byung Chul Lee, Kwan Mo Yang, Jong Lyul Lee, Yong Sik Yoon, In Ja Park, Seok-Byung Lim, Chang Sik Yu, Jin Cheon Kim

(Purpose) Traditionally, colostomy creation have been performed via a laparotomy incision. However, in many situations, stoma construction may be safely performed in a minimally invasive nature such as Trephine colostomy or Laparoscopic colostomy. We present our experience related to the short-term outcome of colostomy creation.

(Methods) We retrospectively evaluated three groups of patients between April 2006 and March 2016 who underwent colostomy by means of laparotomy, trephine and laparoscopic approach. A total of 267 patients underwent colostomy creation under colonic obstruction or fistulous situation caused by various diseases. We compared the difference of operation times, postoperative length of stay, time to return of bowel function and stoma related early complications between the three stoma methods.

(Results) A total of 84 subjects were in the laparotomy group(LT) and 163 in the Trephine group(TP) and 20 in the Laparoscopic group(LAP). The LP group had increased BMI and less history of the previous abdominal operation than other groups. Both were statistically significant. The TP group had a significantly shorter operation time (45.95±23.72 min) and a lesser time until stoma functioning(1.76±1.15 day). There was 2 retraction and 1 kinking after TP(3/163, 1.8%), while nothing after LT and LAP. But there were not statistically significant. Sometimes TP and LAP needed conversion to LT to finish operation but in some case, successfully avoided LT by using the two methods together.

(Conclusion) This study shows that Trephine colostomy is a simple, safe and rapid procedure and may be an attractive primary treatment option for those patients who require a colostomy. On the other hand, Laparoscopic colostomy was just comparable with laparotomy colostomy in operative time and recovery of stoma. Laparoscopic method could provide a direct visualization and abdominal exploration with smaller incision than that of the laparotomy. It would better to be applied for the secondary treatment option under the limited indications.

Table 1. Patient's characteristics for each operation

<table>
<thead>
<tr>
<th></th>
<th>Trephine Stoma (n=163)</th>
<th>Open Stoma (n=84)</th>
<th>Laparoscopic Stoma (n=20)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>Female</td>
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<td></td>
</tr>
<tr>
<td>Age (mean ± SD)</td>
<td>60.1 ± 13.2</td>
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<td>BMI (mean ± SD)</td>
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<td>21.1 ± 3.5</td>
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<td>I</td>
<td>129</td>
<td>73</td>
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<tr>
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<tr>
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<tr>
<td>V</td>
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<td>0</td>
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<tr>
<td>Previous Abd. Op</td>
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<tr>
<td>FJeffreys score</td>
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<td>Indication</td>
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<td></td>
<td>94 (57.7%)</td>
<td>69 (42.3%)</td>
<td>16 (80%)</td>
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<tr>
<td></td>
<td>61 (72.8%)</td>
<td>23 (27.2%)</td>
<td>4 (30.0%)</td>
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</table>

Table 2. Comparison of the operations

<table>
<thead>
<tr>
<th></th>
<th>Trephine Stoma (n=163)</th>
<th>Open Stoma (n=84)</th>
<th>Laparoscopic Stoma (n=20)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation time (mean ± SD, min)</td>
<td>46.0 ± 21.7</td>
<td>73.3 ± 21.3</td>
<td>43.5 ± 22.6</td>
<td>&lt;0.001</td>
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<td>Hospital stay (mean ± SD, day)</td>
<td>11.8 ± 7.3</td>
<td>9.8 ± 7.1</td>
<td>8.9 ± 4.6</td>
<td>0.601</td>
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<tr>
<td>Time to flatus (mean ± SD, day)</td>
<td>1.8 ± 1.2</td>
<td>2.1 ± 2.1</td>
<td>2.2 ± 1.4</td>
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<td>Complication Prolapse Retraction</td>
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<tr>
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<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Kinking</td>
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<td>0</td>
<td></td>
</tr>
<tr>
<td>Total(%)</td>
<td>7 (4.2%)</td>
<td>1 (1.1%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
</tbody>
</table>
**PE-076**

Feasibility of Laparoscopic Colectomy for Sigmoid Volvulus

Department of Surgery, Seoul National University College of Medicine, Seoul National University Bundang Hospital, Korea

Keunchul Lee, Heung-Kwon Oh*, Il-Tae Son, Sung-II Kang, Myung Jo Kim, Duck-Woo Kim, Sung-Bum Kang

**Purpose**
An effective approach to operative treatment of sigmoid volvulus has long been a matter of controversy. The laparoscopic approach after endoscopic decompression for the treatment of sigmoid volvulus has been a rare surgical indication. The aim of this study was to report our experiences on the outcomes of laparoscopic colectomy in comparison to open surgical treatment of sigmoid volvulus. **Methods** We have collected retrospective data to analyze the effectiveness of surgical management for sigmoid volvulus at Seoul National University Bundang Hospital from 2003 through 2016. We categorized the operational approaches into elective/emergency, laparoscopic/open, and investigated operation time, postoperative hospitalization, estimated blood loss, and postoperative complication.

**Results**
There were 17 patients of median age 72.1 years old (range: 44-90). Of them, 5 cases were emergency operations because of failure to sigmoidoscopic reduction or bowel infarction. We performed sigmoidectomy (n=11), Hartmann’s operation (n=4), subtotal colectomy (n=1) and transverse colostomy formation (n=1). Elective colectomy was performed in 12 cases with 7 laparoscopic and 5 open procedures. The median operation time of laparoscopic procedures was 166 minutes (range: 105-200) and in open surgery was 147 minutes (range: 80-200). Laparoscopic sigmoidectomy had shorter postoperative hospitalization duration than open surgical procedures (median: 8 vs. 10 days). Postoperative complication (wound infection) was reported after open surgery. The other patients treated with open or laparoscopic surgical procedures showed no postoperative complications and no recurrence during follow up period (median, 26.5 month; range, 1-151 month). **Conclusion**
Laparoscopic colectomy after a successful sigmoidoscopic decompression in patient with sigmoid volvulus may be a safe and durable procedure in terms of reduced surgical complications and early recovery.

**PE-077**

Short-Term outcome and Validity of Laparoscopic Colorectal Cancer Resection in Octogenarians

Department of Surgery, Inje University College of Medicine, Haeundae Paik Hospital, Korea

Won Beom Jung, Jin Yong Shin*

**Purpose**
Due to the current increasing in the elderly population, laparoscopic surgery is more frequently performed in the elderly. This study aimed to evaluate the short-term outcomes of laparoscopic colorectal cancer surgery in the very elderly over 80 years old compared with those in patients less than 80 years old. **Methods** We retrospectively studied 144 patients older than 65 years who underwent laparoscopic resection for colorectal cancers at our institution between March 2010 and December 2014. Patients were classified into octogenarian group (n=48) or control group (n=96). A clinicopathologic parameters, surgical characteristics, and outcomes were compared. A multivariate analysis were performed to find risk factors associated with each complications. **Results**
There was no statistically significant difference in pain score, time of flatus, time to liquid diet, length of hospital stay and complication rate between the octogenarian group and control group. The octogenarian group (n=48) showed higher rate of postoperative delirium, compared with control group. (25.0% vs. 7.3%, p=0.003). By multivariate analysis, the estimated blood loss (OR=1.003, 95% CI=1.001-1.005, p=0.002) and Female (OR=2.650, 95% CI=1.292-5.437, p=0.008) were independent risk factors for postoperative complications, the ASA score (OR=10.000, 95% CI=1.197-83.556, p=0.034) was independent risk factor for major complications (over Clavien-Dindo grade 3), postoperative wound problem was associated with estimated blood loss (OR=1.004, 95% CI=1.001-1.007, p=0.018), Infectious complication was associated with body mass index (OR=0.757,
95% CI=0.591-0.970, p=0.028), postoperative delirium was associated with age [≥ 80 years](OR=5.720, 95% CI=1.864-17.554, p=0.002), ASA score (OR=5.623, 95% CI=1.705-18.551, p=0.005) and estimated blood loss (OR=1.003, 95% CI=1.001-1.006, p=0.018), and pulmonologic complication was associated with pain score (OR=0.661, 95% CI=0.435-0.986, p=0.043). History of laparotomy (OR=10.000, 95% CI=1.197-83.556, p=0.034) was independent risk factor for postoperative ileus. (Conclusion) There was no significant difference in short-term outcomes for octogenarian group and control group. In addition, octogenarian group showed lower rate of major complications, compared with control group.

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**PE-078**

Classification and Risk Factors for Delayed Anastomotic Leakage after Sphincter Saving Surgery in Rectal Cancer

Department of Surgery, Severance Hospital, Yonsei University College of Medicine, Korea

Jeonghee Han, Gyoung Tae Noh, Hyuk Hur, Kang Young Lee, Byung Soh Min, Nam Kyu Kim*

**Purpose** Many studies have reported on the risk factors of anastomotic leakage (AL) over the last decade regarding the effect of preoperative chemoradiotherapy (pCRT). Aim is to assess the clinical characteristics and predisposing factors of delayed AL following low anterior resection (LAR) for rectal cancer. **Methods** From January 2005 to December 2014, a total of 1904 consecutive patients who underwent elective LAR for rectal cancer were eligible. The patients were treated with (n=711) or without (n=1193) pCRT. AL evaluated as proposed by the International Study Group of Rectal Cancer in 2010. AL was divided according to the time to leakage: early leakage (within 30 days postoperatively) and delayed leakage (after 30 days postoperatively). Delayed leakage included complications associated with delayed anastomotic leakage. The variables and risk factors associated with delayed leakage were analyzed by utilizing multivariate logistic regression and propensity scoring matching. **Results** Postoperative total AL occurred in 258 patients (13.6%). The incidence of early AL and delayed AL were 139 patients (7.3%) and 142 patients (7.5%), respectively. After propensity score matching, the incidence of early AL in patients with or without pCRT was 8.7% and 7.9%, respectively (P=0.63), on the other hand, the incidence of delayed AL in patients with or without pCRT was 14.8% and 3.8%, respectively (P<0.001). In multivariate analysis, pCRT was independent and significant predisposing factor for delayed AL (hazard ratio: 3.7, 95% CI: 2.4-5.6, P<0.001). Diverting ileostomy did not protect against delayed leakage. Complication associated with delayed anastomotic leakage group had several types by pelvic computed tomography. Classification of delayed leakage were in order, fistula with other tissue including perianal abscess (n=44), stricture formation (n=35), leakage with sinus (n=32), abscess formation in pelvic cavity (n=27), necrotizing fasciitis (n=4). In classification of delayed AL, leakage, fistula, stricture, abscess, and necrotizing fasciitis were diagnosed at a median of 4.5, 7, 7, 11, and 14 months postoperatively, but there was no significant difference in diagnosis period (P=0.17). Of 142 patients, 80 underwent open laparotomy and 7 had no repair of diversion. **Conclusion** Rate of delayed anastomotic leakage that develops after 30 days following LAR was 7.5%. Delayed anastomotic leakage is to represent in a broad spectrum, which can be seen from asymptomatic leakages to life threatening necrotizing fasciitis. Even if without symptoms, it should be recognized and managed properly with respect to the risk of delayed AL, especially in case of performing pCRT.
Incidental Diagnosis of Acute Appendicitis by Colonoscopy in Patient with Atypical Presentation

Dae Han Surgical Clinic, 1Department of Surgery, Gwangju Veterans Hospital, Korea

Guh Jung Seo*, Hee Seok Chung1, Byung-Cheol Kim, Hyung-Suk Cho

(Purpose) The diagnosis of acute appendicitis is primarily clinical with supporting laboratory and radiologic findings such as ultrasonography or computed tomographic scan. But some older or immunocompromised patients may have atypical presentation that is indistinguishable from other alternative conditions that are included in the differential diagnosis. Colonoscopic diagnosis of acute appendicitis with atypical presentations is rare. The aim of this paper was to report and discuss a case of acute appendicitis that was initially diagnosed by colonoscopy.

(Methods) A 64-year-old-woman with obscure abdominal pain underwent colonoscopy. Pre-colonoscopic evaluation did not reveal any fever, chills, nausea/vomiting, hematochezia or melena except mild dull pain in periumbilical region and diarrhea. Laboratory blood tests such as white blood cell, hemoglobin, platelet, alanine aminotransferase, and aspartate transaminase were normal. The colonoscopy revealed a pus discharge from appendiceal orifice and erythematous mucosa at appendiceal base (Fig. 1 A, B). Ultrasonography revealed an enlarged appendix with thickened wall and periappendiceal fat infiltration. An emergent laparoscopic partial cecectomy with an appendectomy was performed.

(Results) Colonoscopy may be helpful in the diagnosis of acute appendicitis in patients with atypical clinical presentations.

Irreducible Sigmoid Volvulus Impacted by Sticky Formed Stool

Department of Surgery, National Medical Center, Korea

Jin-Woo Jun, Byeonghun Oh, Eunyoung Kim, Eun Jung Ahn, Jong-Min Park, Sei Hyeog Park*

(Purpose) We experienced a irreducible sigmoid volvulus case which did not reduced by rectal tube. This patient was 69-years old male. He had uncontrolled diabetes mellitus type II and was suffered from chronic constipation. He was conducted Hartmann’s procedure to relieve his symptoms. We thought it was interesting case, so we report this case in purpose of sharing our experience.

(Methods) We conducted open laparotomy and resected sigmoid colon of 69 year-old male patient. We also made end-colostomy to protect an anastomosis site.

(Results) A 69-year-old male patient with uncontrolled diabetes mellitus type II was admitted via Emergency room due to lower abdominal pain. There were some associated symptoms such as nausea, vomiting and constipation. Computed tomography showed sigmoid colonic volvulus with colonic obstruction (Fig. 1). We decided to observe his condition with hydration and pain control using antimicrobials. Next day, the abdominal pain was progressively aggravated and WBC increased from 9800/ìL to 10600/ìL. We strongly suspected strangulation of sigmoid colon and decided a emergent open laparotomy. We found huge dilatation and omega loop formative torsion due to redundant sigmoid colon with fecal impaction during operation. The color of sigmoid colon was pale. Small bowel was entrapped in the pelvic cavity. We reduced torsioned and kinked sigmoid colonic loop. Sigmoidectomy was done using TA & GIA and end-colostomy was made to protect an anastomosis site. The patient had no postoperative complications.

(Conclusion) Volvulus accounts for 1-5 percent of large bowel obstructions. Especially, sigmoid volvu-
lus is occupied 65 percent among volvulus cases. In our case, we decided the emergency operation due to the deterioration of patient’s condition after the placement of rectal tube. Also the dead bowel was observed during exploration, Hartmann’s procedure was performed. In conclusion, when the presence of gangrene, peritonitis, aggravation of symptoms were suspected, proper and rapid operation is an adequate treatment to the irreducible sigmoid volvulus compared with conservative treatment.

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**PE-081**

**Mid-Term Outcomes of Injectable Bulking Agents for Fecal Incontinence: A Systematic Review and Meta-Analysis**

Department of Surgery, Korea University College of Medicine, Korea

**Kwang Dae Hong, Jung-Sik Kim, Woong-Bae Ji, Jun Won Um**

(Purpose) Various bulking agents have been used to treat fecal incontinence. While short-term outcomes are attractive, there is still a lack of long-term data. The aim of this study was to investigate the mid-term outcome of injectable bulking agents and to identify predictive factors for improvement in incontinence. (Methods) PubMed, Embase, Web of Science, and Cochrane Library databases were searched using the terms injection, bulking agents, and fecal incontinence. Cases with a minimum follow-up of 1 year were eligible for review. The improvement rate in incontinence was calculated by percent change in validated fecal incontinence score (FIS) following injection treatment. To explore the impact of predictive factors on improvement in incon-
tinence, univariate meta-regressions were conducted using the random effect model. (Results) A total of 889 patients in 23 articles were included. The weighted mean follow-up duration was 23.7 months (95% CI, 19.3-28.2). Eleven different bulking agents were used. Four validated FIS were used, among which 17 studies used the Cleveland Clinic Fecal Incontinence score (CC-FIS). Most studies reported a statistically significant improvement in FIS. The weighted mean difference in CC-FIS between preoperative visit and last follow-up was 4.9 (95% CI, 4.0-5.8). Hence, the rate of improvement in incontinence was 39.5% based on CC-FIS. Meta regression revealed that the perianal injection route and implants intact on endoanal ultra-

### Table 1. Included study characteristics

<table>
<thead>
<tr>
<th>First author</th>
<th>Year</th>
<th>Study design</th>
<th>Injection material</th>
<th>Injection route</th>
<th>Injection plane</th>
<th>Follow-up duration (month)</th>
<th>Initial no.</th>
<th>Improvemen t rate of FIS (%)</th>
<th>Repeated injection no. (%)</th>
<th>QS</th>
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<tbody>
<tr>
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<td>199</td>
<td>Retro case series</td>
<td>Teflon</td>
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<td>Submucosal</td>
<td>21.6</td>
<td>11</td>
<td>n.a</td>
<td>5 (45)</td>
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<td>14</td>
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<td>19</td>
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<td>20</td>
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<td>50</td>
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<td>74</td>
<td>45</td>
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<td>Intersphincteric vs submucosal</td>
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<td>Submucosal</td>
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<td>21</td>
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<td>1 (5)</td>
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<td>Permacol</td>
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<td>Submucosal</td>
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<td>38</td>
<td>13</td>
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<td>NASHA</td>
<td>Trans-anal</td>
<td>Submucosal</td>
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<td>34</td>
<td>19</td>
<td>18 [53]</td>
<td>5</td>
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<td>Dehl23</td>
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<td>NASHA vs biofeedback</td>
<td>Trans-anal</td>
<td>Submucosal</td>
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<td>64</td>
<td>19</td>
<td>21 [33]</td>
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<tr>
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<td>Permacol</td>
<td>Trans-anal</td>
<td>Intersphincteric</td>
<td>36</td>
<td>100</td>
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<td>Retro case series</td>
<td>PTQ</td>
<td>Intersphincteric vs transanal</td>
<td>Submucosal</td>
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<td>17</td>
<td>7</td>
<td>0 [6]</td>
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<td>Mellgren26</td>
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<td>NASHA</td>
<td>Trans-anal</td>
<td>Submucosal</td>
<td>36</td>
<td>136</td>
<td>19</td>
<td>112 (82)</td>
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<td>Guerra27</td>
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<td>Retro case series</td>
<td>mixed</td>
<td>Trans-anal</td>
<td>Submucosal</td>
<td>84</td>
<td>19</td>
<td>5</td>
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<tr>
<td>Rosato28</td>
<td>201</td>
<td>Prospective case series</td>
<td>Polyacrylate-Polyalcohol</td>
<td>Transcutaneous</td>
<td>Submucosal</td>
<td>36</td>
<td>33</td>
<td>30</td>
<td>0 [3]</td>
<td></td>
</tr>
</tbody>
</table>
| *QS: A quality of score (a maximum score of six indicates the highest quality of study design.*  
†RCT: randomized controlled trial
sonography (EAUS) were predictive of higher improvement in incontinence. **Conclusion** Injectable bulking agents confer significant mid-term improvement in FIS. Perianal injection route and implants intact on EAUS were predictive of higher improvement in incontinence.

**Table 2. Univariate meta-regression analysis of predictive factors on improvement in incontinence**

<table>
<thead>
<tr>
<th>Datasets</th>
<th>Tau²</th>
<th>Coefficient [95% CI]</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>19</td>
<td>2.63</td>
<td>0.06 [-0.14, 0.26]</td>
</tr>
<tr>
<td>Initial CC-FIS*</td>
<td>19</td>
<td>3.46</td>
<td>-0.06 [0.61, 0.49]</td>
</tr>
<tr>
<td>Durasphere vs PTQ</td>
<td>6 vs 5</td>
<td>0.80</td>
<td>0.04 [-1.13, 1.20]</td>
</tr>
<tr>
<td>Injection number (3 vs 4)</td>
<td>4 vs 10</td>
<td>5.36</td>
<td>0.34 [-2.74, 3.42]</td>
</tr>
<tr>
<td>Injection volume</td>
<td>16</td>
<td>2.27</td>
<td>0.13 [-0.21, 0.47]</td>
</tr>
<tr>
<td>Injection plane (submucosal vs intersphincteric)</td>
<td>19</td>
<td>3.02</td>
<td>0.90 [-1.07, 2.87]</td>
</tr>
<tr>
<td>Injection route (Perianal vs transanal)</td>
<td>10 vs 8</td>
<td>1.73</td>
<td>-1.89 [-3.50, -0.29]</td>
</tr>
<tr>
<td>inter-sphincteric vs transanlal</td>
<td>5 vs 8</td>
<td>1.35</td>
<td>-1.86 [-3.63, -0.09]</td>
</tr>
<tr>
<td>trans-sphincteric vs transanlal</td>
<td>5 vs 8</td>
<td>2.49</td>
<td>-1.91 [-4.02, 0.20]</td>
</tr>
<tr>
<td>intersphincteric vs trans-sphincteric</td>
<td>5 vs 5</td>
<td>3.30</td>
<td>0.33 [-0.71, 0.56]</td>
</tr>
<tr>
<td>Anesthesia (local vs general)</td>
<td>4 vs 8</td>
<td>3.26</td>
<td>1.00 [-0.93, 3.10]</td>
</tr>
<tr>
<td>Use of ultrasound guidance</td>
<td>19</td>
<td>2.95</td>
<td>1.14 [-1.65, 2.83]</td>
</tr>
<tr>
<td>% patients of reinjection</td>
<td>19</td>
<td>3.25</td>
<td>0.01 [-0.03, 0.05]</td>
</tr>
<tr>
<td>% patients of missing or migration</td>
<td>6</td>
<td>1.49</td>
<td>-0.04 [-0.08, -0.01]</td>
</tr>
<tr>
<td>Follow-up duration</td>
<td>19</td>
<td>3.04</td>
<td>0.03 [-0.07, 0.05]</td>
</tr>
<tr>
<td>No. of enrolled patients</td>
<td>19</td>
<td>3.33</td>
<td>0.01 [-0.02, 0.03]</td>
</tr>
</tbody>
</table>

*CC-FIS: Cleveland Clinic Fecal Incontinence score

**PE-082**

**Oncologic Outcomes of Complete Mesocolic Excision Versus Conventional Mesocolic Excision in Laparoscopic Right Hemicolectomy for Right-Sided Colon Cancer; Case-Control Study**

Department of Surgery, Inje University College of Medicine, Busan Paik Hospital Korea

**Min Sung An, Se Hui Oh, Kwan Hee Hong, Ki Beom Bae**

**Purpose** Complete mesocolic excision(CME) for colon cancer has been proposed to improve oncological outcomes. The risk and benefit of laparoscopic CME have not been fully examined. We aimed to compare short- and long-term outcomes of CME with conventional mesecolic excision(non-CME) in laparoscopic right hemoicolectomy(RHC) for right-sided colon cancer. **Methods** A total of 115 patients who underwent laparoscopic RHC with stage I-III right-sided colon cancer in Busan Paik hospital from August 2007 to October 2011 were enrolled in this case-control study. Three well trained colorectal surgeons reviewed the videos of surgery, and they were divided into two groups; patients who had undergone with CME (CME group, n=34) and those with conventional mesocolic excision (non-CME group, n=81). Data were collected form prospectively collected colorectal cancer database. A short-term outcome was analyzed with the use of Student's t-test, chi-square test, and Fisher's exact test. **Results** The overall survival rate was similar between two groups (CME vs non-CME group, P-value = 0.096). The 5-year overall survival rate was 89.7% in the CME group and 84.9% in the non-CME group. **Conclusion** Complete mesocolic excision(CME) is a feasible technique for right-sided colon cancer and may improve oncological outcomes. Further studies are needed to confirm these results.

**Fig. 5-year overall survival rate**
the operative time, blood loss, lymph nodes harvested, postoperative complications, and hospital stay. The 5-year disease-free survival rate (5DFR) and 5-year overall survival rate (5OS) were also analyzed to estimate long-term oncologic outcomes. (Results) There was no significant difference between the CME group and the non-CME group for operative time, postoperative complications, and hospital stay. But, the CME group had more lymph nodes harvested (p<0.001) and had lower blood loss (p=0.016) compared with non-CME group. There was no difference of 5DFS between two groups, but 5OS was 100% in the CME group and 89.49% in the non-CME group (p<0.05). (Conclusion) Laparoscopic RHC with CME is safe and associated with better 5OS than non-CME for patients with stage I-III right-sided colon cancer. For further strong evidence, a prospective randomized multicenter trial should be done.

### Table 1. Clinicopathological characteristics

<table>
<thead>
<tr>
<th></th>
<th>Non-CME(n=81)</th>
<th>CME(n=34)</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥65</td>
<td>36 (44.44%)</td>
<td>11 (32.35%)</td>
<td>0.228</td>
</tr>
<tr>
<td>&lt;65</td>
<td>45 (55.56%)</td>
<td>23 (67.65%)</td>
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</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>41 (50.62%)</td>
<td>17 (50.00%)</td>
<td>0.951</td>
</tr>
<tr>
<td>Female</td>
<td>40 (49.38%)</td>
<td>17 (50.00%)</td>
<td></td>
</tr>
<tr>
<td><strong>ASA score</strong></td>
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<td></td>
</tr>
<tr>
<td>1</td>
<td>33 (40.74%)</td>
<td>14 (41.18%)</td>
<td>0.890</td>
</tr>
<tr>
<td>2</td>
<td>44 (54.32%)</td>
<td>19 (55.88%)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4 (4.94%)</td>
<td>1 (2.94%)</td>
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<tr>
<td><strong>Tumor site</strong></td>
<td></td>
<td></td>
<td>0.655</td>
</tr>
<tr>
<td>Cecum</td>
<td>16 (19.75%)</td>
<td>5 (14.71%)</td>
<td></td>
</tr>
<tr>
<td>Ascending</td>
<td>41 (50.62%)</td>
<td>18 (52.94%)</td>
<td></td>
</tr>
<tr>
<td>Hepatic Flexure</td>
<td>21 (25.93%)</td>
<td>8 (23.53%)</td>
<td></td>
</tr>
<tr>
<td>Proximal Transverse</td>
<td>3 (3.70%)</td>
<td>3 (8.82%)</td>
<td></td>
</tr>
<tr>
<td><strong>Stage</strong></td>
<td></td>
<td></td>
<td>0.149</td>
</tr>
<tr>
<td>I</td>
<td>25 (30.86%)</td>
<td>10 (29.41%)</td>
<td></td>
</tr>
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<td>II</td>
<td>28 (34.57%)</td>
<td>17 (50.00%)</td>
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<tr>
<td>III</td>
<td>28 (34.57%)</td>
<td>7 (20.59%)</td>
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</tr>
<tr>
<td><strong>T stage</strong></td>
<td></td>
<td></td>
<td>0.724</td>
</tr>
<tr>
<td>1</td>
<td>15 (18.52%)</td>
<td>4 (11.76%)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>14 (17.28%)</td>
<td>6 (17.65%)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>48 (59.26%)</td>
<td>22 (64.71%)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4 (4.94%)</td>
<td>2 (5.88%)</td>
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<tr>
<td><strong>N stage</strong></td>
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<td>0.354</td>
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<tr>
<td>0</td>
<td>53 (65.43%)</td>
<td>27 (79.41%)</td>
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</tr>
<tr>
<td>1</td>
<td>17 (20.99%)</td>
<td>3 (8.82%)</td>
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</tr>
<tr>
<td>2a</td>
<td>6 (7.41%)</td>
<td>3 (8.82%)</td>
<td></td>
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<tr>
<td>2b</td>
<td>5 (6.17%)</td>
<td>1 (2.94%)</td>
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<tr>
<td><strong>Tumor size(cm)(mean±SD)</strong></td>
<td>4.38±2.28</td>
<td>4.18±1.88</td>
<td>0.801</td>
</tr>
<tr>
<td><strong>Distance of proximal margin(cm) (mean±SD)</strong></td>
<td>13.67±7.57</td>
<td>13.49±7.35</td>
<td>0.871</td>
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<tr>
<td><strong>Distance of distal margin(cm) (mean±SD)</strong></td>
<td>11.43±6.42</td>
<td>10.86±4.49</td>
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</tr>
<tr>
<td><strong>Lymphovascular invasion</strong></td>
<td>18(22.22%)</td>
<td>5(14.71%)</td>
<td>0.357</td>
</tr>
<tr>
<td><strong>Lymphatic invasion</strong></td>
<td>8(9.88%)</td>
<td>4(11.76%)</td>
<td>0.762</td>
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<td><strong>Vascular invasion</strong></td>
<td>15(18.52%)</td>
<td>4(11.76%)</td>
<td>0.373</td>
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<td><strong>Neural invasion</strong></td>
<td>12(14.81%)</td>
<td>7(20.59%)</td>
<td>0.446</td>
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<td><strong>LN harvested(mean±SD)</strong></td>
<td>23.28±7.33</td>
<td>30.65±11.28</td>
<td>&lt; 0.001</td>
</tr>
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</table>
Single-Incision Plus One-Port Laparoscopic Abdominoperineal Resection for Rectal Cancer

Department of Surgery, University of Ulsan College of Medicine, and Gangneung Asan Hospital, Korea

Jae Young Kwak, Myeong Sik Han, Ha Eun Yun, Sang Wee Park, Eun Hwa Park*

(Purpose) Single-incision laparoscopic surgery (SLS) has been successfully introduced for treating colorectal cancer. We describe our experience of APR with SLS plus one port for treating rectal cancer.

(Methods) A 83-year-old female underwent the procedure, which involved a 3cm incision in the left lower side of the umbilicus for the insertion of a single multichannel port as well as the insertion of a 12-mm port into the right lower quadrant. The sigmoid colon and rectum were mobilized using a medial and lateral approach. After the rectum with the mesorectum was completely mobilized according to the total mesorectal excision, the sigmoid colon was intracorporeally transected. Both hypogastric nerve and gonadal vein was preserved. The specimen was removed through the perineal wound. Re-peritonization was done and end colostomy was fashioned at the left lower trocar site. The total operating time was 298 minutes

(Results) Patient discharged 7 days after operation without postoperative complications.

(Conclusion) We conclude that SLS plus one port APR is a technically possible alternative method for treating selected patient with rectal cancer.

Fig. 1. Single multichannel port was inserted on left lower stoma marking site and additional 12mm port was inserted on right lower abdomen.

Fig. 2. Abdomen status of 7 days after operation.

Long-Term Results in Stage II and III Transverse Colon Cancer with Radical D3 Lymphadenectomy

Department of Surgery, Chonnam National University Hospital, Chonnam National University Hwasun Hospital, Korea

Han Deok Kwak, Jae Kyun Ju, Soo Young Lee¹, Chang Hyun Kim¹, Hyeong Rok Kim¹*, Young Jin Kim¹

(Purpose) The surgical type or approach varies for transverse colon cancer largely depending on the surgeons' preference. However, it has an evidence that D3 lymphadenectomy for favorable long-term outcomes. The aim of this retrospective study was to analyze the short- and long-term outcomes following radical D3 lymph node dissection in stage II and III transverse colon cancer.

(Methods) Between May 2006 and December 2014, all patients were treated for stage II and III transverse colon cancer. This is a retrospective study of prospectively collected data in a tertiary teaching hospital.

(Results) A total of 144 patients were included, of whom 110 (76.4%) performed lapa-
Poster Exhibition: Colorectal

roscopically, 124 underwent extended right hemicolectomy. Tumors were located at hepatic flexure (63, 43.8%), transverse colon (79, 54.9%), and splenic flexure (2, 1.4%). Mean operative time was 147.7 minutes with a mean retrieved lymph node of 43.7. The overall morbidity rate was 3.5% (5/144), and there was no postoperative mortality. Seventy-eight had stage II, 66 were stage III. Between the groups, vascular (p=0.001), lymphatic (p=0.002), and neural (p=0.001) invasions had a significant difference. With a mean 37.5 months of follow-up, overall (94.9 vs. 75.7%, p=0.003) and cancer-specific(94.9 vs. 83.9%, p=0.015) survival at 5-years were different statistically. (Conclusion) Radical D3 lymphadenectomy of transverse colon cancer has an acceptable morbidity and favorable oncologic outcomes for stage II and III.

PE-085

Long-Term Results of Stage II and III Colorectal Cancer after D3 Lymphadenectomy in the Patients Over the Age of 80

Han Deok Kwak, Jae Kyun Ju, Soo Young Lee, Chang Hyun Kim, Hyeong Rok Kim, Young Jin Kim

Department of Surgery, Chonnam National University Hospital, Chonnam National University Hwasun Hospital, Korea

(Purpose) Radical lymph node dissection and adjuvant chemotherapy in older patients have been difficult to determine because of underrepresented clinical trials. However, the median age at diagnosis of colon cancer is 71, and the number of old patients presenting for care of colon cancer is expected to rise. The aim of this study was to analyze the short- and long-term outcomes in older patients treated adjuvant chemotherapy following colonic resection. (Methods) Between May 2004 and December 2014, all patients were treated for stage II and III colon cancer. The operation were performed open or laparoscopic resection, and D3 lymph node dissection. D3 dissection was defined as excision of paracolic, intermediate, and principal lymph nodes. This is a retrospective study of prospectively collected data in a tertiary teaching hospital. (Results) A total of 176 patients were included. Mean age was 83 years old, of whom sigmoid colon cancer took 25.5%, and ascending colon was 31%. Laparoscopic resection had 135(76.7%) cases. Mean retrieved lymph node was 31.2. The overall morbidity rate was 4% (7/176), and there was no postoperative mortality. Forty-one (23.3%) patients had chemotherapy. With a mean 30.7 months of follow-up, recurrence free, overall, and cancer-specific survival at 5-years between chemotherapy and no-chemotherapy group were not different statistically. (Conclusion) In the patients who are older than 80, colon cancer of stage II and III has no survival benefit from chemotherapy.

PE-086

Comparison of Treatment Results Between Preoperative Chemoradiotherapy and Combined Chemoradiotherapy Without Surgery in Locally Advanced Rectal Cancer

Myung-Guen Cha, Jae-Im Lee, Chae-Won Kim, Nam-Suk Kim, Seul-Hui Lee, Chang-Hyeok An

Department of Surgery, Uijeongbu St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Korea

(Purpose) The aim of this study is to compare the results between preoperative concurrent chemoradiotherapy (CCRT) or combined chemoradiotherapy without surgery in the treatment of locally advanced rectal cancer in Korean patients. (Methods) This study included 97 consecutive patients with clinical T3, T4 or node-positive rectal adenocarcinoma (stage II or III) from January 1st, 2005 to August 31st, 2014. 40 treated with preoperative CCRT (Group. I) and 57 with combined chemoradiotherapy without surgery (Group. II). The chemotherapeutic agents used concurrent with radiotherapy were either 5-fluorouracil short infusion plus leucovorin and/or capecitabine or 5-fluorouracil infusion alone. All patients received pelvic irradiation.
(Results) The 3-year loco-regional recurrence (LRR), distant metastasis, overall and disease-free survival rates are comparable among preoperative CCRT (Group. I) and combined chemoradiotherapy without surgery (Group. II). By multivariate analysis, pT4, distal margin <1.5 cm, and non-R0 resection were significant factors for LRR. The 3-year-overall survival rates were 89.3% in Group. I and 64.5% in Gr.I (p<0.01). The 5-year-overall survival rates were 79.6% and 42.3% (p<0.012). There were 1 patients (1.03%) with a complete pathological response. (Conclusion) Preoperative CCRT with surgery produced good local control in favorable and unfavorable patients with locally advanced rectal cancer.

**PE-087**

**Transeverse Colon Metastasis From Cervical Cancer with Abdominal Mass: A Case Report**

Department of Surgery, Uijeongbu St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Korea

Myung-Guen Cha, Jae-Im Lee, Nam-Suk Kim, Seul-Hui Lee, Chang-Hyeok An*

(Purpose) Cervical cancer can infiltrate locally and directly spread to adjacent organs including the vagina, peritoneum, rectum, and paracervical lesion, but the colonic metastasis from cervical cancer is extremely rare, which can easily be misdiagnosed. (Methods) The present reports the case of a 75-year-old cervical cancer patient with metastasis to the transverse colon, which presented as an abdominal pain due to LUQ mass lesion. (Case Presentation) The present reports the case of a 75-year-old cervical cancer patient with metastasis to the transverse colon, which presented as an abdominal pain due to LUQ mass lesion. Pre operative colonoscopy revealed encircling huge mass lesion. Initial histopathological examination revealed squamous cell colon carcinoma. The patient underwent exploratory laparotomy and resection of the tumor of the transverse colon. Pathology revealed the mass to be cervical cancer originated squamous cell carcinoma. This case demonstrates that transverse colon seeding must be considered in the differential diagnosis of abdominal mass in patients with cervical cancer. (Conclusion) This case demonstrates that intestine metastasis must be considered in the differential diagnosis of acute abdomen in patients with cervical cancer even at tumor stage.

**PE-088**

**Solute Carrier Organic Anion Transporter Family Member 4A1 (SLCO4A1) in Colorectal Cancer: Identification of Prognostic Marker**

Department of General Surgery, Soonchunhyang University, Korea

Hyun Yong Lee, Taesung Ahn, Dong Hee Cho, Young Ju Kim, Jee Hyun Ahn, Seong Hun Hong, Saeng Jin Park, Moo Jun Baek*

(Purpose) Solute Carrier Organic Anion Transporter Family Member 4A1 (SLCO4A1) is involved in glucose, bile salts and organic acids, metal ions and amine compounds transport. Many researchers reported that SLCO4A1 was highly expressed in in several cancers, but there was no study about the functions and clinical significance of colorectal cancer of SLCO4A1. So in this study, we investigated the functions and clinical significance of SLCO4A1 in colorectal cancer. (Methods) SLCO4A1 expression was investigated by immunohistochemistry (IHC) in 84 cases of colorectal cancer. Tissue section of colorectal cancer and the association of SLCO4A1 expression was examined with clinicopathologic features. To confirm the biological roles of SLCO4A1 in colorectal cancer, we chose 4 colorectal cancer cell lines which have high SLCO4A1 expression. And these cell lines were down-expressed by using SLCO4A1 siRNA. The functional roles of SLCO4A1 were estimated by MTT assay, migration assay, invasion assay and semisolid agar colony forming assay. (Results) SLCO4A1 was down-expressed in colorectal cancer cell lines by siRNA. It revealed significant decreases of viability,
invasion and migration compared to that of control respectively. And SLCO4A1 down-expressed cells was revealed low carcinogenesis compared to that of controls for semisolid colony forming assay. The SLCO4A1 was overexpressed in 32% of the total colorectal cancer samples. Multivariate Cox regression analysis indicated that the overexpression of SLCO4A1 was an independent prognostic factor of decreased survival (p=0.021). The patients of SLCO4A1 high-expression was decreased cumulative survival compared to those SLCO4A1 low-expression patients by Kaplan-Meier analysis. (log rank test, p=0.025) (Conclusion) Taken together, we suggest that SLCO4A1 has oncogenic function in colorectal cancers. And SLCO4A1 high-expression will can be a valuable poor prognostic marker of colorectal cancer.

PE-089

Impact of Obesity on Hospital Costs in Patients Who Underwent Colorectal Cancer Surgery

1Department of Surgery, Seoul National University College of Medicine, 2Department of Surgery, Seoul National University Hospital Healthcare System Gangnam Center, 3Colorectal Cancer Center, Seoul National University Cancer Hospital, 4Cancer Research Institute, Seoul National University College of Medicine, Korea

Yoon-Hye Kwon1, Eun Kyung Choe2, Dong Woon Lee1, Inho Song1, Min Jeong Kim1, Ji Won Park1,3,4, Seung-Bum Ryoo1, Seung-Yong Jeong1,3,4, Kyu Joo Park1,*

(Purpose) To determine whether obesity increases hospital costs in patients who underwent colorectal cancer surgery. (Methods) We retrospectively collected hospital billings for 656 patients who underwent surgery for stage I-III colorectal cancer between October 2004 and December 2008 and analyzed the association between obesity and hospital cost. Obesity was assessed by preoperative body mass index (BMI) and computed tomography-assessed total fat amount (TFA). Patients were classified according to their BMI (normal-BMI; <23kg/m², obese-BMI; ≥25kg/m²) or TFA (non-obese-TFA; <24.710cm², obese-TFA; ≥24,710cm²). Study end point was hospital costs assessed by direct hospital billing during hospitalization. (Results) Hospital billing was higher in obese-BMI group ($2815.42 versus $2503.61, p=0.021) and in obese-TFA group ($2699.78 versus $2493.29, p=0.045). Every two-unit increase in BMI beyond 23kg/m² was associated with approximately $100.59 higher hospital costs (p=0.026). One quartile increase in TFA was associated with $2315.77 higher hospital costs (p=0.034). These estimates remained unchanged after adjusting age and sex (BMI, p=0.020, r²=0.019; TFA, p=0.028, r²=0.014 respectively). The incidence of comorbidities, including hypertension (HTN) and diabetes mellitus (DM) were higher in patients with obese BMI group (HTN, p<0.001, DM, p=0.037, respectively). Operation time was longer in obese BMI (p=0.018) but not in obese TFA group (p=0.420). Intraoperative blood loss was measured indirectly by the number of gauzes used during operation and it was greater in obese BMI (p=0.029). Hospital stay was longer for obese BMI group (mean 7.18±1.74 versus 7.70±3.32 days, p=0.041). (Conclusion) Increased BMI and TFA were associated with higher hospital costs in colorectal cancer patients caused by comorbidities, longer hospitalization and operation time.

PE-090

Transverse Colon Metastasis From Cervical Cancer with Abdominal Mass: Case Report

Department of Surgery, Uijeongbu St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Korea

Myung-Guen Cha*, Chae-Won Kim, Hyung-Nam Jin, Chang-Hyeok An

(Purpose) Cervical cancer can infiltrate locally and directly spread to adjacent organs including the vagina, peritoneum, rectum, and paracervical lesion, but the colonic metastasis from cervical cancer is extremely rare, which can easily be misdiagnosed. (Methods) The present reports the case of a
75-year-old cervical cancer patient with metastasis to the transverse colon, which presented as an abdominal pain due to LUQ mass lesion. She treated with radiation therapy for cervical cancer and she had no evidence of disease before one month. (Results) Pre-operative colonoscopy revealed encircling huge mass lesion. The colonoscopic biopsy showed squamous cell carcinoma. The patient underwent exploratory laparotomy and resection of the tumor of the transverse colon. Pathology revealed the mass to be cervical cancer originated squamous cell carcinoma. This case demonstrates that transverse colon seeding must be considered in the differential diagnosis of abdominal mass in patients with cervical cancer. (Conclusion) This case demonstrates that intestine metastasis must be considered in the differential diagnosis of acute abdomen in patients with cervical cancer even at tumor stage.

PE-091

Clinical Outcomes of Pelvic Lymph Node Dissection According to Tumor Response after Preoperative Chemoradiation Treatment for Rectal Cancer

Department of Surgery, Yonsei University College of Medicine, Korea

Chinock Cheong, Jeonghee Han, Gyoung Tae Noh, Yoon Dae Han, Min Soo Cho, Hyuk Hur, Byung Soh Min, Kang Young Lee, Nam Kyu Kim*

(Purpose) Although some reported pelvic lymph node dissection (PLND) can reduce local recurrence, there are still controversies whether lateral pelvic lymph node (PLN) involvement is a regional or systemic disease. So far, only a few limited studies have been conducted to establish optimal selection criteria for PLND. However, optimal criteria is still undetermined. There are also some adverse effect of PLND in terms of postoperative complications. The aim of this study is to investigate the clinical outcomes of PLND according to tumor response after preoperative chemoradiation therapy (CRT) for rectal cancer. (Methods) A total of 113 patients with middle/lower rectal cancer who underwent curative resection between April 2011 and May 2015 were included for the analysis. A standard long-course regimen of 5-fluorouracil (5-FU)-based chemotherapy and a total dose of 50.4 Gy of external beam radiation was given to patients who had suspicious PLN metastasis by pelvic MRI, and TME with PLND was performed at 6-8 weeks after the completion of preoperative CRT. In this study, clinically suspected PLN metastasis was defined as short axis diameter of PLN remained ≥ 5mm after preoperative CRT. Patients were classified into the group with PLND (PLND; n=44) and without PLND (N-PLND; n=69). Clinicopathologic characteristics, postoperative morbidity between the two groups were compared. (Results) Standard PLND including obturator LN was performed in 59.4% and the remaining patients underwent cherry picking PLND. There were no significant differences in operation time (p=0.802) and estimated blood loss (p=0.273). Postoperative complications did not differ between the groups and only three patients suffered from parasthesia within postoperative 30 days in PLND. The number of LN harvest was significantly greater in PLND group than that of N-PLND group (PLND 21.1±10.9 vs. N-PLND 16.8±11.0 vs; p=0.045). The PLN positivity was identified in 12/69 (17.4%) among PLND group. The number of positive LN (p=0.229) and N stage (p=0.137) didn’t show any difference between two groups. (Conclusion) In the management of lateral PLN for rectal cancer, PLND should be performed selectively for patients after preoperative CRT. The standard criteria of PLND should be also provided based on accurate diagnostic tool preoperatively.

PE-092

A Case Report of Laparoscopic Surgical Resection for Colonic Endometriosis

Department of Surgery, Chung-Ang University College of Medicine, Korea

Kwang Woo Choi, Byung Kwan Park, Yong Gum Park, Beom Gyu Kim*

(Purpose) Colonic endometriosis is defined as the
ectopic endometrial tissue at colon. The differential diagnosis of this is essential, because it is rare disease and sometimes is confused with colonic malignancies. As the development of minimally invasive surgery, we report a case of colonic endometriosis which was treated by laparoscopic surgery. **Methods** A patient with endometriosis located in rectosigmoid colon was reviewed about clinical presentation, imaging, laboratory, and histopathologic result. **Results** A 36 years old female patient who had been suffered recurrent diarrhea and hematochezia during the menstruation from 6 years ago was referred to Chung-Ang University Hospital from local clinic for intractable conservative treatment. Abdominopelvic computed tomography and MRI for rectal protocol revealed left ovary cystic lesion and submucosal mass in rectosigmoid junction. After colonoscopy, there was submucosal lesion at rectosigmoid junction and the histopathologic exam confirmed as colonic endometriosis. Laparoscopic low anterior resection was performed and combined laparoscopic left salpingo-oopherectomy and hysterectomy was also performed by gynecologist. The symptom was disappeared after operation, so she was discharged at 8 day post-operatively without complication. **Conclusion** This study presents a rare case for colonic endometriosis. The careful suspicion should be needed for this rare disease and laparoscopic surgical treatment seems to be a safe surgical modality.

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**PE-093**

**Bacterial Culture and Antibiotic Susceptibility in Patients with Acute Perforated Appendicitis**

Department of Surgery, Chung-Ang University College of Medicine, Korea

Dae Woon Song, Byung Kwan Park*, Seung Eun Lee, Joong-Min Park, Yoo Shin Choi, Yong Gum Park, Beom Kyu Kim

**Purpose** Acute appendicitis is the most common cause of acute abdomen. Essential treatment of acute appendicitis is surgical resection with the use of appropriate antibiotics. In order to effectively treat acute appendicitis it is important to identify the micro-organism of acute appendicitis and evaluate the effective antibiotics. **Methods** Total 1184 consecutive patients who underwent appendectomy for perforated appendicitis between 2010 and 2015 in Chung-Ang University Hospital were recruited. For microbial assessment, luminal contents of the appendix were swabbed after the operation. The patient characteristics, operative data, use of antibiotics, and the result of microbiology were retrospectively reviewed. **Results** Of the 1184 patients, 494 (41.7%) patients had positive microbial result. Among these patients, the mean age was 39.2 (±19.7) years old, and 298 (60.3%) were male. The patients with underlying comorbidities were 76 (15.4%), and ASA ≥ III were 23 (4.7%). In terms of preoperative laboratory results, leukocytosis were 372 (75.3%), mean hemoglobin was 13.9 (±1.5), increase of C-reactive protein were 378 (79.2%). Most of the operations were performed by conventional laparoscopy (76.9%), followed by single port laparoscopy (16.0%). The most common micro-organism was E. coli (66.0%), which was susceptible to amoxicillin/clavulanate, ciprofloxacin, most of cephalosporin, piperacillin/tazobactam, and imipenem. The second most common was Pseudomonas aeruginosa (17.8%), which was resistant to amoxicillin/clavulanate, and cefotaxime. The rate of post-operative morbidity was 7.3%, and the most common type was superficial surgical site infection (4.9%). **Conclusion** In perforated appendicitis, the use of empirical antibiotics seems to be safe. In some cases with pseudomonas, adequate antibiotics should be considered.
that previous abdominal surgery history does not affect the outcome of the laparoscopic surgery. In this study, considering that little is known about the effect of laparoscopic surgery on advanced colorectal cancer patients who had previous abdominal surgery, we investigated how efficient the laparoscopic surgery is in advanced colorectal cancer patients with previous abdominal surgery.

(Methods) This study analyzed 148 patients who had laparoscopic surgery for advanced colorectal cancer (more than T2 cancer) at a Chinjujeil hospital from January 2009 to December 2013. Patients were divided into two groups; 104 patients without a history of abdominal surgery that was called Nonprevious abdominal surgery (NPAS), and 44 patients with an abdominal surgical history that was called Previous abdominal surgery (PAS).

(Results) In this study, there was no difference between the two groups at operation time, blood loss, hospital day, survival rates. Open conversion was zero in the two groups. As a result, we concluded that previous abdominal surgery does not affect the laparoscopic surgery for advanced colorectal cancer.

(Conclusion) Laparoscopic surgery for advanced colorectal cancer with previous abdominal surgery is feasible with favorable short-term and long-term outcome.

Table 1. Patients characteristic

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<th>PAS (n=44)</th>
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<td>Male</td>
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</tr>
<tr>
<td>Age</td>
<td>64±12.42</td>
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<tr>
<td>BMI</td>
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<td>Descending</td>
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<tr>
<td></td>
<td>Sigmoid</td>
<td>Rectum</td>
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</table>

Table 2. OP results

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<th>NPAS (n=104)</th>
<th>PAS (n=44)</th>
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<td>OP time(min)</td>
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<td>R1</td>
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<td>R1</td>
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<tr>
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<td>10±6%</td>
<td>11±4%</td>
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<td>4±3.4%</td>
<td>5±3.1%</td>
<td>0.940</td>
</tr>
<tr>
<td>Open conversion</td>
<td>0</td>
<td>0</td>
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</tr>
</tbody>
</table>
patients with open conversion and 28 patients with double primary cancer), and then 605 patients were included in this study. We compared the patient characteristics, postoperative outcomes, and pathologic results between RPLS and MPLS groups. In subgroup analysis of RPLS, we also compared clinical outcomes of single-incision laparoscopic surgery (SILS) and three-port laparoscopic surgery. (Results) Among 605 patients, there were 115 patients of RPLS and 490 patients of MPLS groups. In RPLS group, 59 (51.3%) patients underwent SILS and 56 (49.7%) patients underwent three-port laparoscopic surgery. There were no significant differences in age, gender, BMI, ASA class, history of abdominal operation, preoperative CEA level between the RPLS and MPLS groups. The mean operating time was significantly shorter in the RPLS group than in the MPLS group (137.4±43.2 vs 155.5±47.9 P<0.001). The RPLS group had shorter incision length than in the MPLS group (5.3±2.2 vs 7.8±1.2, P<0.001). There were no differences in proximal resection margin, but distal resection margin was shorter in RPLS group than MPLS group (4.4±2.3 vs 5.4±3.5, P=0.001). The number of retrieved lymph nodes was similar to two groups (23.4±11.6 vs 23.6±10.3, P=0.836). There were no significant differences in postoperative morbidities (13.9% vs 9.9%, P=0.208), and hospital stay (9.1±3.6 vs 8.8±3.2, P=0.374) between the RPLS and MPLS groups. In subgroup analysis of SILS and three port surgery groups, SILS group showed younger age (58.3±11.2 vs 63.8±9.8, P=0.007), longer operating time (150.2±51.1 vs 124.0±27.6, P=0.001), and shorter incision length than in the three port surgery group (4.2±2.6 vs 6.4±1.0, P<0.001). Three port surgery group was related to more advanced T stage (P<0.001), more lymphatic invasions (P=0.014), and larger tumor size (P=0.037). (Conclusion) RPLS appears to be feasible and safe surgical option for sigmoid colon cancer, and it showed comparable clinical outcomes with shorter operation time and shorter incision length than MPLS. SILS could be applied to the patients with favorable tumor characteristics.

**Three Ports Laparoscopic Right Colectomy Compared with Conventional Five Ports Laparoscopy for Malignancy**

Department of Surgery, Postgraduate School of Medicine, Gyeong-Sang National University Hospital, Korea

Seung-Jin Kwag, Sang-Kyung Choi, Jin-Kwon Lee, Young-Tae Ju*

(Purpose) Single incision laparoscopic colectomy (SILC) for malignancy is a recent advance in minimally invasive surgical techniques. However, there were some technical difficult in SILC and also, SILC is not suitable for bulky tumor. Three ports laparoscopic right colectomy (3-LRC) has several advantages compare to SILC and conventional five ports laparoscopic right colectomy (5-LRC). The purpose of this study is that confirm the feasibility and effectiveness of 3-LRC compare to 5-LRC in right side colon cancer treatment. (Methods) Ninety-eight patients with right side colon adenocarcinoma underwent laparoscopic right colectomy between April 2012 and August 2016. Forty-six of these patients underwent 3-LRC and were compared with the other 52 patients who had performed 5-LRC. Clinical characteristics, intraoperative and postoperative data and early pathologic result were analyzed. (Results) Five cases in 3-LRC were performed emergency operation cause of bowel obstruction. Combine operation such as cholecystectomy and oophorectomy were performed 13 cases of 48 in 3-LRC group and 9 cases of 52 in 5-LRC group (p=0.256). Age (p=0.843), the body mass index (p=0.591), history of previous abdominal operation (p=0.585), presence of intraperitoneal adhesion (p=0.951) and ASA score (p=0.558) were similar between two groups. The operation time was longer in the five ports group than in the three ports group (179±29 vs. 151±28 min; p=0.001). There were no significant differences between two groups for open conversion rate (6 in five ports group vs. 5 in three ports group, p=0.587), postoperative hospital stays (p=0.832). The rate of postoperative complication was similar between two groups (5 in five ports group vs. 2 in three ports group, p=0.585). The tumor size was 5.6cm in 3-LRC group and 4.3cm in 5-LRC group.
There was no positive margin in both groups. The number of the harvested lymph nodes was more in 3-LRC group more than 5-LRC group (29.0±15.5 vs. 22.4±11.9; p=0.02). **(Conclusion)** Three ports laparoscopic right colectomy is a safe and feasible procedure for right side colon cancer. This technique may be step on single incision laparoscopic right colectomy.

**Table 1. Clinical characteristics**

<table>
<thead>
<tr>
<th></th>
<th>Total (N=281)</th>
<th>MDT (N=113)</th>
<th>SCT (N=168)</th>
<th>P</th>
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<tbody>
<tr>
<td>Recurred LN</td>
<td></td>
<td></td>
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<tr>
<td>- Paraortic LN</td>
<td>137 (48.8%)</td>
<td>59 (52.2%)</td>
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<tr>
<td>- Pelvic LN</td>
<td>84 (29.9%)</td>
<td>40 (35.4%)</td>
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<tr>
<td>- Lung hilum LN</td>
<td>28 (10.0%)</td>
<td>6 (5.3%)</td>
<td>22 (13.1%)</td>
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<tr>
<td>- Mesentery LN</td>
<td>7 (2.5%)</td>
<td>2 (1.8%)</td>
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<tr>
<td>- Inguinal LN</td>
<td>7 (2.5%)</td>
<td>4 (3.5%)</td>
<td>3 (1.8%)</td>
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<tr>
<td>- Cervical LN</td>
<td>5 (1.8%)</td>
<td>0 (0.0%)</td>
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<tr>
<td>- supravacuicular LN</td>
<td>5 (1.8%)</td>
<td>1 (0.9%)</td>
<td>4 (2.4%)</td>
<td></td>
</tr>
<tr>
<td>- paraduodenal LN</td>
<td>4 (1.4%)</td>
<td>1 (0.9%)</td>
<td>3 (1.8%)</td>
<td></td>
</tr>
<tr>
<td>- Axillary LN</td>
<td>2 (0.7%)</td>
<td>0 (0.0%)</td>
<td>2 (1.2%)</td>
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<tr>
<td>- Liver hilum LN</td>
<td>2 (0.7%)</td>
<td>0 (0.0%)</td>
<td>2 (1.2%)</td>
<td></td>
</tr>
<tr>
<td>Recurred LN burden</td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>- Multiple</td>
<td>244 (86.8%)</td>
<td>87 (77.0%)</td>
<td>157 (95.5%)</td>
<td></td>
</tr>
<tr>
<td>- Single</td>
<td>37 (13.2%)</td>
<td>26 (23.0%)</td>
<td>11 (6.5%)</td>
<td></td>
</tr>
<tr>
<td>Recurred LN therapy</td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>- CTx</td>
<td>154 (54.8%)</td>
<td>0 (0.0%)</td>
<td>154 (91.7%)</td>
<td></td>
</tr>
<tr>
<td>- CTx+BA</td>
<td>14 (5.0%)</td>
<td>0 (0.0%)</td>
<td>14 (8.3%)</td>
<td></td>
</tr>
<tr>
<td>- CTx+RTx</td>
<td>35 (12.5%)</td>
<td>35 (31.0%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
<tr>
<td>- CTx+RTx+BA</td>
<td>6 (2.1%)</td>
<td>6 (5.3%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
<tr>
<td>- Op</td>
<td>6 (2.1%)</td>
<td>6 (5.3%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
<tr>
<td>- Op+CTx</td>
<td>31 (11.0%)</td>
<td>31 (27.4%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
<tr>
<td>- Op+CTx+BA</td>
<td>4 (1.4%)</td>
<td>4 (3.5%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
<tr>
<td>- Op+CTx+RTx</td>
<td>6 (2.1%)</td>
<td>6 (5.3%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
<tr>
<td>- Op+CTx+RTx+BA</td>
<td>2 (0.7%)</td>
<td>2 (1.8%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
<tr>
<td>- RTx</td>
<td>6 (2.1%)</td>
<td>6 (5.3%)</td>
<td>0 (0.0%)</td>
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</tr>
<tr>
<td>- RTx+CTx</td>
<td>1 (0.4%)</td>
<td>1 (0.9%)</td>
<td>0 (0.0%)</td>
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</tr>
<tr>
<td>- RTx+Op+CTx</td>
<td>1 (0.4%)</td>
<td>1 (0.9%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
<tr>
<td>Treatment response</td>
<td></td>
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<td>&lt;0.001</td>
</tr>
<tr>
<td>- CR</td>
<td>29 (10.3%)</td>
<td>24 (21.2%)</td>
<td>5 (3.0%)</td>
<td></td>
</tr>
<tr>
<td>- SD</td>
<td>20 (7.1%)</td>
<td>14 (12.4%)</td>
<td>6 (3.6%)</td>
<td></td>
</tr>
<tr>
<td>- PD</td>
<td>232 (82.6%)</td>
<td>75 (66.4%)</td>
<td>157 (95.5%)</td>
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<tr>
<td>Disease progression</td>
<td></td>
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<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>- Carcinomatosis</td>
<td>225 (80.1%)</td>
<td>71 (62.8%)</td>
<td>154 (91.7%)</td>
<td></td>
</tr>
<tr>
<td>- Lung</td>
<td>4 (1.4%)</td>
<td>2 (1.8%)</td>
<td>2 (1.2%)</td>
<td></td>
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<tr>
<td>- Spine</td>
<td>2 (0.7%)</td>
<td>1 (0.9%)</td>
<td>1 (0.6%)</td>
<td></td>
</tr>
<tr>
<td>- Kidney</td>
<td>1 (0.4%)</td>
<td>1 (0.9%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
</tbody>
</table>

**PE-098**

**Giant Fibroepithelial Polyps of the Anus Mimicking the Anal Cancer: A Case Report**

Department of Surgery, Ajou University School of Medicine, Korea

_Jung Sub So, Eun Jung Park*, Seung Yeop Oh, Kwang Wook Suh_

**(Purpose)** Fibroepithelial polyps of the anus are benign polypoid tumors, which consist of hyperplastic fibrous stroma covered squamous epithelium and the subepithelial connective tissue. They are associated with local inflammation such as anal fissure or fistula. The most fibroepithelial polyps are small and asymptomatic. However, large fibroepithelial polyps can lead to various symptoms ranging from anal bleeding to obstructive symptoms. We report a patient who had a giant fibroepithelial polyp of the anus mimicking the anal cancer to aware the diagnosis of neoplasia-like benign lesions in the anal canal. **(Methods)** A 90-year-old man with recurrent bleeding from the anal mass was referred in our hospital. According to the digital rectal examination, the about 5cm-sized irregular anal mass was founded in the perianal skin extending beyond the anal canal. He had no previous history for tuberculosis and perianal surgeries. According to the colonoscopy, a 5cm-sized polypoid mass was founded in the anal canal. In the pelvic computed-tomography, there was a suspicious anal cancer extending beyond anal verge without lymph node metastasis. Preoperative carcinoembryonic antigen was 5.4 ng/mL. After endoscopic biopsy, pathologic result of the anal mass was fibroepithelial polyps in the anus. **(Results)** The surgical excision from the perianal skin to the anal canal (until the distance of 3cm from anal verge) was performed. The lesion was contained with large amount of hyperplastic mucinous tissues. Histologically, they were aroused from the anal papillae with mononucleated and multinucleated stromal cells with fibroblastic and myofibroblastic differentiation **(Conclusion)** This case highlight the importance of awareness for differential diagnosis between benign and malignant anorectal lesion. Because a minority of fibroepithelial polyps can be grown as symptomatic, large-sized perianal lesions mimicking the anal cancer, it is required to pay attention to the likelihood of misinterpreting as malignant tumors before pathologic confirmation.

![Image](image_url)

**Fig.** The fibroepithelial polyps of the anus

**PE-099**

**Evaluation of a Critical Pathway Application to Improve Colorectal Cancer Outcomes: A Propensity Scoring Matching Analysis**

Department of Surgery, Severance Hospital, Yonsei University College of Medicine, Korea

_Hyun Woo Bae, Jeonghee Han, Hyuk Hur, Kang Young Lee, Nam Kyu Kim, Byung Soh Min*

**(Purpose)** In recent years, critical pathway (CP) has been applied to the majority of the colorectal cancer patient who has minimal invasive surgery (laparoscopic surgery, robot assisted surgery). The aim of this study is to evaluate the advantage of CP and to ascertain whether combining minimally invasive surgery and CP have additional value within colorectal surgery. **(Methods)** We evaluated 1099 consecutive cases of colorectal cancer surgery between January 2010 and December 2012 retrospectively. Of these, the group A (CP group) was the colorectal cancer patients (N=711) who received the elective colorectal cancer surgery and postoperative care of CP, and the group B (Non-CP group) was the colorectal cancer patients (N=388) who was not indicated to CP during the same period. To overcome selection bias, we used propensity score matching to achieve a one-to-one CP group: Non-CP group ratio. **(Results)** After propen-
sity score matching, 338 patients were included in each group. Baseline characteristics did not differ between the groups. The median (interquartile range) length of hospital stay was 11 (9-14) days in the group B and 7 (6-8) days in the group A, i.e., a four-day reduction (P<0.001) in the CP group. The overall incidence of postoperative complication according to the Clavien-Dindo classification was 8% in the group A and 4.7% in the group B, respectively (p=0.11). The value of preoperative prognostic nutritional index (PNI) was no difference between the group A and group B (50.1 vs. 49.2, p=0.07), however, postoperative PNI of group A is higher than group B (47.2 vs. 46.0, p=0.01). There were no significant differences in the other variants that searched. Median disease free survival (DFS) was 34 (range, 0-60) months and median overall survival (OS) was 36 (range, 0-60) months. In the survival analysis, there was no significant difference in DFS (86.7% vs. 84.3%, p=0.36). However, a significant difference in OS was observed in between group A and group B (97.3% vs. 93.2%, p=0.01). (Conclusion) The CP for colorectal surgery helped to reduce the length of postoperative hospital stay without adversely affecting morbidity. The group that applied CP has benefit in postoperative PNI and overall survival. These results indicate that CP may be feasible and effective in patients with colorectal cancer.

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**PE-100**

**Case Report: Diffuse Fibrovascular Dysplasia (Angiomatosis) Involving Distal Ileum, Cecum, Ascending Colon, RS Colon**

Division of Colorectal Surgery, Department of Surgery, Korea University Guro Hospital, Korea

Young Hyun Na, Sung Yup Joung, Sang Hee Kang, Sun Il Lee, Byung Wook Min*

(Purpose) Vascular malformations of the intestine are extremely rare. Angiomatosis is a form of vascular malformation. Most angiomatosis are asymptomatic. Rarely do they occur in the gastrointestinal tract when they may present with gastrointestinal bleeding, obstructive symptoms or abdominal pain. In most cases occur as part of a defined clinical syndrome - for example, Klippel-Trenaunay syndrome, Osler-Weber-Rendu syndrome, Blue rubber bleb nevus syndrome, or Maffucci syndrome. Most of these syndromes usually present soon after birth, or early childhood. We reported a case of a middle-aged female patient who had diffuse fibrovascular dysplasia (angiomatosis) involving distal ileum, cecum, ascending colon, RS colon. (Methods) We reported a 55-years old female patient with recurrent hematochezia. Her initial hemoglobin was checked at 4.6 g/dL. Colonoscopy showed telangiectasia and venous engorgement. On abdominopelvic CT, multifocal layered wall thickening within multiple calcification at rectosigmoid colon, pericolic infiltration, nodularity and calcification (probably phlebolith) at proximal ascending colon, cecum and distal ileum were found. (Results) Despite a few days of conservative management, a hematochezia persisted and she received additional blood transfusions. We decided that she was needed an operation. Laparoscopic exploration revealed multiple engorged vessels on distal ileum and cecum, proximal ascending colon, distal sigmoid colon, proximal rectum. We had considered total proctocolectomy preoperatively, but a colon between distal ascending colon and distal descending colon was normal. So right hemicolectomy and low anterior resection were done. Histological analysis of the resected bowel revealed a diffuse fibrovascular dysplasia (angiomatosis) with organizing thrombi. The patient recovered well and was able to be fed after 3 days. She was finally discharged after 18 days. (Conclusion) Most visceral vascular malformations are associated with cutaneous lesions and are asymptomatic, although bleeding has been described. Our case presented with symptom indicative of a continuous bleeding. There was no evidence to suggest our patient had a syndrome known to be associated with a vascular anomaly and there were no cutaneous manifestations to suggest underlying vascular malformations. There is little documentation on how to treat angiomatosis. Cases are too rare to formally trial different anti-angiogenic pharmacological treatments. Surgery is reserved for the life-threatening and transfusion dependent cases and only limited resection of the bowel is recommended in children. Follow-up evaluation and regular check-up are vital due to possibility of recurrence in our patient.
**PE-101**

**Independent Risk Factors According to the Status of Extranodal Tumor Extension that Can Predict Recurrence of Stage III Colorectal Cancer**

Department of Surgery, 1Department of Pathology, College of Medicine, Hanyang University, Korea

_Sung Hoo Kim, Seung Sam Paik1, Kang Hong Lee, Byung Kyu Ahn*

(Purpose) Extranodal tumor extension in metastatic lymph nodes is widely regarded as a poor prognostic factor in colorectal cancer. Despite its clinical importance, risk factors according to extranodal tumor extension status associated with recurrence of colorectal cancer remain unclear. The aim of this study was to investigate independent risk factor that contributed to recurrence of stage III colorectal cancer with homogeneous extranodal tumor extension status. (Methods) We enrolled a consecutive series of 169 patients with stage III colorectal cancer and evaluated extranodal tumor extension retrospectively. All patients were underwent a curative surgical resection at the Hanyang University Hospital (Seoul, Korea) between January 2005 and December 2010. All slides of resected lymph nodes were reviewed to determine extranodal tumor extension. Extranodal tumor extension was defined as a perforation of the nodal capsule by tumor tissue with extranodal growth and evaluated as present or absent. (Results) Mean patient age was 63.7 years (range: 27-90), with 106 male patients (62.7%). During the median follow-up period of 58.4 months, 38 patients (22.5%) developed recurrent disease. Extranodal tumor extension was present in 65 cases (38.5%). Recurrence occurred more frequently [20/65 (17.3%) vs. 18/104 (30.8), p=0.041] and disease-free survival (p=0.016) was significantly shorter in extranodal tumor extension (+) group than in extranodal tumor extension (-) group. In extranodal tumor extension (-) group, recurrence was associated with gender (p=0.045), vascular invasion (p=0.001), preoperative tumor perforation (p=0.024). In extranodal tumor extension (+) group, recurrence significantly correlated with preoperative tumor perforation (p=0.048). In a logistic regression model, vascular invasion (p=0.026, 95% CI=1.174-13.049) was an independent risk factor associated with recurrence in extranodal tumor extension (-) group. Preoperative tumor perforation (p=0.025, 95% CI=1.278-41.275) proved to be independent risk factor associated with recurrence in extranodal tumor extension (+) group. (Conclusion) Our studies showed that vascular invasion and preoperative tumor perforation was an independent risk factor of recurrence in extranodal tumor extension (-) and extranodal tumor extension (+) group in stage III colorectal cancer, respectively. It suggests that extranodal tumor extension status might be useful indicator to establish the treatment strategies for some colorectal cancers with unique clinicopathologic characteristics. The potential value of extranodal tumor extension should be further investigated.

**PE-102**

**Bowel Ischemia after Ultra Low Anterior Resection with Coloanal Anastomosis in Low Lying Rectal Cancer**

Colorectal Surgery, Department of Surgery, Severance Hospital, Yonsei University College of Medicine, Korea

_Dong Woo Kang, Jeonghyun Kang, Hyuk Hur, Byung Soh Min, Kang Young Lee, Nam Kyu Kim*

(Purpose) A little studies statemented some results that long segment colon stricture is caused ischemic change of bowel after ultra low anterior resection with coloanal anastomosis. Actually many causes to induce this situations -preoperative chemoradiotherapy, anastomosis site tension due to minimal invasive surgery, injury of mandering margin artery, properly didn’t resected radiated sigmoid colon. This study aimed to clarify risk factors that causes bowel ischemia after ultra low anterior resection with coloanal anastomosis and to report bowel ischemia cases. (Methods) Total 107 patients that were diagnosed rectal cancer and operated low anterior resection with coloanal anastomosis at Severance hospital between 2006, January and 2016, July. And depending on bowel ischemia after coloanal anastomosis, patients were classified two groups -No bowel ischemia group(N=101) and bowel ische-
The medical records of patients were reviewed retrospectively for clinicopathologic features, personal risk factors of bowel ischemia, perioperative factors and vital status at the time of the last follow-up evaluation. **(Results)** A total of 107 patients were analyzed (101 No bowel ischemia after coloanal anastomosis patients and 6 bowel ischemia after coloanal anastomosis patients). There was no statistically significant difference in the clinicopathological features and intraoperative factors between two groups. In personal risk factors, patient comparisons showed that bowel ischemia group had a significantly higher proportion of smoking history than no bowel ischemia group. 5 patients in bowel ischemia group were treated with preoperative chemoradiation therapy. During the postoperative recovery period, patients developed colonic ischemia, presenting with a high fever, anal discharge. And 4 patients were treated with conservative management (antibiotic therapy) but, 2 patients were treated with re-operation. Several months after discharge, two patients developed a long-segment colonic stricture from the anastomosis site to the distal colon. **(Conclusion)** This study shows that smoking history is the risk factor of bowel ischemia after coloanal anastomosis. And this study reports total 6 cases.
about postoperative bowel ischemia after ultra low anterior resection with coloanal anastomosis among total 107 cases. And we organized these cases and informed clinical characteristics and treatment.

**Table 4. Summary of patients**

<table>
<thead>
<tr>
<th>Case</th>
<th>Age/Sex</th>
<th>Operation date</th>
<th>Rectal cancer distance from AV</th>
<th>Preoperative CCRTs</th>
<th>IMA ligation</th>
<th>Intraoperative problem</th>
<th>Interval event</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>64/M</td>
<td>2009.10</td>
<td>5cm</td>
<td>FL + 50.4 Gy</td>
<td>High ligation</td>
<td>Peri Lt. levator ani muscle - severe fibrotic change Edematous change of mesorectum</td>
<td>POD 4</td>
<td>fever abdominal distension</td>
</tr>
<tr>
<td>2</td>
<td>57/M</td>
<td>2012.05</td>
<td>3cm</td>
<td>XELODA + 50.4 Gy</td>
<td>Low ligation</td>
<td>(-)</td>
<td>POD 4</td>
<td>fever, anal discharge</td>
</tr>
<tr>
<td>3</td>
<td>54/F</td>
<td>2012.07</td>
<td>3cm</td>
<td>FL + 50.4 Gy</td>
<td>Low ligation</td>
<td>(-)</td>
<td>POD 5</td>
<td>fever</td>
</tr>
<tr>
<td>4</td>
<td>40/F</td>
<td>2013.01</td>
<td>3cm</td>
<td>(-)</td>
<td>Low ligation</td>
<td>Severe adhesion between jejunum and descending colon</td>
<td>POD 4</td>
<td>fever, anal discharge</td>
</tr>
<tr>
<td>5</td>
<td>53/M</td>
<td>2016.04</td>
<td>4cm</td>
<td>XELODA + 50.4 Gy</td>
<td>Low ligation</td>
<td>bowel color change &gt; more resection</td>
<td>POD 5</td>
<td>fever, anal discharge</td>
</tr>
<tr>
<td>6</td>
<td>66/M</td>
<td>2016.07</td>
<td>3cm</td>
<td>XELODA + 50.4 Gy</td>
<td>High ligation</td>
<td>(-)</td>
<td>POD 3</td>
<td>fever, anal discharge</td>
</tr>
</tbody>
</table>

**Table 5. Treatment of patients**

<table>
<thead>
<tr>
<th>Case</th>
<th>Treatment of colonic ischemia</th>
<th>Discharge day</th>
<th>Colonic stricture after discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Re-operation (Hartmann operation)</td>
<td>POD 23</td>
<td>(-)</td>
</tr>
<tr>
<td>2</td>
<td>Conservative management(antibiotics)</td>
<td>POD 11</td>
<td>(+)</td>
</tr>
<tr>
<td>3</td>
<td>Conservative management(antibiotics)</td>
<td>POD 15</td>
<td>(+)</td>
</tr>
<tr>
<td>4</td>
<td>Re-do coloanal anastomosis</td>
<td>POD 20</td>
<td>(-)</td>
</tr>
<tr>
<td>5</td>
<td>Conservative management(antibiotics)</td>
<td>POD 21</td>
<td>(-)</td>
</tr>
<tr>
<td>6</td>
<td>Conservative management(antibiotics)</td>
<td>POD 13</td>
<td>(-)</td>
</tr>
</tbody>
</table>
Validation of the DiaRem and ABCD Score Systems as Diabetes Remission Predictors in Morbidly Obese Korean Patients Undergoing Roux-en-Y Gastric Bypass

Ji Yeon Park, Yong Jin Kim

(Purpose) The DiaRem score and the ABCD score systems have been proposed as prediction models for diabetes remission after bariatric surgery. This study aimed to validate the applicability of these 2 systems in morbidly obese Korean patients undergoing Roux-en-Y gastric bypass (RYGB). (Methods) A retrospective review of a prospectively established database identified 102 eligible patients for the analysis among those who underwent laparoscopic RYGB between January 2011 and February 2014. Partial and complete remission of diabetes was defined as glycated hemoglobin (HbA1c) level <6.5% and <6.0%, respectively, without the use of antidiabetic medication. The DiaRem score uses age, HbA1c, medication, and insulin usage, while the ABCD score includes age, body mass index (BMI), C-peptide level, and duration of diabetes in the prediction. The rate of diabetes remission was evaluated using both scoring systems. (Results) Forty-seven patients (46.1%) achieved complete diabetes remission after surgery and additional 16 (15.7%) achieved partial remission over the mean follow-up of 12.3±8.0 months. According to the DiaRem scoring system, the probability of complete remission ranged from 13.6% to 85.7% across the score groups demonstrating the overall trend of a higher probability of diabetes remission in the lower score group. However, there was a considerable deviation from the prediction model in score group of 8-12. Meanwhile, the rate of diabetes remission was higher in the higher ABCD score group, which ranged from 0% for those with score 2 up to 100% for those with score 10. (Conclusion) Although both scoring systems were useful to predict diabetes remission, the ABCD score appeared to be more reliable than the DiaRem score in our study cohort. Among the preoperative factors used in the 2 scoring systems, age at operation, baseline BMI, C-peptide and HbA1c levels, diabetes duration, and insulin requirement can be collectively used to predict diabetes remission in Korean patients undergoing RYGB.
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Pediatric
Two Cases of Pyriform Sinus Cyst in Neonates; Importance of Early Recognition and Differential Diagnosis

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(Purpose) Pyriform sinus tract is a rare congenital anomaly which presents as a deep neck abscess. Here we introduce two cases presented in neonates. In the first case, a pyriform sinus cyst was presented as a deep neck abscess on the right side, initially leading to a misdiagnosis of an infected cystic hygroma. The second case presents a more typical form of pyriform sinus cyst, presented on the left side. (Methods) (Case #1) An otherwise healthy girl born at gestation age of 37+6 weeks, birth weight 3.74 kg was referred at 4th day after birth with swelling and redness of the right side of the neck. She presented with high fever of 39°C and slight inspiratory distress during feeding. Physical examination showed a presence of a firm round mass of 4 cm in diameter at the anterolateral aspect of the right neck. Initial ultrasonogram and CT revealed a 3.6 x 6.5 cm sized elongated cystic mass, containing fluid level with air bubble and surrounded by an irregular thick wall with minimal soft tissue infiltrates. Based on these findings, the mass was suspected to be a complicating infected cystic hygroma and antibiotics were started and needle aspiration was done. Feeding was initiated from needle aspiration 1 day, and the size of the cyst started to increase rapidly after needle aspiration, returning to its previous size within two days. Excision of the cyst was done on the 7th day of hospitalization. (Results) (Case #2) A newborn female infant, gestational age of 39+2 weeks, 3.46 kg at birth was referred to our NICU due to a 7 cmLt neck mass presented at birth. The baby arrived at our NICU 3 hours after birth and physical examination revealed a soft, tense, movable mass of 7 cm without signs of inflammation. Initial Neck AP and Lat revealed a 4.7 cm x 3.9 cm size soft tissue density mass at Lt side of neck containing round air density. With previous experience of patients with pyriform sinus cyst, g-tube feeding was initiated from day 1. Fistulography showed a small tubular opacity from the Lt pyriform sinus adjacent to the air filled cyst, suggesting a fistula. On the 6th day of admission, pyriform sinus cyst dissection and fistula ligation was done. (Conclusion) In the unilocular cystic neck mass of neonates, especially, containing air bubble with or without infection, recognition and awareness of the possibility pyriform sinus cyst are necessary for early diagnosis and treatment.

Prenatally Diagnosed Choledochal Cyst Without Anomalous Pancreatico-Biliary Duct Union: A Case Report

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(Purpose) The pathophysiology of choledochal cysts (CC) are multifactorial and not definitely known, but the most common and reliable theory is that they arise from an abnormal pancreaticobiliary junction (APBDU). We report a case of prenatally diagnosed CC without an APBDU. (Methods) The newborn female patient, 36+5 weeks of gestational age (GA), birth weight 3210 g was referred to our NICU immediately after birth due to prenatally di-
agnosed 22×18×15 mm sized CC at 25 weeks of GA. After birth, there was no symptom except mild hyperbilirubinemia but stool color was intermittently acholic. On postnatal ultrasound and MR cholangiography, collapsed gall bladder and 30×32 mm sized cystic lesion were in the porta hepatitis without intrahepatic duct dilatation and APBDU. It was suspected biliary atresia, French type 2, or CC, Todani classification type 1 or 2. However, biliary atresia was excluded because of delayed excretion of radiotracer to the intestine on hepatobiliary scan. At 7 days of age the patient underwent a laparoscopic assisted cyst total excision and Roux-en-Y hepaticojejunostomy. Intraoperative gross findings and cholangiography confirmed a collapsed gall-bladder and a 40 mm sized CC involving proximal portions of both intrahepatic ducts. However, the distal 1 cm of the common bile duct was normal and there was no APBDU and amylase level of cyst fluid aspirate was nearly zero (under 0.1 U/L). The patient recovered uneventfully except umbilical wound infection and was discharged at post-operative 19th day. At latest follow-up the patient was free of symptoms without signs of jaundice or acholic stool. (Results). (Conclusion) A prenatally diagnosed CC with hyperbilirubinemia and acholic stool in a neonate is needed the differentiation from biliary atresia with cystic dilatation, especially, when APBDU was not proved obviously. And this case suggests the existence of other pathophysiology of CC.

**PE-106**

**A Case Report of Inguinal Lymphangioma Which Connected to the Intestinal Lymph Trunk Through Abnormal Lymphatic Channel**

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(Purpose) The lymphatic vasculature is a drainage network that begins at the interstitial spaces and ends at the great veins of the neck or thorax. Lymphatic malformations are a slow-type vascular malformation, which are sponge-like collections of abnormal and cystically dilated lymph vessels filled with lymphatic fluid. Most of these malformations are commonly located in the head and neck area but sometimes they may be located in various site. Herein, we report the case of lymphangioma at left inguinal area which was initially misdiagnosed as inguinal hernia but turned out to be lymphangioma abnormally connected to intestinal lymph trunk. (Methods) We reviewed the medical records of this patient. (Results) The patient was 4 year old male patient who visited out hospital because of a protruding mass at left inguinal area. Suspecting inguinal hernia we planned laparoscopic hernia repair. In laparoscopic exploration, there was retroperitoneal cystic mass around left inguinal internal ring filled with chylous lymphatic fluid. Despite aspiration of whole fluid and marsupialization, the cystic mass recurred after 1 month. The MRI showed 9.6x3.7cm sized multiloculated cyst at the left lower retroperitoneal cavity which spread to the left scrotum through the inguinal canal. Lymphangiography and non-contrast CT showed that lymphatic fluid at the small bowel flowed to left lower retroperitoneal cyst through abnormal lymphatic channels located around left renal vein. At first we inserted the tube percutaneously for drainage of chylous fluid and waited the cyst to be shrunk spontaneously. Despite waiting and fasting for 2 weeks, the amount of drainage did not decreased and we planned the surgical intervention. We ligated all abnormal lymphatic channels around left renal vein and excised the cystic mass which turned out to be lymphangioma on pathologic report. After 2 weeks of fasting the patient restarted the diet and the drain was not chylous anymore. After removal of drain tube, he was discharged. (Conclusion) Lymphangioma filled with chylous fluid can occur due to abnormal lymphatic channel. It is important to diagnose accurately before surgery with radiologic imaging studies. It could be drained percutaneously first but the surgical intervention would be inevitable.
PE-107

Inflammatory Myofibroblastic Tumor in Children

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(Purpose) Inflammatory myofibroblastic tumor (IMF) is a rare, benign solid tumor that most often affects children and young adults. IMFs are diagnosed as masses relating to their anatomic location and are difficult to differentiate from a malignant process based on radiologic studies. Because of its local invasiveness and tendency to recur, this tumor can be confused with a soft tissue sarcoma. Because the treatment of IMF tumor is conservative surgery, preoperative recognition is important to avoid radical surgical resection, radiation therapy, and intensive chemotherapy that would be appropriate treatments for soft tissue sarcomas. We report a case of retroperitoneal IMT and review the literature on abdominal IMT in children.

(Methods) A 7-month-old infant was admitted because of fever. Previously she had follow-up for hydronephrosis of left kidney; therefore, a regular examination was made by the pediatric urologist. The last ultrasonography (US) of the abdomen revealed hydronephrosis of left kidney without any remarkable findings. After 6 months, US of the abdomen showed a 7.4x5.6x6.8cm solid mass in right lower quadrant. The whole body MR showed the mass entrapping the sigmoid colon with high signal intensity in peripheral portion and low signal intensity in central portion on T2w images. Laboratory findings showed a WBC count of 13,800/µL with 37.5% neutrophils and 53.2% lymphocytes; hemoglobin, 10.7g/dL; platelet count, 527,000/µL; CRP, 12.45mg/dL; Level of CA 19-9, CEA, b-HCG were normal whereas level of CA-125 and AFP were increased. After 5 days from admission, fever was no longer observed, and she planned to receive a scheduled operation for removal of tumor. A day after 16 days from admission and a day before the surgery, high fever (38.7°C) was observed abruptly. While we had tried to hold the surgery, abdominal computerized tomography showed that the tumor rapidly increased from 7.4x5.6x6.8 to 8.4x6.3x7.7cm in size in 16 days. So we proceeded planned operation. (Results) During laparotomy the retroperitoneal mass was found to encase sigmoid colon and adhere to appendix. Segmental resection of sigmoid colon including mass and appendectomy were performed. (Conclusion) Seven months later the patient has no evidence of tumor recurrence, is growing appropriately, and has a normal complete blood count and CRP.

PE-108

Rectal Atresia with Postoperative Complication: Stenosis Treated with Hegar Dilation

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Joohyun Sim, Jeong Hong*

(Purpose) Rectal atresia is a rare disorder in the spectrum of anorectal malformations comprising only 1% of all anorectal malformations. After surgical correction of anorectal malformation, regular dilatation is recommended to prevent possible stricture of the neoanus. We present a case of male newborn with rectal atresia presented with stenosis after rectorectal anastomosis which was successfully managed by Hegar dilation for three months. (Methods) A 1-day-old male neonate, delivered at gestational age of 38 weeks and one day, weighing 2150g presented with nonpassage of meconium and abdominal distention. On physical examination, the anus and urethral opening were normal. On rectal examination, a rubber tube could be inserted up to 2.0cm from the anus, where resistance was felt. Barium enema showed the distance between the proximal pouch and distal anal canal was 2.5mm. Loop sigmoid colostomy was performed after initial resuscitation, and the baby was discharged. 3 months later, the baby was admitted for end-to-end anastomosis of proximal and distal rectum. #10 Hegar dilator was passed through the anastomosis without resistance. (Results) On POD 15, when the
baby visited outpatient clinic, only up to #6 Hegar dilator was passed through the anus. At 1 month after the surgery, the patient was scheduled for admission in order to try Hegar dilation under sedation. Up to #7 was tolerable. 2 weeks later, at the outpatient clinic, #8 Hegar was passed with spotting. The baby returned to the clinic twice a week, for 1 month. Every session, Hegar dilator passing was gradually easier than the previous session. After another 1 month of dilation, #12 Hegar dilator was passed easily. The baby was scheduled for colostomy closure at 7 months from the initial surgery and 4 months from the definitive surgery. He was discharged on POD 7 without serious complication. Wound infection was treated at the outpatient clinic with daily dressing. 2 months after the colostomy closure, #16 Hegar was passed easily through the anastomosis site. (Conclusion) Regular dilatation with Hegar could be selected as a good treatment in rectal stenosis after surgical correction of rectal atresia.

PE-109

Laparoscopic Removal of Intraabdominal Fetus in Fetu: A Case Report

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(Purpose) Fetus in fetu (FIF) is rare anomalous condition with incidence of 1 of 500,000 birth. It is considered that malformed monozygotic diamniotic twin developing the body of living fetus parasitically. There are still controversies of considering FIF as highly differentiated teratoma. Axial skeleton is considered as essential component, however, there are several reports without vertebral structure. We report a full term newborn of FIF diagnosed huge abdominal mass by prenatal ultrasonography. (Case Report) A male term baby was born in normal vaginal delivery in gestational age of 38 weeks 1 day. The birth weight was 3700g. Apgar score was 8 in one minute and 9 in 5 minute. Prenatal sonography described huge mass in fetal stomach and there were no other specific fetal findings. There was no specific maternal medical problem. On physical exam the infant did not have morphological abnormalities. Abdominal palpation revealed huge soft mass in the epigastric area and left upper quadrant (LUQ). The mass was soft, round, and not movable with respiration. Simple abdominal X-ray showed radiopaque mass shadow with multiple calcifications in LUQ. Abdominal ultrasonography demonstrated fluid containing, well margined, containing bony structure mass. Computed tomography (CT) presented similar opinion with simple X-ray and sonography. Laboratory findings of chemistry and complete blood cell count were within normal range. Alpha fetoprotein level was 200,000 ng/ml (normal range <8.1 ng/ml) and beta human chorionic gonadotropin was <2.0 mIU/ml (normal range <10.0 mIU/ml). There were no other complicated anomalies. On the 5th day of life, laparoscopic exploration was performed with 4-port approach; 5mm trochar in umbilicus and three other 3mm trochars. A large, well circumscribed, thin walled, fluid containing cystic mass was found. The mass was located posterior to stomach, anterior to pancreas, inferior to diaphragm, medial to left abdominal wall. It was dissected easily without perforation of mass. The mass was wrapped in the laparoscopic bag and was extracted through low transverse incision. The microscopic examination described 7.0X6.3X3.2 cm sized cystic lesion containing fluid and solid components consisted with bone, cartilage, skin, and soft tissues. The postoperative clinical course was uneventful and the patient was in good condition. Regular follow up would be accomplished in outpatient clinic.

PE-110

A Case of Pediatric Nodal Marginal Zone Lymphoma

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(Purpose) Lymph node enlargement is a common finding in children suggesting normal or benign.
Palpable nodes which are large, hard or fixed must be examined carefully to rule out malignant diseases. (Methods) A 15-year-old boy presented to our hospital to inspect the palpable mass at his post-auricular area being found 2 months ago.

(Results) It was diagnosed as nodal marginal zone lymphoma (NMZL) through excisional biopsy and immunohistochemistry. No distant metastasis was found from computed tomography and positron emission tomography. NMZL is very rare, especially in children and young adults, but occurs locally in most cases with good prognosis compared to adults. He is under chemotherapy with combined cyclophosphamide, vincristine, methotrexate, and prednisone. (Conclusion) Excisional biopsy with diagnostic imaging should be performed in pediatric patients with lymph node enlargement when malignancy is suspected after thorough physical exam. In locally advanced painless lymphomas like NMZL, early suspect of disease with excisional biopsy is a key factor for tissue confirmation and appropriate management.

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**PE-111**

**How Can We Explain the Death Caused From Mixed Germ Cell Tumor Misdiagnosed as Constipation in 8 Months Old Girl: Case Report**

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So Hyun Nam*

(Purpose) Germ cell tumor includes teratoma (mature and immature), choriocarcinoma, endodermal sinus tumor (yolk sac tumor) and dysgerminoma. The vast majority are benign cystic teratoma, but the remainder have a higher incidence of malignant behavior. Here, we present the fatal outcome of malignant mixed germ cell tumor. (Case report) 8-month old girl was referred for abdominal mass with constipation. She had been treated for constipation over 4 months, but the symptom was not improved. Her mother visited 4 of different pediatrician, but she got the medication of laxatives only. At the clinic, they checked the ultrasonography. Intra-abdominal huge mass was discovered. On initial examination, she looked very sick with moaning and groaning. Her belly was very hard and tense, and left leg was asymmetrically edematous. On the abdomino-pelvic CT, we found the 10x9x10cm mass occupying lower abdomen and pelvis with multiple hepatic metastasis, both lobe of the liver. It displaced the bladder and uterus making severe hydronephrosis. We did exploration and found huge mass originated from retroperitoneum containing fat component, hair, and blood clot. Liver metastasis and omental seeding was proven intraoperatively. The mass was tightly attached to pelvic wall, and it was very hard to remove. After 12 hours of operation, abdominal distension was developed and minor bleeding was suspicious. Laboratory findings revealed that AST/ALT elevated up to 15837 / 3015 IU/L and PT prolonged up to 16.2%. We rechecked the CT and found enlarged liver metastatic tumor occupying whole liver parenchyme. Finally, she died from liver failure. The pathologic diagnosis was mixed germ cell tumor including mature cystic teratoma and yolk sac tumor. Conclusion) Malignant germ cell tumor is known to highly chemo-sensitive and it can bring favorable outcome. Though early diagnosis and surgical treatment can lead favorable outcome of germ cell tumor in infants, she couldn’t get medical attention neither suspicion. We need to pay more attention for intractable constipation.

Fig. 1. On the abdomino-pelvic CT, we found the 10x9x10cm mass occupying lower abdomen and pelvis with multiple hepatic metastasis, both lobe of the liver.
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Acute Care
Predisposing Factors of Failed Apnea Test During Brain Death Determination in Potential Organ Donor

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(Purpose) Apnea test is an essential component in the clinical determination of brain death, but it may incur a significant risk of complications such as hypotension, hypoxia and even cardiac arrest. We analyzed the risk factors associated with failed apnea test during brain death assessment in order to predict and avoid these adverse events. (Methods) Medical records of apnea tests performed for brain-dead donor between January 2009 and January 2016 in our institution, were reviewed retrospectively. Age, gender, etiology of brain death, use of catecholamine and results of arterial bleed gas analysis (ABGA), systolic/diastolic blood pressure (SBP/DBP), mean arterial pressure (MAP) and central venous pressure (CVP) prior to apnea test initiation were collected as variables. A-a gradient and PaO2/FiO2 were calculated for more precise assessment of the respiratory system. In total, 267 cases were divided into a group which was completed apnea test and the other which was failed the test. (Results) 13 cases failed the apnea test and the majority of reasons were severe hypotension (SBP<60 mmHg). In terms of hemodynamic state, SBP was significantly higher in the completed test group than the failed group (126.5±23.9 vs. 103±15.2, respectively; p=0.001). In ABGA, the completed test group showed significantly higher PaO2/FiO2 (313.6±229.8 vs. 141.5±131.0, respectively; p=0.008) and lower A-a gradient (278.2±209.5 vs. 506.1±173.1, respectively; p=0.000). In multivariable analysis, low SBP (p=0.040) and high A-a gradient (p=0.002) were independent risk factors associated with failed apnea test. (Conclusion) Although the unexpected adverse events during apnea test for brain death determination do not occur frequently, they could be fatal. If a brain-dead patient shows low SBP and high A-a gradient, clinicians should pay more attentions and preparations prior to apnea test.

Management of Children with Liver and Spleen Injuries: Experience From a Single Center

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Jin Soo Kim, Ki Hoon Kim*

(Purpose) Intra-abdominal solid organs such as the liver and spleen are the most susceptible to damage by blunt abdominal trauma, the most common cause of hemoperitoneum. Management of children with intra-abdominal solid organ injuries has evolved steadily and we describe herein the current management protocol for children with intra-abdominal solid organ injuries after blunt trauma in a single center. (Methods) Children (<19 years) with blunt liver and spleen injuries, hospitalized at our center between May 2010 and February 2016, were included in the present study. Data were retrospectively analyzed for demographic profile (age and sex), cause and grade of injury, injury severity score (ISS), initial hemoglobin level, cause of injury, injury severity score (ISS), initial hemoglobin level, pack RBC transfusion(within 3 admission days), treatment method, duration of stay in the hospital, and mortality rate. (Results) During the study period, 34 patients with blunt liver injury and 21 patients with blunt spleen injury presented at the center. The mean age for the liver injury patient group was 12.7 years (range, 3-19) with 67.6% of the patients being male (n=23). The most common cause of injury in this group was motor vehicle collision, reported in 18 cases (52.9%), followed by fall (9, 26.5%), and other causes (7, 20.6%). Most patients had a grade II (12, 35.3%) or grade III injury (12, 35.3%), while grades I, IV, and V injuries were present in 3 (8.8%), 4 (11.8%), and 3 (8.8%) patients respectively. Initial hemoglobin level of patients with liver ranged from 7.3 to 15.4 g/dL with a mean of 12.6 g/dL. They received a transfusion of pRBC within 3 admission days ranged from 0 to 58 Units with a mean of 4.7 units. The mean age of patients with spleen injuries was 12.7 years (range, 2-19), comprising 16 (76.2%) male patients. The reported causes of injuries were traffic accidents in 13 (61.9%), fall from a height in 5 (23.8%), and oth-
er causes in 3 cases (14.3%). Grade II (8, 38.1%) and grade IV (2, 28.6%) spleen injuries were most common, followed by grade III (4, 19.0%), grade V (2, 9.5%), and grade I (1, 4.8%). A mean ISS of 20.4 (range, 4-50) was recorded for both liver and spleen injury groups. Initial hemoglobin level of patients with liver ranged from 8.3 to 15.2 g/dL with a mean of 12.5 g/dL. They received a transfusion of pRBC within 3 admission days ranged from 0 to 16 Units with a mean of 2.6 units. Thirty patients (88.2%) with liver injuries and 18 patients (85.7%) with spleen injuries were managed conservatively. The average duration of hospital stay was 22.1 days (range, 1-90 days) for the liver injury group, and 22.2 days (range, 3-90 days) for the spleen injury group. N (Conclusion) In keeping with the recent trends in solid organ injury management, we have performed the conservative treatment modality in more than 85% of the solid organ injury patients.

PE-114

Results of the Traumatic and Non-Traumatic Open Abdomen

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(Purpose) The purpose of this study is to review the single center experiences of the open abdomen. (Methods) Medical records for 59 patients who were managed with open abdomen after laparotomy were reviewed retrospectively from March 2009 to December 2015 at tertiary university hospital. The indications for the open abdomen were followed; 1) traumatic hemoperitoneum requiring massive transfusion, 2) uncontrolled intra-abdominal infection, 3) bowel infarction requiring second look laparotomy, and 4) impending risk of abdominal compartment syndrome such as non-traumatic intra-abdominal bleeding. Patients who died within 48 hours after initial open abdomen were excluded from the analysis. Statistical analysis were performed by using IBM SPSS ver. 20.0. (Results) Forty-seven patients were included in this study. Mean age was 52.2±16.7 years old, and men were 37 (78.7%). The leading cause of open abdomen was traumatic abdominal injury in 23 (48.9%), and followed by bowel perforation (10, 21.3%), non-traumatic bleeding (7, 14.9%), and bowel infarction (6, 12.8%). Preoperative shock was accompanied by 37 patients (78.7%). Abdominal wall was closed in 38 patients (80.9%), and median times for dressing changes were 0 (IQR 0 ~ 1). Abdominal wall was closed by primarily in 21 patients (44.7%), and followed by fascial closure using artificial mesh technique (12, 25.5%). Length of ICU and hospital stay were 12.0 days and 32.0 days, respectively. Time interval to abdominal closure was 4 days (IQR 2~10.3 days) after open abdomen. Complications were developed in 27 patients, including uncontrolled sepsis (21.3%), entero-atmospheric fistula (19.1%), ventral hernia (8.5%), bleeding (4.3%), and lateralization (4.3%). Overall mortality rate was 44.7% in all patients, and main cause of the death was sepsis (61.9%). The closing rate of traumatic patients and non-traumatic patients was similar. It was 86.9%(n=20) in traumatic patients and 75%(n=18) in non-traumatic patients. But, survival rate was definitely different. It was 73.9%(n=17) in traumatic patients, on the contrary, 33.3%(n=8) in non-traumatic patients. (Conclusion) We guess that the different results between traumatic open abdomen and non-traumatic open abdomen would come from different pre-operative conditions. In many traumatic patients, general condition and intra-abdominal pressure were not bad than that of non-traumatic patients, so mortality rate would be lower. The major cause of abdomen was traumatic intraabdominal bleeding, and closed primarily in most patients. However, complications were occurred frequently, resulting in poor outcome. Further analysis for the risk and benefits of the open abdomen is required.
Traumatic Diaphragmatic Rupture: Experience with 51 Patients

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Jihoon Jang, Kyoung Hoon Lim, Jinyoung Park*

(Purpose) Traumatic diaphragmatic rupture (TDR) is uncommon, but is associated with high rates of morbidity and mortality. The purpose of this study was to present our experience with management of this injury. (Methods) Medical records of fifty-one patients with TDR that were treated in our hospital from January 2001 to June 2016 were analyzed retrospectively. The cause of injury, location of rupture, associated injuries, preoperative vital signs, Injury Severity Score (ISS), the time until diagnosis, surgical treatment, morbidity and mortality, predictive factors for mortality were evaluated. (Results) There were 41 male patients (80.4%) and 10 female patients (19.6%) with a mean age of 24.4 years (range 18-84 years). Blunt trauma accounted for the injuries of 38 patients (74.5%) and 13 patients (25.5%) had penetrating injuries. The diagnosis was preoperatively established in 29 patients (56.9%) with a plain chest X-ray or computed tomography. Rupture of diaphragm was left-sided in 39 patients (76.4%), right-sided in 11 (21.6%), and bilateral in 1 (2.0%). The most of cases were repaired with primary suture except one case which was repaired by biological mesh (Permacol®). Postoperative complications were observed in 10 patients (19.6%). Overall mortality was observed in 8 patients (15.7%). The mortality was associated with preoperative hemodynamic instability (p=0.000). (Conclusion) The presence of preoperative hemodynamic instability is predictive factors for mortality after traumatic diaphragmatic rupture.

Damage-CONTROL Surgery for Coagulopathy Complicated by Subclavian Vein Catheter-Related Injury

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Wu Seong Kang, Ji Woong Yeom, Young Goun Jo, Jung Chul Kim*

(Purpose) We report a case of damage-control surgery for bleeding due to hepatic hemangioma laceration in a patient with coagulopathy, which was complicated by subclavian vein catheter-related injury. (Methods) A 30-year-old woman experienced blunt trauma upon falling from the bed. Hepatic hemangioma laceration was diagnosed, and the hemangioma seemed to exist previously. No other injury was detected on preoperative diagnostic workup. Subclavian vein catheterization was performed. Subsequently, angio-embolization was performed to control bleeding due to hemangioma laceration. After angio-embolization, the patient’s systolic blood pressure and hemoglobin level were 70 mm Hg and 5.3g/dL, respectively. She underwent emergency laparotomy. (Results) During the surgery, a large volume of blood in the abdominal cavity, due to profuse bleeding from the ruptured hemangioma, was seen. Additionally, we observed bulging of the right diaphragm and performed thoracoscopy, which revealed large volume of blood in the right thoracic cavity and perforation of subclavian vein by the catheter. After the damage-control surgery, she recovered safely. (Conclusion) In this case, Coagulopathy complicated by subclavian vein catheter-related injury was treated safely by damage control surgery.
**PE-117**

Laparotomy following Cardiopulmonary Resuscitation after Traumatic Cardiac Arrest: is It Futile?

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Wu Seong Kang, Ji Woong Yeom, Young Goun Jo, Jung Chul Kim*

(Purpose) The survival rate for cardiopulmonary resuscitation (CPR) in traumatic cardiac arrest is very poor. Moreover, some consider laparotomy for abdominal trauma after CPR futile. This study aimed to determine the outcomes for victims of trauma who were pulseless and received CPR followed by laparotomy (Methods) We conducted a retrospective review of medical records of our hospital from January 2009 to March 2016. Patient demographics, injury severity scores, CPR time, operative data, and mortality data were collected and analyzed. (Results) A total of 385 patients underwent laparotomy because of trauma. Sixty-two (16.1%) patients died after laparotomy. Sixteen underwent successful CPR in the emergency room, followed by laparotomy, and only 1 patient (6.2%) with an iliac artery injury survived. Among the patients who died, the length of hospital stay was <1 day for 5 (5/15, 33.3%) patients and >7 days for 3 patients (3/15, 20.0%). Mean time from injury to admission was 172 minutes. All patients were victims of blunt injury. (Conclusion) The survival rate for laparotomy following CPR after traumatic cardiac arrest was very poor, but not futile. Further improvement of the system of emergency transport to trauma centers is needed.

**PE-118**

Quality Improvement of Damage Control Laparotomy after Establishment of Trauma Center: Single Center Experience in Korea

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(Purpose) Damage control laparotomy (DCL) is a lifesaving technique to minimize the lethal triad of coagulopathy, hypothermia, and acidosis. In our hospital, we have performed DCL for severe trauma patients since 2009. We investigated mortality of DCL and its related risk factors. Additionally, we compared outcomes between pre-trauma center period (2009-2013) and trauma center period (2014-2015). (Methods) Seventy eight consecutive patients underwent DCL between 2009 and 2015. Multivariate logistic regression was performed to identify risk factors for mortality. Risk-adjusted cumulative sum (RA-CUSUM) and the graphs of Seventy eight consecutive patients were used for monitoring change of mortality. (Results) Mortality rate has decreased from 61.5% to 25.0% in 2011-2015 (p=0.029). Operation time (105 vs. 80 min, p=0.019) and time to arrive operation room from admission (161 vs. 123 min, p=0.001) are reduced in trauma center period. Post-operative infused crystalloid was reduced in trauma center period (5237 vs. 4492 ml, p=0.041). FFP to PRC ratio (0.63 vs 1.00, p=0.004) was higher in trauma center period. Multivariate logistic regression identified that GCS (OR 0.869, CI 0.760-0.993, p=0.039), age (OR 1.052, CI 1.015-1.089, p=0.005), intraoperative transfused PRC (OR 1.114, CI 1.012-1.226, p=0.028), Injury Severity Score (ISS) (OR 1.103, CI 1.018-1.195, p=0.017) are statistically significant risk factors for mortality. RA-CUSUM curve showed upward slope from 2011 to 2014 which means increased mortality. In 2014, since 63th patient RA-CUSUM curve shows downward slope which means reduced mortality. (Conclusion) Mortality rate of DCL has decreased since 2011. Quality of DCL seems to be improved after establishment of trauma center.
Damage Control Surgery C NPWT for Impalement Injury of Pelvic and Periproctal Wound

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Younggoun Jo, Jiwoong Yeom, Wuseong Kang, Jungchul Kim*

(Purpose) Management of penetrating complex periproctal wounds are difficult and at risk for nonhealing. Here, we present a case of impalement injury of pelvic and periproctalound and successfully managed with damage control surgery with negative pressure wound therapy (NPWT). (Methods) A 74 year-old man visited emergency department after cultivator overturn accident. Cultivator handle was impalement at left upper medial thigh area and perianal perineum was penetrated. On digital rectal examination, intact rectal mucosa was secured. Abdominal computed tomography (CT) showed left ischial fracture with active bleeding at left anterior pelvic wall. An immediate operation was performed. Foreign body was removed and bleeding from femoral vein was noted. After ligation of injured branch of femoral vein, main femoral venorraphy was conducted. Because of contamination and diffus oozing from damaged soft tissue and muscle tissue massive irrigation and pad packing was done. Two days later second look operation was performed. After pad removal, perianal necrotic tissue was found and it was connected with pubic ramus. Transverse colostomy was formed and 12mm penlose drain insertion at periproctal space. (Results) After procedure periproctal wound discharge was continued. Under local anesthesia irrigation and debridement of necrotic periproctal wound was performed. Wound discharge was diminished but pus like drainage was remained. 10 days after surgery, we applied negative pressure wound therapy (NPWT) system by V.A.C Therapy. 8 days later, partial wound closure was performed and granulation tissue formation was made. POD 60, patient was discharge and follow up Abdomen CT showed improvement of in left perineal area, left thigh muscle and soft tissue layer. Intact internal sphincter muscle was secured by transrectal ultrasonography and anal sphincter tone is preserved. (Conclusion) In case of penetrating periproctal injury, careful management is needed and NPWT could be helpful for successful healing of complex damaged wound.
PE-120

Acute Malperfusion Syndrome Complicated by Blunt Traumatic Aortic Injury

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Deok Heon Lee, Tak-Hyuk Oh, Gun-Jik Kim, Kyoung Hoon Lim

(Purpose) Malperfusion syndrome is a rare and fatal complication of aortic dissection, mainly type B aortic dissection. We report an experience of acute malperfusion syndrome complicated by blunt traumatic aortic injury. (Methods) Forty-one-year-old man was admitted our hospital after pedestrian traffic accident. Initial chest computed tomography revealed an aortic dissection from aortic isthmus to above renal artery. After a few hours later, his vital status was unstable with no palpable femoral pulse. So, we decided to perform emergency operation. (Results) An endovascular stent-graft was implanted with sacrificing left subclavian artery. We performed angiogram and found inappropriate flow of celiac axis, superior mesenteric artery and both femoral artery. So, we inserted stent at both femoral artery and superior mesenteric artery but, we could not perform fenestration for longer operative time and his unstable vital status. We finished operation but, he was died on postoperative first day. (Conclusion) Malperfusion syndrome occurs in patients with type B aortic dissection and has high mortality. Endovascular fenestration has introduced for management of malperfusion syndrome due to dynamic compression. But, we could not perform endovascular fenestration for instability due to longer operative time and reperfusion injury. We suggest that emergency management must be considered when suspected condition of malperfusion syndrome such as unstable vital sign and unexplained metabolic acidosis, abnormal physical examination appear. We report an acute malperfusion syndrome exacerbated after blunt traumatic aortic injury.

PE-121

Isolated Extrahepatic Bile Duct Injury following Blunt Trauma

Division of Trauma Surgery, Department of Surgery, Chonnam National University Medical School, Korea

Ji Woong Yeom, Young Kwon Cho, Wu Seong Kang, Jung Chul Kim

(Purpose) Isolated extrahepatic bile duct injury from blunt abdominal trauma is rare. Herein, we report a case of bile peritonitis due to extrahepatic bile duct injury after blunt trauma. (Methods) A 50-year-old man was admitted to the emergency Department of a local hospital after falling from a breakwater. He was hemodynamically stable. He presented with chest pain and mild abdominal pain. Computed tomography (CT) revealed multiple rib fractures without hemothorax or pneumothorax, and mild hemoperitoneum without active bleeding. Thus, he was admitted to the ward with a conservative treatment plan. However, his abdominal pain persisted, and laboratory tests revealed jaundice (5 days after admission total/direct bilirubin level, 15.18/10.47). Hence, he was referred to our hospital emergency department. We also admitted him to the ward with a conservative treatment plan. Owing to the aggravation of his abdominal pain, we performed follow-up CT after 3 days of admission and found an increased amount of fluid collection. (Results) We decided to perform an emergency operation. The abdomen was opened through a midline incision, which was found to have large amounts of bile contents (Fig. 1). Severe inflammation surrounded the liver, gallbladder, hepatoduodenal ligament, and duodenum. After adhesiolysis, cholecystectomy, and choledochotomy, we found a 1.5-cm longitudinal laceration of the common hepatic duct (CHD; Fig. 2). We primarily repaired the CHD and inserted a T-tube in the choledochotomy site. After inserting two drains in the subhepatic area, we completed the operation. On postoperative day (POD) 28, endoscopic retrograde cholangiopancreatography and endoscopic retrograde biliary drainage were performed. On POD40 and POD45, we removed the t-tube and drains. (Conclusion) Isolated injuries of the extra-
hepatic bile duct after blunt abdominal trauma are rare, and diagnosis is usually delayed. Therefore, a higher level of suspicion is necessary to identify injuries in the hepatic ducts, as delayed diagnosis is generally related with poor prognosis.

PE-122

Diaphragmatic Hernia Repair for Delayed Presenting Traumatic Diaphragmatic Hernia

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Eui Tae Kim, Ye Seob Jee*

(Purpose) Traumatic diaphragmatic hernia (TDH) is an uncommon surgical problem and diagnosis is often delayed. However, the mortality from bowel necrosis can reach 80%. Therefore, a suspicion was needed and surgery is required to prevent complication. (Methods) We experienced two TDH cases. One is 50-year-old male who had fallen down 15 months prior and CT scan at that time revealed a small defect of diaphragm without herniation. The other is 55-year-old male who took Lt lung wedge resection due to stab injury. But at that time they could not find diaphragmatic injury. (Results) Two patients was transferred due to abdominal pain and vomiting. Chest X-ray and CT scan showed herniation of the stomach through the left diaphragm. We diagnosed delayed herniation of TDH. The first patient underwent laparoscopic repair using an expanded polytetrafluoroethylene (ePTFE) mesh. Recovery was uneventful and CT scan at 3 months after operation showed no recurrence. The second patient also underwent laparoscopic exam but transverse colon reduction was not appropriate. So we converted open surgery and repaired diaphragmatic defect with nonabsorbable suture material after putting transvers colon and omentum back. He discharged ten days after surgery without any special event. (Conclusion) Delayed TDH is uncommon. But if detection of bowel necrosis delayed than the mortality rate can reach 80%. Therefore, to prevent late, serious complications of diaphragmatic hernia, a high index of suspicion is needed and surgery is mandatory for late-presentation traumatic diaphragmatic hernia. A laparoscopic approach is safe and feasible during elective surgery. Also we suggest that radiographical follow-up exam is important to detect delayed diaphragmatic injuries of diaphragm.
PE-123

Crrt During Tae in Unstable Pelvis Fracture with Severe Metabolic Acidosis

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(Purpose) Correction of severe acidosis in major trauma patient is as important as hemostasis, because it can lead to mortality. We report a case of applying CRRT in the intervention room, just before performing TAE for severe bleeding in a patient with unstable pelvic ring fracture. (Methods) We compared pH of the patient on arrival to our trauma center and just after finishing TAE with CRRT. (Results) On arrival, pH was 6.98, and just after TAE, pH was 7.25. (Conclusion) Early application of CRRT was helpful for the correction of acidosis in a major trauma patient who needed radiologic intervention.

PE-124

Rapid Recovery and Favorable Outcomes of Cerebral Fat Embolism Syndrome with Comatose State: A Case Report

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Eun Young Kim, Seok Chan Kim1*

(Purpose) Fat embolism syndrome (FES) is the serious manifestation of fat embolism involving the multi-organ systems. Cerebral fat embolism syndrome (CFES) is the neurologic manifestation of FES that widely varies from mild disorientation to coma. Although it can be associated with significant neurologic sequelae, the treatment mainly depends on supportive managements, and the prognosis of deep coma caused by CFES has been rarely reported. (Methods) Herein, we present an unusual case of severe CFES without pulmonary manifestations that was rapidly recovered with favorable outcomes. (Results) A 31-year old male presented bilateral femur fractures due to a traffic accident. After bone fixation, he suddenly became deep coma and the brain magnetic resonance imaging revealed the scattered foci of high signal over bilateral cerebral hemispheres. Supportive managements and various methods were used in order to prevent further degeneration of brain. (Conclusion) After 13 days, the patient was completely recovered the consciousness and neurologic functions without sequelae.

PE-125

Preclinical Validation of Transgenic Pig Skin Xenograft with Non-Human Primate Skin Transplant Model

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Kyo Won Lee, Gyu-Seong Choi*, Ji-Seon Lee3, Hyeon Yoon3, Wook Chun1

(Purpose) This study was performed to compare the healing quality of the allogenic acellular dermal matrix (ADM) and xenogenic ADM combined with autologous skin graft. (Methods) Xenogenic ADM was obtained from two GaT knock-out pigs. Allogenic ADM was obtained from cynomolgus monkeys. ADM was stored with lyophilization. Full-thickness skin wounds were made on the back of two cynomolgus monkeys. In one monkey, wounds were covered by xenogenic ADM combined with autologous skin graft or autologous skin...
graft only. In another monkey, wounds were covered by allogenic ADM combined with autologous skin graft or autologous skin graft only. Skin healing process was observed during 2 weeks and skin biopsies were performed on 3 months after skin transplantation. We obtained IACUC approval (ORIENT-IACUC-16053) (Results) Skin on the xenogenic ADM was necrotized 1 week after skin transplantation. Possibly due to the thickness of ADM, which block the blood supply from the subcutaneous tissue to the autologous skin graft. Skin biopsy revealed that less fibrotic change of the skin on the ADM compared with the skin without ADM. (Conclusion) Xenogenic ADM can be used in high degree burn patients who can suffered from contracture after healing since it can reduce fibrotic change. This study was funded by Rural Development Administration project (PJ012265)
PE-126

**The Administration of Oral Rehydration Solution Enhances Early Recovery after Surgery in Gastrectomized Patients**

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* Sang Hoon Lee, Tae Kyung Ha*

**Purpose**
It is customary for the patient who undergo gastrectomy to remain nil per oral (NPO) except water until the restoration of bowel function. Our aim is to assess the effects of oral rehydration solution (ORS) in gastrectomized patients on early recovery after surgery.

**Methods**
Prospective clinical data of 116 patients who had undergone gastrectomy for gastric cancer were collected. They were divided into oral rehydration solution (ORS) and oral administration of water (OAW) groups: ORS(n=38, patients were given ORS on the day of surgery), OAW(n=78, patient were given water after confirming the return of bowel function by the evidence of subjective symptoms and radiologic imaging). Postoperative complications and length of stay were evaluated.

**Results**
There were no significant differences in hospitalization (p=0.866) and post-operative complications (ORS=26.3%, OAW 28.2%, p=1.000) between the two groups. Compared with OAW group, ORS group showed early advancement of liquid diet after gastrectomy (ORS=3.5day versus OAW=4.0day, p=0.001)

**Conclusion**
ORS as compared with OAW advanced diet recovery; however, does not increase the length of hospital stay and post-operative complication rates.

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PE-127

**Multidisciplinary Treatment for Patient with Stage Iv Gastric Cancer: the Role of Conversion Surgery following Chemotherapy**

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**Purpose**
Recent advance of chemotherapy for gastric cancer have raised new clinical question regarding to the role of surgical intervention for patients with good chemotherapy response even they had distant metastasis. Surgery for those patients may provide long-term survival through removing of macroscopically remaining lesions. This type of surgery, referred to as conversion surgery, aims to cure the disease rather than just palliative intent, on the basis of the response to chemotherapy as in initially unresectable colorectal cancer. However, the clinical value of such multimodal therapy including chemotherapy and conversion surgery for stage IV gastric cancer remains controversial. The aim of this study is to investigate the efficacy of conversion surgery following induction chemotherapy for stage IV gastric cancer patients.

**Methods**
We retrospectively identified patients with a clinical diagnosis of stage IV gastric cancer who underwent conversion gastrectomy in Yonsei Cancer Center from January 2005 through December 2012. A total of 101 patients were analyzed for this study. Clinico-pathologic variables and oncologic outcomes were evaluated.

**Results**
Of the 101 patients included in this study, overall R0
resection rate was 56.4% (57/101). In operation, peritoneal infiltration was observed in 32 patients (31.7%), and any kind of metastasectomy was conducted for 11 patients (10.9%; three of hepatectomy, six of para-aortic lymph node dissection, and three of oophorectomy). Finally R0 resection was achieved in 57 patients (56.4%). There was no postoperative surgery related mortality for 1 month. Median overall survival (OS) was 26.0 months. Multivariable analysis identified curative resection (R0 resection), chemotherapy response (CR/PR) of metastatic site, and CEA change as independent prognostic factors contributing to OS. (Conclusion) Patients with stage IV gastric cancer exhibiting good clinical response to chemotherapy may obtain a longer survival benefit from conversion gastrectomy following induction chemotherapy. Prospective, randomized trials are required to determine the best treatment strategy.

**PE-128**

**Validation of Postoperative Surveillance Protocol after Gastrectomy for Early Gastric Cancer**

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Dong Jin Park, Gyu Yeol Kim*

(Purpose) Although there have been many reports about clinical outcomes of surgical treatment for early gastric cancer (EGC), little is known about detection of recurrence and second primary cancer after gastrectomy. This study aims to clarify the clinical value of tumor markers or imaging tools, including conventional computed tomography (CT) and 18-F-fluoro-2-deoxy-D-glucose positron emission tomography (FDG-PET) scans, in detecting recurrence and secondary primary cancer after gastrectomy in Korea. (Methods) We reviewed the medical records of 353 patients who had undergone curative gastrectomy for EGC at Ulsan University Hospital between January 2008 and December 2010. The clinical and pathological characteristics were evaluated retrospectively. (Results) Median follow up was 145 months. Seven patients (2.0%) had recurrence, and twenty-one patients (5.9%) had second primary cancer. The initial recurrent site were the intraluminal in two, lung in two, the liver in one, the bone in one, and the ovary in one. Two patients showed recurrence over 5 years (69 and 86 months, respectively) and four showed second primary cancer over 5 years (61, 66, 74, and 79 months, respectively). The ability for CT scan to detect recurrence and second primary cancer was 71.4% and 52.4%, respectively. And the ability of FDG-PET was 85.7% and 52.6%, respectively. Tumor markers were shown to have poor diagnostic yields (42.9% and 38%, respectively). (Conclusion) Oncological follow-up after gastrectomy for EGC should be continued over 5 years. And for the detection of recurrence and second primary cancer, CT scan and FDG-PET have to be obtained under regular follow up.

**PE-129**

**A New Simple Purse-String Suture Technique for Esophagojejunostomy with a Circular Stapler in Laparoscopic Total Gastrectomy**

Division of Gastrointestinal Surgery, Department of Surgery, Ajou University School of Medicine, Korea

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(Purpose) Esophagojejunostomy is crucial and difficult procedure in totally laparoscopic total gastrectomy (LTG). Although several methods have been applied, standard procedure is not yet determined. Here, we describe new simple purse-string suture method for anvil insert in the esophagojejunostomy with circular stapler. (Methods) After transection of esophagus by linear stapler, the resected esophagus is nearly opened along staple line remaining small portion at the left later side. Assistant pulled the resected stapling line to expose the resected esophagus. And then operator made six or seven full thickness stitches for purse-string with checking lumen. Anvil is placed at esophageal end, and then Roux-and-Y anastomosis is done with circular stapler. (Results) Total 36 patients were underwent LTG with new simple purse-string suture in this study, and open
total gastrectomy (OTG) were performed in 40 patients during same period. Mean operative time was 224.58±33.40 min LTG group. Mean time for anvil insert was 18 min and it has been gradually decreased into 10 min. The complications were occurred in 14 patients (38.9%), but 7 patients (19.4%) required the interventions to solve the problem (severe complication: Grade 3 or 4 in Clevien Dindo scale). Although total complication rate of LTG group was not differ from it of OTG group (P=0.120), severe complication was more frequently occurred in LTG group (P=0.016). However, most severe and anastomosis-related complications were developed within initial 15th case. (Conclusion) After transection of the esophagus, the full thickness purse-string suture for anvil insert is fast and feasible technique in totally LTG.

**PE-130**

**Laparoscopic Local Resection Through Subserosal Dissection for Submucosal Tumors Located Esophago-Gastric Junction**

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(Purpose) Laparoscopic local resection is widely accepted as a choice of treatment for gastric submucosal tumors (SMTs). However, SMTs located esophago-gastric junction (EGJ) are challenging for gastric surgeon due to the high risk of causing deformity or stenosis in the gastric inlet. Therefore, this study reports on the experience of laparoscopic local resection through subserosal dissection for SMTs located EGJ. (Methods) Three patients with SMT including EGJ underwent this procedure at Gyeongsang National University Hospital. We sequentially performed laparoscopic dissection around the lesser curvature and abdominal EGJ area, subserosal dissection around SMTs using laparoscopic monopolar bovie and ultrasonic shears, and enucleation SMT. Then, laparoscopic seromuscular re-inforce suturing were done under laparoscopic view. Thereafter, the patency and any leakage were checked through intraoperative endoscopy. (Results) All laparoscopic procedures were performed successfully without change planned surgical plan. The mean operation time was 150 minutes (range, 120-170 min) and blood loss was too minimal to be measured. All patients started oral intake on the third postoperative day. There was no postoperative complication. The mean hospital stay was 7.33 days (range, 7-8 days). Pathologic diagnoses were leiomyoma in two and benign gastrointestinal stromal tumor in one. There was no tumor recurrence or evidence of stenosis of the EGJ during a mean follow-up of 17.67 months (range, 6-33 months). (Conclusion) Laparoscopic local resection through subserosal dissection for SMTs located EGJ is a safe treatment option, as major resection of the stomach is avoided.

**PE-131**

**Transcriptome Analysis Reveals Mitochondrial Gene Signature Upregulation in Gastric Cancers Expressing the Stem Cell Marker CD133**

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Han Hong Lee*, Hyung Nam Jin, Tae-Min Kim

(Purpose) Gastric cancers expressing the stem cell marker CD133 are more aggressive than those that do not express the marker, and are associated with more unfavorable clinical outcomes. The CD133-associated aggressive behavior of gastric cancer remains poorly understood at the molecular level. (Methods) In the present study, we performed gene expression profiling of bead-sorted CD133+ and CD133- KATO III cell lines to derive in vitro molec-
ular signatures of CD133 expression in gastric cancer. **(Results)** Three expression signatures associated with CD133 expression (Mitochondria, Cell cycle, and Lipid metabolism) were inferred upon study of a module association map of the key molecular signatures associated with CD133 expression in gastric cancer. Among these signatures, upregulation of the Mitochondria signature was associated with unfavorable clinical outcomes. We further showed that CD133+ KATO III cells were more susceptible to the mitochondrial inhibitors rotenone, antimycin A, and NaN3, than were CD133- cells. **(Conclusion)** Together, our findings suggest that transcriptional up-regulation of the Mitochondria gene signature may identify CD133+ gastric cancers; such data are of clinical and pharmacological relevance.

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**PE-132**  
**Adequacy of Lymphadenectomy Range for Gastric Cancer According to Gastric Cancer Treatment Guidelines**

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Hyuk-Joon Lee

Han-Kwang Yang

**(Purpose)** This study is to compare the adequacy of lymph node dissection between the two treatment guidelines by investigating the prevalence of lymph node metastasis in each station. **(Methods)** Pathologic data was reviewed from the patients who underwent gastrectomy for primary gastric cancer between 2011 and 2015. In all cases, lymph node was divided in each stations in terms of 3rd Japanese classification by attending surgeons. For comparison of two guidelines, prevalence of positive lymph nodes were compared in severity (EGC vs AGC) and location (upper, middle, lower) of the tumor in each stations. **(Results)** 3698 patients were reviewed for the study 2317 cases were EGC and 1381 cases were AGC. Upper, middle lower cases were 597, 1049, 2052. For upper third tumors in EGC, the node positive rate were 0.3%, 0%, 0.8%, 1.4% in station 4d, 5, 6, 11p. In AGC, 4.4%, 8.8%, 2.6% were positive in station 5, 6, 12a. In early lower third tumors, 0.8%, 0% were positive in station 1and 4sb. In AGC, 3.61%, 5.73% were positive in station 4sb and 14v. **(Conclusion)** For upper third tumor in AGC, LN dissection for station 4d, 5, 6, 11p, 12a is necessary and for lower third tumors, 14v LN dissection should be recommended. For early cancers located in the lower third, station 1, 4sb should be reconsidered for dissection.

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**PE-133**  
**Evaluation of P-POSSUM as a Risk Prediction Model in Laparoscopic Gastrectomy of Elderly Patients with Gastric Cancer**

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Su Jin Kim, Chang In Choi  
Dae Hwan Kim  
Tae Yong Jeon  
Dong Heon Kim  
Sun Hwi Hwang

**(Purpose)** The physiological and operative severity score for the enumeration of mortality and morbidity (POSSUM) is a validated scoring system for auditing surgical outcomes. However, evaluation of this system has primarily been applied to open surgical techniques. The present study demonstrates the validity of P-POSSUM in predicting morbidity and mortality in the treatment of elderly patients with gastric cancer who underwent curative laparoscopic gastrectomy. **(Methods)** All patients aged 70 years or over, who underwent curative laparoscopic gastrectomy between January 2014 and January 2015, were collected from our hospital database. A case-note review was used to collate data in terms of clinical and operative factors as described in P-POSSUM. Observed/Estimated ratio of morbidity
and 30-day mortality were calculated. **(Results)** Laparoscopic gastrectomy was performed in 101 patients. The mean age was 74.9 years (70-83 years). A significant postoperative morbidity was observed in 20 (19.8%) of 101 patients. There was no 30-day mortality. Using exponential analysis, P-POSSUM predicted morbidity in 22 patients. Thus, O/E ratios for morbidity and mortality were 0.9 and 0, respectively. **(Conclusion)** P-POSSUM scoring slightly overestimated predictions of morbidity and mortality. An assessment of its application to laparoscopic gastrectomy of elderly patients with gastric cancer merits further evaluation. Also, laparoscopic gastrectomy was a feasible and safe treatment for elderly patients in terms of P-POSSUM.

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**PE-134**

**Two Cases of Glomus Tumor in Stomach**

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**Geum Jong Song, Young Gil Kim, Hyun Jung Kim, Sang Hyun Park, Jong Eun Lee, Hae Il Jung, Tae Sung Ahn, Myoung Won Son, Sun Wook Han, Sang Ho Bae, Sung Yong Kim, Moo Jun Baek, Moon Soo Lee**

**(Purpose)** A glomus tumor is a neoplastic lesion of subepithelial mesenchymal origin arising from the neuromyoarterial canal or glomus body. Most glomus tumors occur in peripheral soft tissue and in the distal extremities. A gastric glomus tumor is a rare submucosal mesenchymal tumor and consists mostly of benign components. We report 2 cases of gastric glomus tumor, which was histopathologically diagnosed after complete resection. **(Case report)** Case 1 A 41-year-old woman was admitted to medical department with epigastric discomfort and dyspepsia. Endoscopy revealed a round protruding mass of 18 X 20 mm with normal mucosa in great curvature of gastric antrum. Endoscopic ultrasound (EUS) presented a hypoechoic heterogeneous mass originated from the proper muscle layer. Wide excision was performed, and the patient was discharged one week after surgery. The result of immuno-histochemistry of the specimen showed a positive reactivity for smooth muscle actin. Definitive pathologic analysis confirmed the diagnosis of glomus tumor. Case 2 A 50-year-old man presented to outpatient department with gastric ulcer for four months. Endoscopy and EUS revealed the presence of hypoechoic submucosal mass arising from the proper muscle in posterior aspect of gastric lower body portion, measuring 25 mm in diameter. Abdominal computed tomography (CT) scan showed highly enhancing mass in stomach and confirmed no evidence of enlarged lymph node or distant metastasis. The patient underwent gastric wedge resection and post-operative period was uneventful. The final diagnosis was glomus tumor on immuno-histochemical analysis report. Routine follow-up after discharge was conducted, and he has maintained a healthy condition until the last follow-up. **(Discussion)** A gastric glomus tumor is a rare benign mesenchymal tumor originating from the glomus body. It was first reported by Kay et al. in 1951, few cases have been reported since then. Histologically, gastric glomus tumors are described as well defined, solitary lesion located in gastric submucosal or proper muscle layer. EUS can help to identify the layer of lesion and abdominal CT scans are useful modalities for evaluating gastric glomus tumor. But, it is not easy to differentiate a gastric glomus tumor from other submucosal lesions such as gastrointestinal stromal tumors (GIST) and carcinoid tumors. Thus, Immuno-histochemical stains are helpful in the diagnosis of gastric glomus tumors. **(Conclusion)** For gastric glomus tumor, complete resection of tumor with negative resection margins is the treatment of choice. And gastric glomus tumor should be considered in the differential diagnosis of gastric submucosal lesions.
A Case of Gastric Cancer Metastasis to the Breast in a Female with BRCA2 Germline Mutation and Literature Review

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Minah Cho1, Audrius Dulkas1,2, Mahdi Al Bandar1, Yoon Young Choi1, Su-Jin Shin3, Seung-Hoon Beom4, Taeil Son1, Hyung-Il Kim1, Jae-Ho Cheong1, Woo Jin Hyung1, Sung Hoon Noh1,*

(Purpose) Gastric cancer is a deadly disease which affects one million patients worldwide, resulting in 700,000 cancer related deaths in 2012. Gastric cancer can be cured by surgery alone without any adjuvant treatment when it is diagnosed at an early stage; the 5-year overall survival is over 90%. However, when it is detected at an advanced stage, over 50% of patients experience cancer recurrence even after standard treatment, and the prognosis of patients with distant metastasis is very poor despite the use of advanced cancer treatment strategies. The breast is a rare site of metastasis in gastric cancer which occurs in male dominantly, and only some cases have been reported, consequently, its mechanism remains poorly understood. The Breast Cancer 2 (BRCA2) gene is a tumor suppressor gene, and its mutation is known to be related to hereditary breast-ovarian cancer syndrome. Breast metastasis from extramammary tumor is rare, and breast metastasis from gastric cancer in a patient with the BRCA2 mutation has never been reported. Herein, we report a case of metastatic gastric cancer in the breast with the BRCA2 germline mutation.

(Methods) A 34-year-old female was admitted to the hospital with dyspepsia and a palpable mass in the left breast. Gastric cancer was confirmed to be signet ring cell adenocarcinoma. The breast mass exhibited histological properties consistent with gastric cancer. Immunohistochemistry results showed the breast tumor was intestinal epithelial cell markers, CDX-2 and CK20, were positive. However, staining for ER and CK7, which are usually positive in breast, lung, ovary, and urothelium, were negative. GATA3, which is a marker for mammary gland origin, was negative. The BRCA1 gene had a wild-type sequence, but a heterozygous variant was discovered in BRCA2 in exon 10 (c.1744A>C, p.T582P); the significance of this variant is unknown. (Results) The patient received palliative XELOX with radiation therapy to the stomach. The breast tumor resolved completely, but the overall response was partial. The patient survived and has been treated for 12 months. (Conclusion) Gastric cancer with breast metastasis is rare but should be considered when a patient is young, female, and with signet ring cell type of gastric cancer. Active chemotherapy with/without radiation therapy may improve the survival of the patient. The relationship between breast metastasis and BRCA2 germline mutation is unclear and needs to be evaluated.

Is the Application of Lymph Node Ratio Grouping to the 8Th AJCC TNM Staging System for Gastric Cancer Appropriate?

Min-Gyu Kim, Hyun-Il Kim1, Eun-Woo Nam1, Mi-Soo Chang3, Sung-Joon Kwon2,*

(Purpose) The purpose of this study is to compare the classification performance in gastric cancer between lymph node ratio (LNR) grouping and the 7th AJCC nodal classification. (Methods) Retrospective data of 2,175 gastric cancer patients underwent a curative surgery with more than 16 examined-lymph-nodes reviewed. Survival rates are compared between the two different nodal staging systems: LNR grouping with (LNR0: 0%, LNR1: 1-20%, LNR2: 21-50%, LNR3: 51-100% of examined nodes positive) and the 7th AJCC nodal classification (N0: 0, N1: 1-2, N2: 3-6, N3: >7). (Results) Unadjusted overall survival curves of LNR groups
for gastric cancer patients present a more even distribution than those of the 7th AJCC N classification, whereas the homogeneity in each LNR group is comparable to that in each category of 7th AJCC N classification. In particular, a forest plot of the adjusted 5-year survival time ratios based on the multivariable survival analyses shows that LNR grouping present a more distinctive division than the 7th AJCC nodal classification. Moreover, since the Bayesian information criterion (BIC) of the regression model including LNR groups (5783.68) was smaller than that of the model including the 7th AJCC N classification (5821.31), LNR groups explain survival time ratio better than the other. **(Conclusion)** LNR grouping demonstrated to be superior in classification performance to N classification. Therefore, LNR grouping is an effective tool to predict survival rate in Eastern gastric cancer patients with extended lymph node dissection, recommending the application of LNR grouping to the up coming 8th AJCC nodal staging system.
Annual Congress of KSS 2016

Poster Exhibition

Breast
**PE-137**

Nodal Stage May Attributable to Ipsilateral Tumor Recurrence in BRCA-Positive Breast Cancer Regardless of the Surgical Technique: Analysis in Two Medical Centers

Department of Surgery, Kyungpook National University, School of Medicine, 1Department of Hemato-oncology, Kyungpook National University, School of Medicine, 2Department of Surgery, Pusan National University, School of Medicine, Korea

Jeeyeon Lee, Ho Yong Park*, Jin Hyang Jung, Wan Wook Kim, Yee Soo Chae1, Soo Jung Lee1, Seokwon Lee2, Younglae Jung2, Yountae Bae2

**Purpose** The incidence of ipsilateral breast tumor recurrence (IBTR) seems to be higher in BRCA-positive than sporadic breast cancer. We compared the oncologic outcomes of BRCA-positive breast cancer patients managed with breast-conserving surgery, simple mastectomy or mastectomy followed by immediate reconstruction in a multicenter analysis.

**Methods** Thirty women with 34 BRCA-positive breast cancers were grouped according to surgical treatment: breast-conserving surgery (n=17), simple mastectomy (n=9), and mastectomy followed by immediate reconstruction (n=8). Clinicopathologic factors and oncologic outcomes were compared during a 3-year mean follow-up. **Results** BRCA-positive breast cancer patients were significantly younger in the mastectomy followed by immediate reconstruction group than in the other two groups. Other clinicopathologic factors did not differ significantly between the three groups. Neoadjuvant chemotherapy and nodal and pathologic stages differed significantly between the breast-conserving and simple mastectomy groups. There was no IBTR or distant metastasis in the breast-conserving group during follow-up; however, IBTR occurred in the simple mastectomy (n=2) and mastectomy followed by immediate reconstruction (n=1) groups. Distant metastasis occurred in the simple mastectomy and mastectomy followed by immediate reconstruction groups (n=1, each). Nodal stage was associated with IBTR in both these groups whereas pathologic stage was associated with distant metastasis only in the simple mastectomy group. **Conclusion** Although there were no differences in oncologic outcomes between the three groups, the nodal stage was strongly associated with IBTR in patients with BRCA-positive breast cancer. IBTR may be attributable to nodal stage and pathologic tumor stage.

**PE-138**

Comparison of Two Different Type of Oxidized Regenerated Cellulose as Filling Compound for Partial Defect of Breast

Department of Surgery, Kyungpook National University, School of Medicine, Korea

Jeeyeon Lee, Jin Hyang Jung, Wan Wook Kim, Ho Yong Park*

**Purpose** Breast conserving surgery followed by radiotherapy had become a standard treatment for small breast cancer. However, the tumor-to-breast ratio would be different in moderate to large-sized breast and small-sized breast. The authors applied a small compound composed with two different types of oxidized regenerated cellulose for partial defect of small-sized breast and compared clinicopathologic factors between two methods. **Methods** Between Jan 2014 and June 2016, a total of 28 patients with breast cancer underwent conventional breast conserving surgery and filling compound insertion technique. And the patients had all small-sized breast (cup size A) and >1cm, ≤2cm of breast cancer. The filling compounds were a sheet-type (Interceed®, n=14) and a cotton-type (Fibrillar®, n=14) of oxidized regenerated cellulose and the sheet-type one was made as a pouch shape. The clinicopathologic factors were compared between two different types of oxidized regenerated cellulose. **Results** Mean age of Fibrillar group was 47.4 years (±SD, 9.68) and Interceed group was 52.3 years (±SD, 6.60). Mean weight of removed breast tissue was 40.5 g (±SD, 19.98) in Fibrillar group and 42.9 g (±SD, 19.01) in Interceed group. Mean operation time was shorter in Fibrillar group with statistical significance (p=0.027). And the infection rate was significantly higher in Interceed group.
(p=0.040). However, the seroma formation was last-
ed similarly in both groups (p>0.999) and the cos-
metic outcomes did not showed difference between 
two groups. (Conclusion) The reconstructive sur-
gery using Fibrillar took shorter operation time than 
Interceed group and showed less incidence of post-
operative infection. However, both different type of 
oxidized regenerated cellulose were feasible as fill-
ing compounds for partial defect of breast.

**PE-139**

**Decreased Serum Cholesterol Levels after 
Adjuvant Chemotherapy in Breast Cancer 
Patients Were Associated with 
Good Prognosis**

Department of Surgery, Kosin University College of 
Medicine, Korea

*Alvinlyle Kim, Chang Wan Jun, 
Dong Won Ryu*

(Purpose) The aims of our study were to assess the 
correlation between serum Cholesterol levels and clinicopathologic factors and to assess the effect of 
the changes in serum Cholesterol levels after ad-
juvant Chemotherapy on survival rate. (Methods) 
The study subjects, 604 women with breast cancer, 
were a subset of patients operated at OOO hospital 
from Jan 2010 to Dec 2015. Patients were grouped 
according to disease free survival (DFS) and catego-
rized as survivors without metastasis(Group A), or 
survivors with metastasis(Group B). We used a cut-
off of 200mg/dl to distinguish between high and 
low serum Cholesterol levels. We also evaluated the 
changes in serum Cholesterol levels between 
measures. Clinicopathologic factors were compared 
with changes of serum Cholesterol level. (Results) 
The numbers of Group A were 529 and 75 patients 
were included in Group B. Mean level of 
Cholesterol before operation in Group B were not 
significantly higher than Group A (194 vs 190 
mg/dl, p=0.072 respectively). Also Mean level of 
Cholesterol after adjuvant Chemotherapy in Group B 
were higher than Group A (188 vs 177 mg/dl, 
p=0.023 respectively). And We evaluated the differ-
ences of Serum Cholesterol between pre operative 
and post Adjuvant chemotherapy. Decreased Mean 
Serum levels of Cholesterol after adjuvant chemo-
therapy were higher in Group A than Group B (12.8 
vs 4.4 mg/dl, p=0.001 respectively) (Conclusion) 
According to our study, Decreased Serum levels of 
Cholesterols after adjuvant Chemotherapy was assoc-
iated with Good prognosis. So close Follow up will 
be needed

**PE-140**

**The Accuracy and Safety of Axillary Core 
Needle Biopsy in Breast Cancer**

Department of Surgery, College of Medicine, The 
Catholic University of Korea, Korea

*Jong Chang Kim, Byung Joo Chae*

(Purpose) Detection of axillary node metastasis sta-
tus is important factor of breast cancer patients. 
Recently ultrasound (US) guided core needle biopsy 
(CNB) of axillary node plays a role in determining 
the axillary status and operation methods. In this 
study we evaluated the accuracy of CNB and com-
pare the clinicopathologic factors between negative 
and positive axillary lymph node metastasis 
(ALNM) group. (Methods) We retrospectively re-
viewed the data of breast cancer patients whose ax-
illary node biopsy by core needle biopsy were 
done from January 2009 to August 2016. 555 pa-
tients were eligible for inclusion criteria; (1) pri-
mary breast cancer (2) without history of neo-
adjuvant chemotherapy. Sensitivity, specificity, pos-
itive predictive value and negative predictive value 
of ultrasound guided CNB were evaluated. 
(Results) Among 555 patients, 272 (49%) had axil-
lar node metastasis on permanent pathologic 
findings. 220 patients had positive axillary node 
metastasis in CNB, 213/220 had positive on perma-
nent pathology representing 96.8% of sensitivity. 
Among 335 patients who were negative on CNB, 
276 were true negative on permanent pathology 
with 82.3% of specificity. Accuracy of CNB was 
88.1%. Positive and negative predictive values were 
78.3% and 97.5%, respectively. Mean axillary node 
size of positive and negative ALNM group were 
1.452 and 1.156 cm (p value=0.0001). There were no
complication after US guided CNB. **(Conclusion)** US guided CNB of axillary node of breast cancer patients shows relatively high accuracy rate and feasibility of intervention.

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**PE-141**

The Clinical Characteristics of Asymmetric Gynecomastia: A Single-Center Experience

Damsoyu Hospital, Korea

Byung Seo Choi, Geon Young Byun, Seong Bae Hwang, Bum Hwan Koo, Sung Ryul Lee*

**(Purpose)** The purpose of this study is to report the clinical characteristics of the asymmetric gynecomastia patients who underwent surgery in our institution. **(Methods)** From January 2014 to May 2016, 49 out of 1473 patients who underwent surgery in our hospital had asymmetric gynecomastia. We compare the clinical characteristics (age, body mass index (BMI), classification according to the glandular amount, Simon’s classification and asymmetry ratio) of patients with and without the asymmetry. According to Simon’s classification, results of aforementioned variables were also compared in asymmetric cases. **(Results)** 3.3% of gynecomastia patients show asymmetry. In these cases, larger left breast cases were more common (73.5% vs. 26.3%). There were no significant differences in the age and breast size according to the Simon’s classification. BMI was significantly higher in patients without asymmetry (25.5±3.37 vs.24.1±2.63). Patients with asymmetry had more true-type (entirely glandular) gynecomastia based on the amount of glandular amount (73.5% vs. 43.4%). Asymmetry ratio was also significantly higher in the group with asymmetry (3.74±8.91 vs. 0.26±0.51). According to the Simon’s classification in asymmetric cases, age, classification according to the amount of glandular tissue and asymmetry ratio showed no significant differences. Statistics revealed that BMI was directly proportional to the breast size according to Simon’s classification. **(Conclusion)** Asymmetry of gynecomastia is commonly observed yet the diagnostic criteria according to the breast size or tissue amount hasn’t been reported. Further studies are planned to provide more accurate diagnostic standard.

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**PE-142**

The Breast Implant Inferior Malposition Can be Corrected Through Not Inframammary Approach But Periareolar or Axillary Incision

Shinyu Clinic, Korea

Seung Ho Shin*

**(Purpose)** Breast implant inferior malposition is one of the most common reasons for revisionary aesthetic breast surgery. And the inframammary approach has been known as the most common way to manage this complication. But, this article suggests an alternative pathway for it: periareolar or axillary approach. **(Methods)** A retrospective chart review was conducted, reviewing 21 patients who underwent revision augmentation for inferior implant malposition by a single surgeon for two years, from July 2014 to July 2016. Patients with superior, medial or lateral types of malposition were not included in the data collection. And 402 patients with other complications were also excluded. The data with periareolar incision and axillary approach were collected. The patients with inframammary incision were excluded. **(Results)** Revision surgery for breast implant inferior malposition by periareolar incision was performed under local anesthesia. Revision by endoscopic axillary approach was also successfully done. There had been no recurrence for average 11.6 months. Mild pain, hematoma, seroma, etc. were presented within a normal range as the post-operative early complications. **(Conclusion)** The correction of the breast implant inferior malposition by periareolar incision or endoscopic axillary approach is valuable enough to be an alternative method which replaces inframammary.
Two Cases Report for Diabetic Mastopathy Mistaken for Breast Cancer and Newly Revealed Breast Cancer From Long Standing Diabetic Mastopathy

Department of Surgery, Konyang University Hospital, Korea

Ye Ji Lee, Hye Yoon Lee, Dae Sung Yoon*

(Purpose) Diabetic mastopathy is benign process typically found in patients with type 1 diabetes. However, the pathogenesis of diabetic mastopathy remains unknown and imaging studies do not show any specific features of Diabetic mastopathy. For that reason, it is difficult to differentiate Diabetic mastopathy and breast cancer, and the definite diagnosis hinges on histologic assessment. So the clinicians need to pay close attention to distinguish between Diabetic mastopathy and Breast cancer. (Methods) We have two clinical cases, one case is Diabetic mastopathy which was mistaken for Breast cancer and the other is newly revealed Breast cancer from long standing Diabetic mastopathy. Both patients were female with diabetic mellitus and complained about palpable mass in the left breast. Through ultrasonography, one was revealed suspicious for malignancy and the other was revealed benign which was recommended to be follow up. So we did surgery for former patient and follow up study for latter. (Results) The former patient complained about 2cm sized non-tender mass in the upper inner quadrant of the left breast which was not associated with pain, skin and nipple discharge. Ultrasonography revealed ill-defined mass and sono guided core needle biopsy revealed suspicious for invasive carcinoma, and excisional biopsy was recommended. Therefore, we did breast conserving surgery and excisional biopsy was performed. Histologic examination reveals collagenous stroma with myelofibroblastic proliferation, peripheral lymphocytic aggregation of periductal and perilobular, which was no evidence of malignancy. The patient was dismissed in post operative day 3, and we are planning to evaluate follow up study in 3 months. The latter patient’s clinical examination was similar to former patient, and she already had surgery for Lt. palpable mass 8years ago which was revealed fibrocystic changes with adenosis. So we did follow up ultrasonography under the premise of Diabetic mastopathy. But, through follow up ultrasonography, increasing sized palpable mass was noted and sono guided biopsy revealed invasive ductal carcinoma or neuroendocrine tumor, poorly differentiated, high grade. We are planning to chemotherapy for this patient. (Conclusion) Diabetic mastopathy should be considered for diabetic patient undergoing a breast biopsy for suspicious malignancy, and also newly breast cancer can be revealed by follow up. In conclusion, the clinicians should be alert to distinguish between Diabetic mastopathy and Breast cancer by histologic assessment to make a definite diagnosis owing to limitation of imaging study.

Estimation of Efficacy and Safety of Genexol-PM, a Cremophor-Free, Polymeric Micelle Formulation of Paclitaxel, in Recurrent or Metastatic Breast Cancer Patients

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S.M. Kang1,*, S. Kang2, H. Lee2, M. Hur2, S. Ko2, C. Yoon2, J. Roh3

(Purpose) Genexol®-PM is a Cremophor EL (CrEL)-free polymeric micelle formulation of paclitaxel that allows higher-dose administration with less hypersensitivity. This study was conducted to evaluate the response and safety of Genexol®-PM monotherapy in patients with recurrent or metastatic breast cancer (MBC). (Methods) A total of forty-eight patients with recurrent or MBC, ECOG performance status ≤ 2 received Genexol®-PM by intravenous infusion at 300 mg/m2 over 3 h every 3 weeks in the inpatient setting with premedication until disease progression or intolerability. Response to therapy was assessed after every 3 cycles using
the Response Evaluation Criteria in Solid tumors (RECIST) guideline (version 1.1) and adverse events were evaluated according to the NCI Common Terminology Criteria for Adverse events, Version 3.0. (Results) A total of 290 chemotherapy cycles were administered, with a median of 6 cycles per patient (range, 1-16). The overall response rate was 52.1% with 1 complete response (CR) and 24 partial responses (PR). Of 11 patients who received Genexol®-PM as a first-line therapy, there were 5 responses (45.5%). Disease control rate (CR + PR + stable disease) was 64.6% (first-line: 72.7%, second-line: 53.8%, respectively). The median time to progression (TTP) was 6.0 months (range, 2.0-36 months). The common grade 3/4 non-hematologic toxicities were peripheral neuropathy (n=22, 45.8%) and myalgia (n=5, 10.4%). Hematologic toxicities were grade 3 and 4 neutropenia (n=15, 31.3% and n=6, 12.5%, respectively), and grade 1 and 2 thrombocytopenia (n=7, 14.6%). No febrile neutropenia was observed. (Conclusion) Genexol®-PM, a CrEL-free, polymeric micelle formulation of paclitaxel chemotherapy showed significant antitumor activity with relatively low incidence and severity of toxicity in spite of a high paclitaxel dose in patients with MBC. Although further studies with larger sample size and different dosing schedules are warranted, this study suggests that Genexol®-PM monotherapy may be a candidate as a reasonable treatment for MBC patients.

<table>
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<th>Table 1. Differences between Mass and Microcalcification</th>
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<td><strong>Superior</strong></td>
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<td><strong>Inferior</strong></td>
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<td><strong>Lateral</strong></td>
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<td><strong>Medial</strong></td>
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<td><strong>Mean diameter with four direction of surgical margins (cm)</strong></td>
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(Purpose) The authors compared diameters of true pathologic surgical margin and radiologic surgical margin to evaluate their correlations. (Methods) From 2011 to 2013, a total of 93 cases of consecutive patients underwent breast conserving surgery in Kyungpook National University Hospital. The surgical margins were assessed with 3-4 directions of frozen tissue biopsy and the removed cancer specimen was performed specimen mammography to assess the diameters of surgical margin. The diameters in specimen mammography were measured twice based on mass and microcalcification. And the true diameter of surgical margin in pathologic report and radiologic diameter of surgical margin in specimen mammography were compared. (Results) Mean age of patients was 51.59±10.33 years. A mean clinical tumor size was 1.55±0.65 cm and pathologic tumor size was 1.45±0.59 cm. In both evaluation based on mass and microcalcification, the most of diameters in radiologic surgical margin were longer than true surgical...
margins. And the differences between radiologic surgical margins and pathologic surgical margins were more than 0.5cm in every direction. (Conclusion) The radiologic surgical margins were not matched with true surgical margins. This is because of compression technique in specimen mammography. Although the surgeon get some information from specimen mammography, such as complete removal of scattered microcalcification or localized needle, the mammographic surgical margin cannot represent a pathologic surgical margin in breast cancer in breast conserving surgery.

**PE-146**

**Usefulness of Ultrasound-Guided Intralesional Steroid Injection in Management of Idiopathic Granulomatous Mastitis**

Department of Surgery, HiU Clinic; ¹Department of Surgery, U&U Clinic, Korea

Byung Seup Kim, Bon Yong Koo¹, Tae Ik Eom*

(Purpose) Idiopathic granulomatous mastitis (IGM) is a rare chronic inflammatory disease of the breast. The purpose of this study was to evaluate the outcomes of patients with IGM managed by ultrasound-guided intralesional steroid injection. (Methods) From May 2012 to March 2016, 15 patients who were diagnosed with IGM were included in this study. In 15 patients, a total of 30 IGM lesions, including recurrent and multifocal lesions, were managed by intralesional triamcinolone injection with or without oral steroid administration. Triamcinolone was injected once every 1 or 2 weeks, and repeated until the resolution of symptoms and ultrasonographic findings. In cases of abscess formation, the abscess was aspirated using a syringe, and then triamcinolone was injected into the abscess pocket and surrounding inflammatory tissue. The size of the IGM lesion was measured in each patient using ultrasonography. (Results) All IGM lesions responded to intralesional triamcinolone injection. The mean pretreatment size was 22.2±11.6 mm (range, 7-50 mm). The mean size of IGMs after the first and second injections was significantly decreased to 13.7±8.6 mm (range, 3-38 mm) and 8.4±3.9 mm (range, 0-17 mm), respectively (P<0.001). The mean size of IGMs after the third, fourth and fifth injections was 7.8±6.1 mm (range, 0-26 mm), 6.4±3.0 mm (range, 4-11 mm) and 6.5±3.5 (range, 4-9 mm), respectively. The mean complete remission time was 115.3±75.9 days (range, 30-250 days). There were no recurrences of IGM or complications related to intralesional triamcinolone injection under ultrasound guidance. (Conclusion) Intralesional steroid injection appears to be effective in treating IGM. It would be an alternative to conventional IGM therapy.

**PE-147**

**A Natural History of Invasive Papillary Breast Carcinoma in a Patient with Denial of Treatment**

Department of Surgery, Myongji Hospital Seonam University College of Medicine, Korea

Yong Joon Suh*, Wan Sung Kim, Hyukjai Shin

(Purpose) The multidisciplinary approach to breast cancer decreased the incidence of treatment denial. These days, only few patients with breast cancer remain without treatment. Studies on natural history of untreated breast cancer depend on the past when recent advanced techniques did not exist. However, clinicians’ understanding of disease process will make significant contributions to managing patients with breast cancer. To this end, having experiences to follow up invasive papillary breast carcinoma in a patient with treatment denial, the authors report a case. (Methods) A 49-year old female patient visited the hospital in July 2006, complaining of left palpable breast mass. The patient denied underlying disease or family history. About 10.4×7.2 cm sized mass was replacing upper outer area of breast tissue. The tumor-abutted skin caused necrosis with foul discharge. The patient was diagnosed with invasive papillary breast carcinoma, based on radionuclear and pathologic assessment. In 1996, the patient already experienced right mastectomy with no records. However, any
treatment was refused except follow-up examination, at this time. The patient provided informed consent. (Results) In 2006, the tumor was staged as IIIB (T4bN1) according to the 7th edition of AJCC staging system, because of observed 2 enlarged lymph nodes of axillary vein group. For ten years, the tumor has increased up to 12.1×4.2 cm with included multifocal air-bubbles. Over time, more prominent lymph nodes were observed along axillary lymphatic chain even in subclavicular group. In 2016, the tumor was staged as IIIC (T4bN3a). Whole body bone scan and 18F-FDG PET/CT showed no evidence of distant metastasis. The immunohistochemistry has remained unaltered. The tumor was estrogen/progesterone-receptor-positive and the expression of C-erbB2 was not detected. Furthermore, the measured labeling index of Ki-67 stayed at around 10%. (Conclusion) Invasive papillary breast carcinoma has relatively good prognosis. More curative treatment could be considered for a patient with invasive papillary breast carcinoma.

PE-148

Our Experiences of Liposuction Technique for the Treatment of Gynecomastia: A Preliminary Result

Liposuction, Fat Transfer and Breast Augmentation Center, Dual-Clinic, Korea

S.W. Jung, Y.I. Hong*, W.J. Kim R.J. Jung

(Purpose) Gynecomastia is defined as the benign enlargement of the male breast which may cause embarrassment and significant emotional distress. In the absence of a medically treatable condition, surgery is the only effective treatment. The method of liposuction techniques and excision of the remaining glandular tissue is the preferred method for treating gynecomastia. This study aimed to evaluate the outcome of liposuction excision of gynecomastia through a small axillary approach. (Methods) 41 patients underwent suction-assisted lipectomy between April 2014 and Oct 2016. The median age was 26.6 years (range 18-42 years) and with varying degrees of gynecomastia. We not only treat the breast tissue around the nipple areola complex but also prefer to treat any area of the chest that has excess fat tissue. The patients with a diagnosis of pseudogynecomastia were excluded from the study. Each breast is infiltrated with tumescent solution which contained 1000 mL of Normal saline with 20 mL of 2% lidocaine, 20 mL of sodium bicarbonate and 1 mL of 1:1000 epinephrine. Suction-assisted lipectomy was performed with 3.5 mm six-hole cannula inserted through 4 mm anterior axillary fold incision in all cases. The endpoint of liposuction was decided based on the type of aspirate and pinch thickness. Drains were not used in any of our patients. Compression dressing was immediately applied on nipple area for 24 h and use of pressure garment was continued for 4 weeks. Postoperative antibiotics and analgesics were prescribed for 5 days. (Results) Forty one patients (82 breasts) underwent operation and median BMI was 27kg/m2 (range 18.5 to 39.6 kg/m2). The average infiltrated tumescent solution was 612.5ml (range 300 to 1000ml) per breast. The average volume aspirated was 302.5 ml (range 100 to 700 ml) per breast. The use of circumareolar incision for removal remnant glandular tissue only in 10 breasts (n=10, 12.2%). Mean operation time was 56.3 minutes (range 28 to 93 minutes). All patients were discharged the day of surgery without any complications. During follow up period none of the patients showed bleeding, hematoma, seroma, wound infection, nipple areolar complex necrosis, or retraction. One patient underwent reoperation due to cosmetic reasons (n=1, 3.2%). The overall patient satisfaction rate was 94%. (Conclusion) We used conventional liposuction technique to treat gynecomastia without power-assisted liposuction. There were no surgical related complications. Procedure was safe, effective in any grades of gynecomastia, and also leads to uniformly good esthetic results.
**PE-149**

**Huge Breast Mass (10Cm) Diagnosed to Benign Granular Cell Tumor with New Arising Contralateral Breast**

Department of Surgery, Min General Surgery Hospital, Korea

**Hyuk Mun Kim**

(Purpose) Granular cell tumor (GCT) of the breast is a rare neoplasm that is usually benign in nature. The physical examination, ultrasonographic findings and the pathologic findings are often suggestive of carcinoma. We report here a rare case of granular cell tumor of the breast that mimicked carcinoma on ultrasonography. (Methods) A 46-year-old woman visited our hospital with a palpable mass in the left breast to axillary area. Physical examination revealed a hard and well-circumscribed mass with no tenderness. Ultrasonography demonstrated a relatively homogeneous enhancing solid mass in the left breast and the mass measured 10cm. Subsequently, surgical excision was performed. The histologic report confirmed the diagnosis of benign granular cell tumor. A year later, Ultrasonography revealed a new mass in contralateral breast. Vacuum assisted biopsy was done. Also, its pathologic report confirmed the diagnosis of benign granular cell tumor. (Results) Huge breast mass and contralateral breast mass was performed benign granular cell tumor. (Conclusion) Granular cell tumor (GCT) of the breast is a rare neoplasm, also rarely reported contralateral new arising, it is difficult to differentiate benign lesions from malignant lesions based on the size or imaging findings alone. Therefore, it is necessary to confirm the diagnosis through biopsy or to perform complete surgical resection of a mass.

**PE-150**

**Survival and Prognostic Factors in Triple Negative Breast Cancer: An Institutional Analysis**

Division of Breast and Endocrine Surgery, Hallym University Sacred Heart Hospital, Department of Surgery, Hallym University College of Medicine, Korea

**Han Sung Kim, Jae-Won Lee, So-Eun Ahn, Sang-Hwa Kim, Ho-Jin Jang, Lee Su Kim**

(Purpose) Triple negative breast cancer (TNBC) is defined by a lack of expression of estrogen and progesterone receptors and human epidermal growth factor receptor2. In this study, we evaluate prognostic factors and short- and long-term survival of patients with TNBC with routine clinical treatment in our institution. (Methods) Of 754 female patients who underwent curative surgery followed by standard adjuvant therapies in Hallym Sacred Heart Hospital from 2003 to 2011, 111 patients were confirmed TNBC. We analysis survival using the Kaplan-Meier method. The Cox proportional hazard model was used in the multivariate analysis. (Results) The mean age of patients was 50.14±0.41 (range, 28-76) years and the median follow-up period was 61 months (range 7-137). five(4.5%) pts had local recurrence only, 11(95%) pts had distant recurrence and 6 pts died. 5 year disease free survival (DFS) for TNBC group was 92.5% and 5 year overall survival (OS) was 97%. In univariate analysis, recurrence was related to lymph node (LN) status(p=0.013), Ki-67(p=0.020), lymphovascular invasion (LVI)(p=0.010) and adjuvant immunotherapy using mistletoe (p=0.020). In multivariate analysis, nodal status (p=0.02) and Ki-67(p=0.03) were statistically significant factor that was related recurrence. (Conclusion) In this study, nodal status and Ki-67 were found be independent prognostic factors for DFS whereas no independent prognostic factors for OS. With many limitation of data, there is no pattern of increasing incidence of early recurrence.
PE-151

Role of Breast MR in LCIS

Department of Surgery, Kyungpook National University, School of Medicine; 1Department of Radiology, Kyungpook National University, School of Medicine, Korea

Jin Ho Chung, Ryu Kyung Lee, Hye Jung Kim, Jeeyeon Lee*

(Purpose) Breast magnetic resonance (MR) imaging is useful in detection of lobular carcinoma in situ (LCIS) as screening modality. The authors evaluated the outcome of breast MR imaging in detection of remnant LCIS lesion after initial excision.

(Methods) Between 2009 and 2015, a total of 29 patients with LCIS who was performed excision initially were included for this study. Every patient was conducted breast ultrasonography and breast MR after initial excision. The outcomes of imaging finding were compared to pathologic results. The abnormality of imaging finding was defined as >BI-RADS category 4 lesion.

(Results) There were 10 cases (34.5%) of margin positivity after initial excision which were LCIS (n=9), Atypical lobular hyperplasia (ALH) (n=1). And the remnant lesions were identified in 12 cases which were LCIS (n=10, 34.5%); ALH (n=1, 3.5%); Papillary carcinoma in situ (n=1, 3.5%). Among them, 3 cases of LCIS showed severe multifocality and the mean size of remnant LCIS lesion was 1.6±0.95cm. Before second operation, the ultrasonography could detected these lesions in 6 cases (sensitivity: 50.0%, specificity: 100%) and breast MR could detected in 8 cases (sensitivity: 66.7%, specificity: 100%).

(Conclusion) Breast MR showed higher sensitivity than breast ultrasonography for detection of remnant LCIS lesion. And if the suspicious lesion was found in breast MR, second operation should be considered because of possibility of multifocality, even if LCIS was confirmed at initial operation.

PE-152

The Predictive Value of Neutrophil/Lymphocyte Ratio (NLR) and Platelet/Lymphocyte Ratio (PLR) in Terms of Mortality and Response Rate in Patients Underwent Neoadjuvant Chemotherapy for Advanced Breast Cancer

Department of Surgery, Inha University College of Medicine; 1Department of Surgery, Yonsei University College of Medicine, Korea

Moon Il Lee, Se Jung Kim*, Young Up Cho, Min Hee Huh, Jung Bum Hong, Sin Young Park

(Purpose) Pretreatment the predictive value of platelet/lymphocyte ratio (PLR) and neutrophil/lymphocyte ratio (NLR) is an independent predictor of long-term mortality in not only breast cancer patients but several cancer. The objective of this study was to evaluate relation between predictive value of NLR and PLR and response rate to each biological subtypes in patients underwent neoadjuvant chemotherapy for advanced breast cancer.

(Methods) to evaluate for more 5 years long-term overall survival, DFS(disease free survival), retrospective review identified Eighty-seven patients who underwent neoadjuvant chemotherapy for advanced breast cancer between July, 1996 and August, 2011 at INHA university hospital were included for this study. The patients were categorized to quartiles according to their baseline 25th, 50th, and 75th NLR and PLR percentiles. We analysed the response rate to neoadjuvant chemotherapy by reviewing the post-operative pathologic report. According to each biological marker, patients was grouped Luminal A type, Luminal B type, Her-2 type and Basal-like type. all patients was performed US and/or MRI before neoadjuvant chemotherapy to compare pre-operation tumor size with the post operative pathologic report’s tumor sizes. Statistical analyses were performed by SPSS 18.0 with Kaplan-Meier survival curves were plotted to illustrate difference in the 5-year mortality in the different NLR and PLR quartiles. Logistic regression anlaysis was used to
build a multivariate model in order to evaluate the independent effect of PLR and NLR on mortality and response rate. **(Results)** The mean age at diagnosis was 46.98 (22-74) years old. Pre-operation clinical stage was 40 patients for stage II, 47 patients for stage III. The tumoral response to neoadjuvant chemotherapy as, 7 patients showed a complete response (CR), 50 patients showed a partial response (PR), 22 patients showed a stable disease (SD), and 8 patients showed a progressive disease (PD). Each 5 years overall survival rate were 85.8%, 92.3%, 95.8%, 90.0%. (n-s) between each response group and NLR, PLR quartiles, lower quartiles group shows high response rate and long term survival rate is superior. Among biological subtype, no significant relation to response rate and mortality, but high NLR, PLR quartiles and no response group has high mortality rate. (P<0.01) **(Conclusion)** The major limitation of our study is that it is an observational, single-center study and the small sample size. Despite the above limitations, suggests that both the NLR and PLR are independently associated with an increased risk of mortality in breast cancer and could be used predictive value for neo-adjuvant chemotherapy response.

**PE-153**

Comparison of Oncologic Safety of Breast-Conserving Surgery in Patients with Multiple and Unifocal Breast Cancer

Department of Breast Endocrine Surgery, Hallym University College of Medicine, Sacred Hospital, Korea

**Sanghwa Kim, So Eun Ahn, Hansung Kim, Jaewon Lee, Lee Su Kim***

**(Purpose)** Breast-conserving surgery (BCS) has a prominent position in breast cancer therapy. However, it is still debated that the choice of BCS is appropriate for multiple breast cancer. We compared the clinical outcomes after BCS and mastectomy in multiple compared to unifocal breast cancer. **(Methods)** We performed a retrospective analysis of 777 patients who operated on for stage I-III primary breast cancer between 2002 and 2011. Clinicopathological characteristics, recurrence-free survival (RFS), and overall survival (OS) were analyzed. **(Results)** Multiple breast cancers were 96 cases (12.4%) and more frequently underwent with mastectomy (68 cases, 70.8%) than with BCS (27 cases, 6.3%; p<0.001). Patients with multiple breast cancer showed higher lymph node involvement rates (N0 46.9% vs. 61.7%; p<0.001) compared to whom with unifocal breast cancer. Patients underwent BCS showed a better 5-year RFS than mastectomy in multiple breast cancer group; however, the difference was not significant (100.0% vs. 92.0%, p=0.78). The 5-year RFS among unifocal and multiple breast cancer were (95.5% vs. 100%, p=0.97) for the BCS group and (92.7% vs. 92.0%, p=0.52) for the mastectomy group. Multiple tumor was not a significant factor for relapse or survival in breast cancer patients. In multivariate analysis, multiple breast cancer was not associated with poor clinical outcomes in terms of RFS and OS (HR for RFS=0.86, 95%CI=0.44-2.69, HR for OS=0.24, 95%CI=0.03-2.24). **(Conclusion)** Multiple breast cancer patients who underwent BCS showed non-inferior recurrence survival and overall survival, unlike unifocal breast cancer patients with BCS. Thus, BCS could be a reasonable surgical option in selected patients with multiple breast cancer.

**PE-154**

Accessory Axillary Breast Excision with Liposuction using Minimal Incision (MABS, Magic Accessory Breast Surgery)

Damsoyu Hospital, Korea

**Seong Bae Hwang, Geon Young Byun, Byung Seo Choi, Bum Hwang Koo, Sung Ryul Lee***

**(Purpose)** Accessory breasts has received little attention in the surgical field, although it is commonly occurring in 2~6% women. Its convexity and cyclic pain make women embarrassed, so they often desire surgical excision to improve their appearance and remove pain. **(Methods)** 1091 patients who had been treated with an excision of accessory breast tissue with liposuction using minimal incision (MABS, Magic Accessory Breast Surgery) from
September 2013 to June 2016 at the Damsoyu Hospital were analyzed for clinical factors retrospectively. **Results** All 1091 patients were female. There were 580 (53.2%) unmarried patients and 511 (46.8%) married patients. The median age of patients was 32.9 years old (range 13-65). The major clinical manifestation was cosmetic problems with cyclic pain in unmarried and married groups (82.7% VS. 87.9%). Three types of accessory breasts were observed: 879 (80.6%) breast tissue only in axillae, 205 (18.8%) breast tissue with accessory nipple, and 7 (0.6%) breast tissue with accessory nipple-areolar complex. The mean operation time was 58 minutes. Postoperative complications developed in 57 patients and ugly axillary contour after operation was the most common (3.10%). In our study, 95.7% of patients were satisfied with cosmetic outcomes.

**Conclusion** From our experience, complete excision of accessory breast, wide liposuction, and minimal incision for minimal scarring are essential factors in the operation of accessory breast excision. The surgical excision of accessory breasts through the minimal incision (MABS) is safe and effective in making women comfortable in clinical manifestations and satisfied with their cosmetic axillary line.

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**PE-155**

**Neutrophil to Lymphocyte Ratio at Diagnosis Has No Prognostic Value in Early Stage Breast Cancer Patients**

Department of Surgery, Division of Breast and Thyroid, Keimyung University School of Medicine, Korea

Moo Hyun Lee, Jihyoung Cho, Sun Hee Kang*

**Purpose** Inflammation is an essential component of pathogenesis and progression of cancer. A high neutrophil-to-lymphocyte ratio (NLR) is considered as a prognostic indicator for various cancers. The goal of our study was to evaluate the prognostic value of NLR in early stage breast cancer patients.

**Methods** Patients were selected via an initial review of the medical records of stage I-II breast cancer patients with available results for NLR at diagnosis between January 2003 and December 2009. The clinical and pathological data of 436 consecutive patients who underwent curative resection of breast cancer were reviewed. Prognostic factors were evaluated by univariate Kaplan-Meier models and multivariate Cox regression model. **Results** Of 436 patients, 216 (45.1%) had stage I and 263 (54.9%) had stage II breast cancer. Median NLR was 1.92. High NLR was not associated with both disease free survival and overall survival (p=0.276, 0.402). On multivariate Cox regression analysis, there was no correlation between high NLR and disease free survival (HR 0.762, 95% CI 0.427-1.361). And the high NLR was not correlated with overall survival (HR 0.303, 95% CI 0.653-3.943).

**Conclusion** In contrast to prior studies, our study could not demonstrate prognostic values of NLR in the early stage breast cancer patients. Additional studies are needed to clarify the role of NLR in early breast cancer patients using a larger clinical cohort.

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**PE-156**

**Intraductal Foreign Body Extension Secondary to Breast Implant Rupture: A Case Report**

Department of Surgery, Inje University College of Medicine, Ilsan Paik Hospital, Korea

Joon Whoi Cho, Jae Il Kim*

**Purpose** Breast implant rupture has been well documented. But there were only a few imaging studies to describe breast prosthesis rupture extension through the mammary duct. **Methods** We report a case of ruptured breast implant with intraductal foreign body extension. **Results** A 30-year-old woman was referred to outpatient department for left nipple discharge. She had a history of augmentation mammoplasty at 5 years ago. She was breastfeeding after she had given birth to a child 3 months ago. On physical examination, silicone like discharge was spilled from left nipple. Mammography showed diffuse high density materials within left mammary duct. Magnetic resonance imaging showed linear high signal intensity in T2 weight image at left lower central portion and within mammary duct. **Conclusion** Breast implant
rupture is a well-known complication. However, imaging study of extensive leakage after implant rupture is rare. This case demonstrate the feature of foreign body within mammary ducts secondary to breast implant rupture.

**Fig. 1.** Mammography demonstrates foreign body leakage in left mammary duct.

**Fig. 2.** MRI T2WI shows left breast implant rupture with intraductal foreign body extension.

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**PE-157**

**The Prognostic Factors in Patients with Pathologic N3 Breast Cancer**

Department of Surgery, Gyeongsang National University School of Medicine and Gyeongsang National University Hospital, *Department of Surgery, Gyeongsang National University School of Medicine and Gyeongsang National University Changwon Hospital, Korea

Jae-Myung Kim, Ju-Yeon Kim*, Eun Jung Jung*, Eun Jin Song, Sang-Ho Jeong, Chi-Young Jeong, Young-Tae Ju, Young-Joon Lee, Soon-Chan Hong, Sang-Kyung Choi, Woo-Song Ha

(Purpose) The aim of this study was to identify the prognostic factors in patients with pathologic N3 (pN3) breast cancer. (Methods) We performed a retrospective review of 51 patients with pN3 breast cancer, who underwent surgery from January 2005 to December 2015. All patients received adjuvant therapy according to standard protocols. The primary outcome was disease-free survival (DFS). (Results) Within a median follow-up period of 46.3 months (range, 6-112 months), 19 patients (37.3%) had developed disease recurrence. Distant metastasis occurred in 17 patients, locoregional recurrence was occurred in 2 patients. The median time between surgery and disease recurrence was 29.0 months. The log rank analysis showed large tumor size (>5cm) was associated with DFS (p=0.047). The lymph node ratio (LNR, p=0.001) and number of metastatic axillary lymph nodes (ALN, p=0.006) were also associated with DFS. (Conclusion) Despite surgical and standard adjuvant treatments, the disease recurrence rate of patients with pN3 breast cancer was high. Large tumor size (>5cm), the LNR, the number of metastatic ALN were associated with DFS. Especially, the patients who belonged to 4th quartile of LNR, and the patients who had more than 25 metastatic ALN showed significantly poor DFS.
Table 1. Clinical characteristics of the patients

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean±SD, years)</td>
<td>52.12±11.39</td>
</tr>
<tr>
<td>Tumor size (mean±SD, cm)</td>
<td>3.08±1.75</td>
</tr>
<tr>
<td>&lt;2cm</td>
<td>16 (31.4)</td>
</tr>
<tr>
<td>2-5cm</td>
<td>29 (56.8)</td>
</tr>
<tr>
<td>&gt;5cm</td>
<td>6 (11.8)</td>
</tr>
<tr>
<td>Estrogen receptor</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>25 (51.0)</td>
</tr>
<tr>
<td>Negative</td>
<td>25 (49.0)</td>
</tr>
<tr>
<td>Progesterone receptor</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>25 (49.0)</td>
</tr>
<tr>
<td>Negative</td>
<td>25 (51.0)</td>
</tr>
<tr>
<td>HER2</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>17 (33.3)</td>
</tr>
<tr>
<td>Negative</td>
<td>31 (60.8)</td>
</tr>
<tr>
<td>Unknown</td>
<td>3 (5.9)</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
</tr>
<tr>
<td>I and II</td>
<td>23 (45.1)</td>
</tr>
<tr>
<td>III</td>
<td>25 (49.0)</td>
</tr>
<tr>
<td>Unknown</td>
<td>3 (5.9)</td>
</tr>
<tr>
<td>Lymphovascular invasion</td>
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</tr>
<tr>
<td>Present</td>
<td>17 (33.3)</td>
</tr>
<tr>
<td>Absent</td>
<td>34 (66.7)</td>
</tr>
<tr>
<td>Operation type</td>
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<tr>
<td>Mastectomy</td>
<td>38 (74.5)</td>
</tr>
<tr>
<td>Conservation</td>
<td>13 (25.5)</td>
</tr>
<tr>
<td>Metastasis/Pickup LNR (mean±SD)</td>
<td>0.73±0.20</td>
</tr>
<tr>
<td>Metastatic LN (mean±SD)</td>
<td>20.41±12.58</td>
</tr>
</tbody>
</table>

Table 2. Tumor characteristics and the association with disease-free survival

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Disease-free survival (mean±SD, months)</th>
<th>Log-rank p value</th>
<th>Univariate hazard ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤50</td>
<td>83.28±10.14</td>
<td>0.110</td>
<td>Reference</td>
</tr>
<tr>
<td>&gt;50</td>
<td>48.38±10.54</td>
<td>0.047</td>
<td>Reference</td>
</tr>
<tr>
<td>Tumor size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤5cm</td>
<td>80.20±3.75</td>
<td>0.047</td>
<td>Reference</td>
</tr>
<tr>
<td>&gt;5cm</td>
<td>30.03±3.70</td>
<td>0.047</td>
<td>Reference</td>
</tr>
<tr>
<td>Subtype</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR+/HER2+</td>
<td>61.64±6.58</td>
<td>0.030</td>
<td>Reference</td>
</tr>
<tr>
<td>HR+/HER2-</td>
<td>36.01±6.60</td>
<td>0.030</td>
<td>Reference</td>
</tr>
<tr>
<td>HR-/HER2+</td>
<td>65.97±17.64</td>
<td>0.030</td>
<td>Reference</td>
</tr>
<tr>
<td>HR-/HER2-</td>
<td>39.38±13.39</td>
<td>0.030</td>
<td>Reference</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I and II</td>
<td>61.61±12.27</td>
<td>0.007</td>
<td>Reference</td>
</tr>
<tr>
<td>III</td>
<td>76.46±10.90</td>
<td>0.007</td>
<td>Reference</td>
</tr>
<tr>
<td>Lymphovascular invasion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>73.06±9.34</td>
<td>0.085</td>
<td>Reference</td>
</tr>
<tr>
<td>Present</td>
<td>51.16±10.24</td>
<td>0.085</td>
<td>Reference</td>
</tr>
<tr>
<td>Lymph node ratio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 (0.0-0.5)</td>
<td>98.20±11.45</td>
<td>0.001</td>
<td>314.04 (11.49-8551.74)</td>
</tr>
<tr>
<td>Q2 (0.57-0.71)</td>
<td>83.26±13.00</td>
<td>0.001</td>
<td>314.04 (11.49-8551.74)</td>
</tr>
<tr>
<td>Q3 (0.72-0.90)</td>
<td>64.97±12.66</td>
<td>0.001</td>
<td>314.04 (11.49-8551.74)</td>
</tr>
<tr>
<td>Q4 (0.91-1)</td>
<td>23.78±15.68</td>
<td>0.001</td>
<td>314.04 (11.49-8551.74)</td>
</tr>
<tr>
<td>Metastatic LN (number)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 (0.0-1)</td>
<td>88.27±15.40</td>
<td>0.006</td>
<td>1.04 (1.01-1.07)</td>
</tr>
<tr>
<td>Q2 (1-2)</td>
<td>69.90±12.06</td>
<td>0.006</td>
<td>1.04 (1.01-1.07)</td>
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<tr>
<td>Q3 (2-4)</td>
<td>62.11±16.00</td>
<td>0.006</td>
<td>1.04 (1.01-1.07)</td>
</tr>
<tr>
<td>Q4 (5+)</td>
<td>29.57±18.86</td>
<td>0.006</td>
<td>1.04 (1.01-1.07)</td>
</tr>
</tbody>
</table>

SD, standard deviation; LNR, lymph node ratio; LN, lymph node

Fig. Disease-free survival and overall survival according to lymph node ratio and number of metastatic lymph node

Our Experience of Breast Cancer Diagnosed in Pregnancy

Department of Surgery, Inha University Hospital;
1Department of Surgery, Severance Hospital, Korea

Jungbum Hong, Sejung Kim*, Youngup Jo1, Minhee Huh, Sinyoung Park, Munil Lee

(Purpose) A cancer diagnosed in pregnancy is uncommon. Now a breast cancer is a second most common malignancy in pregnancy women. But because of the current trend to delay childbirth, the incidence of these malignancies during pregnancy is likely to increase. Pregnancy associated breast cancer (PABC) is usually diagnosed at advanced stage (bulky primary tumor and node metastasis). Because of physiologic change in pregnancy women, a diagnosis is delayed in most of patients. Also PABC has unfavorable biologic features re-
lated to poor prognostic outcome. 20 years ago, patients with breast cancer diagnosed in pregnancy was done radical mastectomy, a fetus in the uterus therapeutically was terminated. But recently chemotherapy is used during the second and third trimester has no teratogenicity and no fetal harm. A chemotherapy was available during pregnancy. Because of that, a therapeutic termination of fetus was not necessary in patients of PABC and breast conservation surgery is possible in patients of early staged PABC. (Methods) Six cases of breast cancer diagnosed during pregnancy and managed at Inha university hospital between June, 2010 and July, 2016 are reported. (Results) The mean age of the patients at the diagnosis was 32.8 years old (range: 25-40). In 4 patients, breast cancer was diagnosed at 2nd trimester of pregnancy and in 2 patients during 3rd trimester. A treatment was determined by the gestational age at the time of diagnosis. Patients was diagnosed at 2nd trimester of pregnancy had a surgical operation preferentially. All patients was diagnosed as advanced breast cancer on histology. They was treated with 4 course of AC (adriamycin and cyclophosphamide) chemotherapy before delivery. After delivery, 2 patients was treated with radiation therapy due to they had a breast conservative surgery. 1 patient who had a hormonal receptor overexpression was treated with selective estrogen receptor modulator. In 2 patients, breast cancer was diagnosed at 3rd trimester of pregnancy. 1 patients had a nipple retraction before diagnosis. She had ductal carcinoma in situ on left breast and had a total mastectomy after delivery. Another patients was diagnosed at gestational age 33 weeks. She had a large mass on right breast that was impossible to do breast conservative surgery. Because of that, she had a delivery before treatment. After deliver, she was treated with 6 cycles of neo (Conclusion) A diagnosis of breast cancer is difficult during pregnancy and PABC have a poor prognosis. Each patients must have a treated with individual treatment plan.

**PE-159**

**Tendinous Chondroepitrochlearis that Can Affect Axillary Lymph Node Dissection**

Department of Surgery, Dongguk University Gyeongju Hospital, College of Medicine, 1Department of Anatomy, Dongguk University, College of Medicine, Korea

Hee Seung Lee, Ki Hoon Jeong, Yongwook Jung

(Purpose) The chondroepitrochlearis is a rare muscular anomaly that may arise as an accessory slip from the pectoralis major muscle, which then crosses the axilla and inserts on the medial epicondyle of the humerus and/or the medial intermuscular septum. A small number of cases of chondroepitrochlearis muscle with and without the presence of an axillary arch muscle and without normal twisting of the tendinous insertion of the pectoralis major muscle have been reported. Furthermore, it has been suggested that the presented anomaly can lead to neurological problems which are associated with axillary lymph node dissection for the patient with breast cancer. Here, we describe for the first time, the presence of a tendinous chondroepitrochlearis. (Methods) During educational dissection, unilateral tendinous chondroepitrochlearis was found in the cadaver of a 72-year-old Korean female. The chondroepitrochlearis originated as a tendinous slip from the inferolateral border of the pectoralis major in right side, then coursed superficial to the short head of the biceps brachii and the neurovascular bundle of the axilla, especially the ulnar nerve. Finally, it inserted onto the medial epicondyle of the humerus and medial intermuscular septum. It was composed of only tendinous material and had no muscular component. It was 14.6 cm long and 0.9 cm wide at its broadest point. No arterial or nerve supply or evidence of their connections was found. In addition, no other accessory or anomalous muscles, especially axillary arch muscles were evident and the normally twisted insertion of pectoralis major muscle was absent. (Results) The first case of chondroepitrochlearis muscle was described by Calori in 1867, in which the muscle was located at the inferior border of pectoralis major and inserted into
the tendinous intermuscular septum. Although the incidence of chondroepitrochlearis muscle has been reported to range from 12% to 20% of cases, this seems unlikely, as fewer than 30 cases reports have been published in the past 200 years. However, the variation described here, that is, of a tendon-like muscular slip appears to be unique. (Conclusion) In summary, this case delineates a unilateral example of a rare supernumerary tendon-like muscle, the chondroepitrochlearis unassociated with muscular abnormalities in the axilla. This anomaly attracts clinical attention because of its potential to compress the intercostobrachial nerve during axillary lymph node dissection. Thus, the possible presence of a chondroepitrochlearis muscle should not be overlooked by any surgeon conducting surgical procedures in the axillary region.

PE-160

Clinicopathological Predictive Factors of the Endopredict High Risk Group in Breast Cancer

Department of Surgery, Ewha Womans University School of Medicine Korea

Hyungoo Kim, Joohyun Woo, Sehyun Paek, Junwoo Lee, Hyungju Kwon, Nam-Sun Paik, Byung-In Moon*

(Purpose) Recently, genomic multigene assays are drawing attention as the decision making tools in the tailored treatment of patients with estrogen receptor positive (ER+) and HER2 negative (HER2-) early breast cancer. The Endopredict (EP) has been introduced as a novel multigene test which combined the quantification of mRNA levels of eight genes and the clinicopathological risk factors. In this study, we introduced the experience of the EP test and investigated the predictive clinicopathological factors of high risk groups according to the EP test. (Methods) We analyzed the clinicopathological findings of 301 patients received the surgical treatment for the breast cancer between June 2015 and May 2016 which was the period when the EP test was available. All patients who had diagnosed with T1N0 breast cancer were suggested the EP test excluding HER2 positive and triple negative breast cancer. There were some additional patients who requested the EP test despite advanced stage. The EPclin score was determined in 77 patients who received the EP test during same period and we assessed the correlation between the clinicopathological factors and the EP results. (Results) Of 301 patients, total 77 patients (25.5%) had the EP test and mean EPclin score was 2.80 (Interquartile range, 2.15-3.10). Among 77 patients, 10 (13.0%) was revealed the high risk group finally in EP test. In univariate analysis, predictive factors of the high risk group were higher T stage (T1 vs Table 1. Clinicopathological characteristics of all patients and EndoPredict patients

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total patients (N=301)</th>
<th>EndoPredict (N=77)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median follow-up (month)</td>
<td>7.1 (IQR, 3.0-8.0)</td>
<td>7.0 (IQR, 4.0-7.0)</td>
</tr>
<tr>
<td>Median Age (year-old)</td>
<td>50.0 (IQR, 44.0-57.0)</td>
<td>53.0 (IQR, 48.0-58.5)</td>
</tr>
<tr>
<td>Median Tumor size (cm)</td>
<td>1.8 (IQR, 1.2-2.5)</td>
<td>1.5 (IQR, 1.1 - 1.7)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>T stage</th>
<th>Total</th>
<th>EndoPredict</th>
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<tbody>
<tr>
<td>T1</td>
<td>168</td>
<td>64</td>
</tr>
<tr>
<td>T2</td>
<td>123</td>
<td>12</td>
</tr>
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<td>T3</td>
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<td>1</td>
</tr>
<tr>
<td>T4</td>
<td>2</td>
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<table>
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<th>Estrogen receptor</th>
<th>Total</th>
<th>EndoPredict</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>224</td>
<td>77</td>
</tr>
<tr>
<td>Negative</td>
<td>77</td>
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<table>
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<tr>
<th>Progesterone receptor</th>
<th>Total</th>
<th>EndoPredict</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>203</td>
<td>75</td>
</tr>
<tr>
<td>Negative</td>
<td>97</td>
<td>2</td>
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<tr>
<td>Unknown</td>
<td>1</td>
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<table>
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<tr>
<th>HER2 overexpression</th>
<th>Total</th>
<th>EndoPredict</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>225</td>
<td>77</td>
</tr>
<tr>
<td>Unknown</td>
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<table>
<thead>
<tr>
<th>Lymphovascular invasion</th>
<th>Total</th>
<th>EndoPredict</th>
</tr>
</thead>
<tbody>
<tr>
<td>present</td>
<td>93</td>
<td>4</td>
</tr>
<tr>
<td>not present</td>
<td>208</td>
<td>73</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ki-67 index</th>
<th>Total</th>
<th>EndoPredict</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 20%</td>
<td>182</td>
<td>64</td>
</tr>
<tr>
<td>&gt; 20%</td>
<td>119</td>
<td>13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Median EP Score</th>
<th>Total</th>
<th>EndoPredict</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>280</td>
<td>(IQR, 215-310)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EndoPredict risk group</th>
<th>Total</th>
<th>EndoPredict</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>67</td>
<td></td>
</tr>
</tbody>
</table>
T2 and T3, p=0.050), stronger ER expression (allred score ≥7 vs <7, p=0.043) and higher Ki67% (≥20% vs >20%, p=0.001). However, in multivariate analysis, high Ki67 index (≥20%) was only associated with high risk group (Odd ratio=8.55, 95% CI: 1.72-42.80, p=0.009). (Conclusion) Ki67 index appears to be a critical factor for prediction of the high risk group in EP test clinically. If Ki67 index is high despite low grade, ER positive and HER negative breast cancer, physicians might consider to omit the EP test and suggest the conventional chemotherapy.

Table 2. Multivariate analysis of factor which exerted influence on the Endopredict result

<table>
<thead>
<tr>
<th>Variable</th>
<th>Univariate P value</th>
<th>Multivariate OR 95% CI P value</th>
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</thead>
<tbody>
<tr>
<td>T stage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1</td>
<td>0.050</td>
<td>1.00 -</td>
</tr>
<tr>
<td>T2, T3</td>
<td>4.74</td>
<td>0.86-25.91</td>
</tr>
<tr>
<td>ER</td>
<td>0.043</td>
<td>1.00 -</td>
</tr>
<tr>
<td>(allred score)</td>
<td>≥7</td>
<td>10.00 -</td>
</tr>
<tr>
<td>&lt;7</td>
<td>13.09</td>
<td>0.69-245.58</td>
</tr>
<tr>
<td>Ki67 index</td>
<td>≥20%</td>
<td>0.001</td>
</tr>
<tr>
<td>&gt;20%</td>
<td>8.55</td>
<td>1.70-42.80</td>
</tr>
</tbody>
</table>

(Conclusion) Ki67 index appears to be a critical factor for prediction of the high risk group in EP test clinically. If Ki67 index is high despite low grade, ER positive and HER negative breast cancer, physicians might consider to omit the EP test and suggest the conventional chemotherapy.

Impact of Tumor-Infiltrating Lymphocytes and Tumor-Associated Macrophages in Breast Cancer

Department of Surgery, Uijeongbu St. Mary’s Hospital, The Catholic University of Korea

Yong-Seok Kim, Hyungnam Jin, Jeong-Soo Kim*

(Purpose) Breast cancer is composed of the malignant tumor cells and tumor microenvironment, which includes fibroblasts, extracellular matrix, and inflammatory cells. The inflammatory cells, known as lymphocytes and macrophages, regulate and release inflammatory mediators with pro-angiogenic or pro-metastatic effects in breast cancer. Tumor infiltrating lymphocytes (TILs) and tumor-associated macrophages (TAMs) are regarded to play a key role in progression and metastasis of various tumors. We evaluated their correlation with clinicopathologic parameters and prognostic impact in patients with breast cancer. (Methods) A total of 73 patients with stage I to III breast cancer who underwent surgery at Uijeongbu St. Mary’s Hospital between 2005 and 2010 were included. The mRNA expression of immunologic markers (CD68, CD163, CD4, FoxP3) were investigated by quantitative reverse transcription polymerase chain reaction in fresh-frozen breast cancer tissues and adjacent non-cancerous breast tissues. Clinicopathologic parameters including tumor size, lymph node metastasis, stage, the expression status of hormonal (estrogen and/or progesterone) receptor, and human epidermal growth factor receptor-2 were analysed. Also, disease free survival and overall survival were reviewed. (Results) Breast cancer tissues were more likely to have higher mRNA expression than non-cancerous breast tissues (p<0.001). However, CD163 mRNA expression had no significant difference between two groups. Moreover, CD163 and FoxP3 mRNA expression was associated with tumor aggressiveness. The median level of CD163 mRNA expression was significantly higher in T2-T4 tumors than in T1 tumors (p=0.001). No association was observed between FoxP3 mRNA expression and tumor size (p=0.109). Both CD163 and FoxP3 mRNA expression were associated with axillary lymph node metastasis (p<0.001, P=0.012, respectively). Survival data was categorized patients into two groups with low expression(<median) and high expression(>median). A high FoxP3 mRNA expression was significantly associated with a poor overall survival (log-rank test, χ²=5.805; p=0.016). In multivariate analysis with Cox regression, lymph node metastasis and high FoxP3 mRNA expression were a significant prognostic factors for poor survival (HR:6.735; 95% CI: 1.471-30.844; p=0.014/ HR:4.312 95% CI: 1.181-13.936 p=0.029, respectively). (Conclusion) Our results showed that larger tumor size, advanced stage, lymph node metastasis were associated with high TAMs and TILs infiltration. In addition, high FoxP3 expression was one of the independent prognostic factors for overall survival in stage I to III breast cancer patients.
Comparative Study of Prognosis Depending on Whether They Underwent Axillary Lymph Node Dissection in Patients with a Positive Sentinel Lymph Node Biopsy in Early Breast Cancer

Department of Surgery, Catholic University of Korea, College of Medicine, Korea

Jina Lee, Bong Kyun Kim, Woo Young Sun*

(Purpose) Sentinel lymph node biopsy is a common standard procedure of breast conserving surgery in breast cancer. When the sentinel lymph node is positive result, axillary lymph node dissection is routine procedure. In 2011, ACOSOG z0011 trial revealed axillary lymph node dissection is not necessary in early breast cancer. The purpose of this study is comparison of disease specific survival between whether axillary lymph node dissection or not in sentinel lymph node biopsy in early breast cancer. We used the data of Korea Breast Cancer Society registry. (Methods) In Korea Breast Cancer Society Registry Data, from Jul. 1978 though Dec.2015, total number of 140,174 received breast cancer surgery. Inclusion criteria are T stage 1 or 2, lymph node positive 1 or 2, breast conserving surgery, whole breast radiation therapy, no neoadjuvant therapy. We analyzed the difference of disease specific survival between axillary lymph node dissection or not. And we analyzed difference of two groups. Also, the difference of disease free survival in axillary lymph node dissection or not is analyzed in total breast cancer patients. (Results) There is no difference in disease specific survival in axillary lymph node dissection or not with positive sentinel lymph node biopsy. Not doing in axillary lymph node dissection is more related disease specific survival than doing axillary lymph node dissection in total breast cancer patients. (Conclusion) ACOSOG z0011 trial shows no difference in locoregional recurrence and disease free survival between axillary dissection or not in sentinel lymph node positive in early breast cancer. After 5 year follow up, ACOSOG z0011 trial still showed same result as 1st trial. Our result showed no difference in disease specific survival. In Korea, additional axillary dissection may not be necessary in breast conserving surgery of sentinel lymph node positive patients with early breast cancer.

5-Year Disease Free Survival and Overall Survival of Breast Cancer Patients According to HER2 Receptor Status

Department of Surgery, Eulji University College of Medicine Korea

Tae Hyung Kim, Yoon Jung Kang*, Jae Hag Jung

(Purpose) The purpose of this study was to evaluate the disease free survivals and overall survivals of breast cancer patients based on human epidermal growth factor receptor 2 (HER2) status. (Methods) A total of 749 patients who underwent surgical treatment for stage I-III breast cancer from January 2004 to Jun 2015 were included in this study. The clinicopathologic, molecular and survival data were reviewed retrospectively. We estimated the disease free survivals (DFS) and overall survivals (OS) using Kaplan-Meier method and compared according to the four subtypes (luminal HER2- type, luminal HER2+ type, HER2 enriched type, triple negative type). (Results) The mean age of the patients was 52.4 years old and, median follow-up period was 55 (2-128) months. Thirty-three percent of patients underwent mastectomy, and 67% underwent breast conserving surgery. The 5-year DFS rates by stage were stage I, 88%; stage II 80%; stage III 62% (p<0.001). The 5-year OS rates by stage were by stage were stage I 92%; stage II 90%; stage III 85% (p=0.030). The 5-year DFS rates by subtypes (luminal HER2- type, luminal HER2+ type, HER2 enriched type, triple negative type) were 90%, 83%, 79%, 55%, respectively (p<0.001). And, the 5-year OS rates were 98%, 97%, 95%, 79% for subtypes, respectively (p<0.001). And, the 5-year OS rates were 98%, 97%, 95%, 79% for subtypes, respectively (p<0.001). The DFS rate of HER2+ patients (luminal HER2+ type, HER2 enriched type) was lower than luminal HER2- patients (76% vs. 89%, p=0.105). HER2+ patients with trastuzumab treatment had similar DFS and, OS rate compared with luminal HER2- patients (DFS 0.85% vs. 0.89%; P=0.103, OS: 0.94% vs. 0.95%; p=0.461). (Conclusion) HER2- tumors (except triple negative tumors) are associated with a higher DFS and OS rates compared with HER2 + tumors. The HER2+ patients with trastuzumab treatment could have similar outcomes and recurrences compared with luminal HER- patients.
The Analysis HER 2 Positivity and Its Clinical Implication According to Different Detection Methods of Overexpression in Immunohistochemistry and Gene Amplification in In Situ Hybridization in HER 2 Positive Breast Cancer

Department of Surgery, Daejeon St. Mary’s Hospital, College of Medicine, The Catholic University of Korea, Korea

Bong Kyun Kim, Jina Lee, Woo Young Sun*

(Purpose) According to the ASCO guideline, When in breast cancer patients with HER2 protein overexpression as 3+ of the score in immunohistochemistry (IHC) or with gene amplification (nucleus than 6 per copy) in fluorescence in situ hybridization (FISH), we can diagnose HER2 positive. However, there are few reports on whether differences in outcome between these two conditions determined HER2 positive. In this study, we compared the outcomes based on difference of the methods in the expression of HER2 protein in patients with HER2 positive breast cancer. (Methods) The data were conducted retrospective analysis of HER2 positive breast cancer in 26,020 patients, out of these, 3,684 patients as 3+ of the score in IHC(IHC 3+) and 22,336 patients showing gene amplification in FISH(FISH+) from the Korean Breast Cancer Society Registry. The measurements of outcomes were compared to breast cancer specific survival and overall survival between each IHC 3+ and FISH+ whether with or without trastuzumab, and also analyze the factors affecting the survival rate. (Results) Using trastuzumab proportion in 26,020 people of IHC 3+ or FISH+ patients showed a significant difference between IHC 3+ group and FISH+ group(19.5% vs 40.8%, p<0.0001). In survival compared using the Kaplan-Meier method, breast cancer specific survival showed a significant difference between IHC 3+ group and FISH+ group, 5-year cumulative survival rates of IHC 3+ and FISH+ were each 95.4% and 99.1%(P<0.0001) in patients without trastuzumab, and each 98.9% and 100.0%(p=0.0187) in patients with trastuzumab. There was no difference in overall survival between IHC 3+ group and FISH+ group with or without trastuzumab. In cox proportional hazard model, the factors that affect the breast cancer specific survival were pathologic stage, mastectomy, axillary dissection, histologic grade, nuclear grade, chemotherapy and FISH in without trastuzumab, and over 50 years of age, premenopause in with trastuzumab. And the factors that affect the overall survival were pathologic stage, mastectomy, axillary dissection, histologic grade and chemotherapy in without trastuzumab, and none in with trastuzumab. (Conclusion) When used IHC and FISH methods in analysis of the HER2 positivity in HER2 positive breast cancer showed visible differences in breast cancer specific survival. This prospective study is considered necessary for the future.

Fig. 1. The breast cancer specific survival and overall survival curves by Kaplan-Meier method. (A) Breast cancer specific survival without trastuzumab. (B) Breast cancer specific survival with trastuzumab. (C) Overall survival without trastuzumab. (D) Overall survival with trastuzumab.
(Purpose) In general, mammary Paget's disease is considered as intraepithelial carcinoma with Paget cell and the main treatment is surgical removal only. Although dermal invasion is reported recently, there is no consensus of appropriate adjuvant treatment or following operation. (Methods) A 64 years old female patient admitted dermatology clinic because of desquamative and erythematous patch on the right nipple over 2 years. Punch biopsy had been performed from the areolar skin and pathologic result was confirmed in Paget's disease. For the curative treatment, total mastectomy and sentinel lymph node biopsy was performed. (Results) Final pathologic diagnosis was confirmed to 6.0x5.5 cm sized Mammary Paget's disease. Amongst the lesion, there was 10mm deep dermal invasion was observed. Of all the sentinel lymph node and axillary lymph nodes acquired by biopsy, there was no malignant cell. After the operation, patient is on adjuvant cytotoxic chemotherapy session and will be taken hormonal treatment. (Conclusion) Although there are well established treatments of invasive carcinoma and Paget's disease, appropriate primary and adjuvant treatment of invasive mammary Paget's disease is not built because of its rarity. Through the research of large data or meta-analysis, proper management should be established.
and high histologic grade (p=0.023). However, there were no significant correlation with age, obesity, hormone receptor status, c-erbB2 overexpression and lymphovascular invasion. **(Conclusion)** 

$^{18}$F-FDG PET/CT showed relatively low sensitivity and high specificity in the detection of multifocality and axillary lymph node metastases of primary breast cancer. And High level of maximum SUV would be predictive of poor prognosis, however large prospective study will be needed that $^{18}$F-FDG PET/CT could be a useful tool to determine the biological characteristics of preoperative primary breast cancer.

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**PE-167**

**Nipple Adenoma Projecting Out of the Nipple: Report of a Case**

Department of Surgery, Chonnam National University Medical School, Korea

Gerelmaa Enkhbat, Dong Hoon Cho, Young Jae Ryu, Jin Seong Cho, Min Ho Park*, Jung Han Yoon

**(Case)** Nipple adenoma is a rare benign tumor that is often mistaken for Paget’s disease and misinterpreted pathologically as breast carcinoma. We report herein a case of adenoma of the nipple projecting out of the nipple in a 33-year-old woman. In this case, we performed curative wide resection with clear margin. The diagnosis of adenoma of the nipple was confirmed pathologically. Although the adenoma was found on top of the nipple projecting out of the nipple, curative wide excision was possible without recurrence after 3 years follow up. Surgeons should be aware that nipple adenoma is a rare benign tumor but it can be the cause of a projecting mass in the nipple.

**PE-168**

**Axillary Staging is Essential for T1mi Breast Cancer?**

Department of Surgery, Kyung Hee University School of Medicine, Kyung Hee University Hospital at Gangdong, Korea Breast Cancer Society, Korea

Sang-Ah Han, Jeong-Yoon Song*, Korean Breast Cancer Society

**(Purpose)** Microinvasive carcinoma of the breast (T1mi) is defined as tumor ≤1 mm. The incidence of microinvasive carcinoma of the breast has been reported to be <1% of all breast cancers, 1.06% of all infiltrating carcinoma and 5.1-13.5% of all in situ carcinoma. Even T1mi has favorable prognosis, axillary metastasis rate in this category of breast cancer has been reported to be 2.2-11.2% according to the result of individual report with small size. Standard management guideline which categorize T1mi with T1 cancer do not specifically state the surgical management of T1mi breast cancer due to missing evidence and rarity of this category of disease. This study was performed to reveal actual rate of axillary metastasis of T1mi breast cancer from national wide data collection, also to define optimal surgical management plan, particularly in axillary staging among T1mi breast cancer patient.

**(Methods)** The Korean Breast Cancer Society has constructed a nationwide breast cancer database through utilization of an online registration program since 2001. Data including age, cancer stage, type of surgery, pathological information (biological markers and histological types) were obtained from the KBCS online breast cancer registry (http://registry.kbcs.or.kr/ecrf/login.php). After searching for T1 breast cancer until 31st DEC 2015, 90,211 cases were selected. Tumor size ≤1 mm were 2401 cases. Among these cases, those with primary systemic therapy or having apparent axillary presentation of breast cancer or distant metastasis were excluded remaining 2313 cases.

**(Results)** Median age of 2313 patient with T1mi cancer was 50 (23-89) years old. Breast conserving surgery was performed in 1091 (47.2%), mastectomy was 1205 (52.1%). Other surgery including biopsy were 17 (0.7%). Axillary surgery were sentinel biopsy (SNB)
only 1360 (58.8%), SNB followed by Axillary lymph node dissection 265(11.5%), ALND 437 (18.9%), and No operation 243 (10.5%), unknown 8 (0.3%). Lymph node metastasis were identified in cases: 91 macrometastasis (3.9%), 12 micrometastasis (0.5%). Axillary LN macrometastasis rate was 3.3% (59/1628) among SLNB tried cases. Predictors of lymph node metastasis were symptom positivity (0.006), palpable axillary LN (<0.001), nuclear grade (0.001), lymphatic invasion (<0.001), and vascular invasion (<0.001). (Conclusion) From this study, axillary lymph node macrometastasis rate were identified as 3.3-3.9% of T1mi breast cancer. It seems to be obvious that microinvasive breast cancer has the ability to metastasize. In considering our data, axillary staging is necessary in this category of patients. However, further risk stratification system to avoid unnecessary axillary surgery in ninety-six percent of patients is required.

**PE-169**

**Dietary Patterns for Patients of Triple-Negative Breast Cancer in Women with Dense Breasts**

Department of Surgery, College of Medicine, †Department of Food & Nutrition, Hanyang University, Korea

**Tae-In Yoon, Min Sung Chung*, Yukyung Ko**†

(Purpose) Triple-negative breast cancer (TNBC) is common subtype of breast cancer in women with dense breast, leading to poor prognosis. Diet is well known modifiable risk factor for breast cancer, but the association between the risk of TNBC and diet has not been studied. The present study was investigated the hypothesis that healthy dietary pattern was negatively associated with risk of TNBC in women with dense breast. (Methods) Dietary intake was assessed using 24 hour recall shortly after total mastectomy or breast conserving surgery in women with dense breasts (density types 3 and 4). Patients of TNBC (n=38) and non-TNBC (n=178) were recruited. (Results) The risk of TNBC was negatively associated with healthy dietary pattern consuming seafood and vegetables, while positively associated with dietary pattern consuming grains, meats and eggs in women with dense breast. In addition, intake of animal fat, eggs and meats was positively, but intake of vegetable fat, nuts and vegetables was negatively associated with the risk of TNBC after adjusting for energy intake and BMI. Patients with TNBC had a significantly higher proportion of obesity (BMI ≥ 25 kg/m²) or abdominal obesity (WC ≥ 85cm) as compared to those with non-TNBC. (Conclusion) The present study was the first study showing negative association between risk of TNBC and healthy dietary pattern in women with dense breast, suggesting the importance of diet on the risk of TNBC.

**PE-170**

**Does Immediate Breast Reconstruction Lead to Delay in Adjuvant Chemotherapy for Patients with Breast Cancer?**

Department of Surgery, Severance Hospital, Yonsei University College of Medicine, Korea

**Seung Ho Baek, Jong Won Lim, Hak Woo Lee, Sung Kwe Ahn, Joon Jeong**

(Purpose) Adoption of immediate breast reconstruction (IR) at the time of total mastectomy has been promoted by advances in surgical and reconstructive techniques as well as improved systemic therapies have markedly ameliorate loco-regional control rate. Correspondingly, demand for the superior cosmetic outcome by conserving the nipple-areolar complex (NAC) or breast envelope is increased in patients with higher stage who should receive adjuvant chemotherapy. A large study with the impact of chemotherapy on IR is lacking. In this study, we investigated the interval between operation day and the day of first chemotherapy in patients receiving IR and adjuvant chemotherapy. (Methods) From 2005 to 2014, there was 204 patients who had total mastectomy with IR after diagnosed breast cancer in Gangnam Severance Hospital Breast center. Among them, 112 patients received adjuvant chemotherapy (Results) The proportions of AJCC stage were 27% (n=30) for stage I, 61% (n=68) for stage II, and 11% (n=12) for stage III. The rate of nodal involvement was 54% (n=60).
With respect of types of IR, autologous reconstruction was performed in 54 patients (48%), IR with implant in 45 patients (40%), and missed in 13 patients (12%). The median of interval time between IR and the first day of chemotherapy was 17 days (range, 14–42 days) (Conclusion) We showed that the interval between IR and first chemotherapy administration is within the acceptable range. In terms of delivery of adjuvant chemotherapy, our findings suggest that IR does not delay the start of chemotherapy in patients with advanced stage.

PE-171

Recurrent Paget’s Disease after Conventional Mastectomy: A Rare Case Report

Department of Surgery, College of Medicine, Hanyang University, Korea

Tae-In Yoon, Minsung Chung*

(Purpose) Paget’s disease (PD) of the breast is a rarely presented breast malignancy, accounting for only 1–3% of all breast tumors. While mastectomy has been considered as a standard operation of PD, some studies have demonstrated that breast-conserving surgery with radiotherapy can be used as an alternative treatment option in some patients. The pathogenesis of PD has been debated; the most widely accepted theory is that Paget’s cells might migrate from the underlying breast tumors. Another theory is that Paget’s cells are transformed in situ keratinocytes of the epidermis of the nipple. In the present study, we report a case of a woman treated for ductal carcinoma in situ (DCIS) with mastectomy recurring with Paget’s disease of the skin. Here, we report a case of unusually recurrent Paget’s disease after conventional mastectomy for Paget disease with DCIS. (Methods) A 69-year-old woman presented with an 18-month history of recurrent erythematous rash and bloody discharge on the left nipple. At presentation, mammary Paget's disease(PD) was clinically suspected. Skin punch biopsy was performed and revealed ulceration, granulation tissue, and inflammation only. On mammography, scattered fibroglandular density and pleomorphic microcalcifications in leftLt. nipple and subareolar area, of the extent of calcification 3cm, were observed. At ultrasonography, focal duct change with calcifications about 1.2cm was also seen in Lt.left nipple and subareolar area. A core needle biopsy successfully sampled and showed a high-grade DCIS with solid, comedo necrosis and microcalcifications. (Results) The patient underwent mastectomy and sentinel lymph node biopsy (SLNB). Pathological results revealed 4cm extent DCIS of solid and comedo type, with grade 2 nuclei, central necrosis, and microcalcifications. Resection margins and lymph nodes were free from the tumor. The overlying epidermis invaded by Paget’s cells, hyperchromatic nuclei, and abundant pale-staining cytoplasm. DCIS was negative for both estrogen receptors and progesterone receptors and showed diffusely strong for HER2. One and a half years afterward, the patient developed an erythematous skin lesion. A punch biopsy revealed intraepithelial atypical cell nests consistent with Paget’s disease. The subsequently performed wide excision showed PD only. (Conclusion) Paget’s disease recurrence after radical mastectomy is exceedingly rare. Several reports are available about PD local recurrence after skin-sparing mastectomy, not a conventional mastectomy. This case is a rare recurrent Paget’s disease after conventional mastectomy for Paget disease with DCIS.

PE-172

Lymphadenopathy by Tuberculosis Seemed Like Metastasis on FDG PET/CT in Patients with Breast Carcinoma

Department of Surgery, Korea University, 1Department of Nuclear Medicine, Korea University, Korea

Seong Hoon Lee, Sang Uk Woo*, Woo Young Kim, Jae Bok Lee, Jae Sun Uh1

(Purpose) Tuberculosis (Tb) is continuing to be a serious health concern in South Korea. Extrapulmonary Tb constitutes approximately 20% of all Tb cases. Pleura are the most commonly affected sites, followed by lymph nodes. Now, we report 3 cases of breast carcinoma patients who had lymphadenopathies with increased FDG uptake on PET/CT.
seemed like metastatic lesions that confirmed to be Tb lymphadenopathy by Tb PCR. (Case 1) A 37-year old woman underwent left lumpectomy for her left breast DCIS or ADH on core needle biopsy. She was diagnosed with DCIS by pathologic report after surgery. Adjuvant radiotherapy and endocrine therapy (tamoxifen) was followed. Two years after the surgery, lymph node enlargement in her right paratracheal and supraclavicular area, suspicious metastasis were shown in the follow up chest CT scan. FDG PET/CT was performed for further investigation. On the FDG PET/CT images, multifocal hypermetabolic lesion in her left supraclavicular, highest mediastinal and upper and lower paratracheal area were detected. These findings were interpreted as suspected metastatic lymph nodes, more likely. Ultrasonography guided biopsy was done on her right supraclavicular area. It was confirmed as Tb lymphadenopathies by Tb PCR. She was treated with anti Tb drugs for 9 months. After the treatment the follow up chest CT and neck US showed improved lymph node enlargement. (Case 2) A 49-year old woman was diagnosed with left breast cancer. Her preoperative Breast MRI and US showed no abnormal findings in both axilla, but her FDG PET/CT showed focal hypermetabolic lesions in her left supraclavicular and right axillary area that are suggestive of multiple lymph node metastases. She underwent left lumpectomy with sentinel lymph node biopsy. Her pathologic report showed left breast cancer with no metastasis in two sentinel lymph nodes. She underwent US guided neck biopsy in left level VB area, and Tb PCR test showed positive result. Case 3. A 60-year old woman was diagnosed with left breast Paget’s disease on biopsy. Her preoperative breast US and MRI showed multiple lymphadenopathies in her left axillary area which suggested metastatic lymphadenopathy. Her PDG PET/CT also showed intense uptake in the left axillary area and also suggested metastasis. She underwent a breast conserving surgery with left axillary dissection. The pathologic report showed left breast cancer and no metastasis in 36 lymph nodes, but her Tb PCR test showed positive result. 

(Purpose) Current guidelines recommend completion axillary lymph node dissection (cALND) in case of one or two sentinel lymph node (SN) metastasis larger than 2 mm (macrometastasis). To identify cases who could have undergone omission of the ALND with confidence, we have retrospectively evaluated the predictive size of SN metastasis with one or two positive SN. (Methods) This study was based on a retrospective database of 1102 patients who underwent sentinel lymph node biopsy (SNB) and ALND for breast cancer, of whom 61 patients had one or two SN metastasis intra- and postoperatively. All clinical and histological variables were analyzed according to NSN status, by using Manne Whitney U test, univariate and multivariate logistic regression model and optimal metastatic size of SN was analyzed by ROC curve. (Results) The size of metastatic SN and the number of positive lymph node and LN ratio were correlated with NSN metastasis. The area under ROC curve for the size of metastatic SN was 0.76. The best cut off value of the size of metastatic SN was 3.1mm. (Conclusion) In patients with invasive breast cancer and one or two metastatic SN, The size of metastatic SN was useful for prediction of NSN metastasis.
Annual Congress of KSS 2016

Poster Exhibition

General
PE-174

Single Incision Laparoscopic Appendectomy is Feasible Even for a Resident

Department of Surgery, Ulsan University Hospital, University of Ulsan College of Medicine, Korea

Sung Min Lee, Dong Jin Park*, Song Soo Yang, Soon Young Tae, Yeong Cheol Im

(Purpose) Conventional laparoscopic appendectomy (CLA) has been widely performed as a standard for the treatment of acute appendicitis. Recently, single incision laparoscopic appendectomy (SILA) has become an option for treating appendicitis and the use of SILA is increasing. Although several studies had reported the safety and technical feasibility of SILA, there are not many residents who perform a SILA during training period. In this study, we report our resident's experience.

(Methods) We reviewed clinical characteristics and outcomes of 1005 patients who underwent appendectomy between October 2013 and April 2016. Every operation was performed by only residents and there were no cases found where SILA switched to CLA as well as CLA to open appendectomy. Clinical characteristics and operative outcomes between two groups were reviewed after propensity score matching.

(Results) SILA was used more frequently in younger-aged patients (23.3 yrs vs 36.4 yrs, p=0.000), women (66.4% vs 45.9%, p=0.000) and patients with lower BMI (20.2 Kg/m^2 vs 22.9 Kg/m^2, p=0.043). After propensity score matching, there were no significant differences in clinical outcomes including hospitalization periods (2.7 days vs 2.9 days, p=0.380) and use of analgesics (2.0 times vs 2.1 times, p=0.128) between two groups. Also there were no significant differences in operation time (56.68 min vs 59.09 min, p=0.068) and postoperative wound infection rate (10.3% vs 14.6%, p=0.333).

(Conclusion) SILA can be a good option even for a resident level surgeon because it is safe, easier than what it's known for and has better post-operative cosmetic outcome.

PE-175

The Effect of Polyglycolic Acid Sheet for Preventing Anastomotic Leakage

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(Purpose) Anastomotic leakage is a major cause of death after intestinal anastomosis. The polyglycolic acid (PGA) sheet has been used not only for prevention of air leakage after pneumonectomy, post-operative pancreatic fistula after pancreatectomy and bile leakage after liver resection. Although several surgeons apply the PGA sheet to prevent anastomotic leakage, the effect of PGA sheet to intestinal anastomosis is unknown. The present study investigated the effect of a PGA sheet for anastomotic leakage with rat leakage model.

(Methods) A total of twelve rats were used to make an anastomosis leakage model. We performed a gastrojejunostomy with intentionally omitting one to three stitch. Rat with omitting one stitch were appointed to the minor leakage model and rat with omitting two stitch were done to the major leakage model. In minor leakage model, 20 rats were divided into four groups; control, fibrin glue, PGA and both fibrin glue+PGA group. The mortality was checked for each group. A histological change was checked for survived rats at postoperative 2 weeks. The same protocol was applied to additional 20 rats as major leakage model.

(Results) In minor leakage model, there were 2 deaths in fibrin free group (control and PGA sheet group) whereas 6 deaths were observed in fibrin applied group (fibrin glue and fibrin glue+PGA group). However, there was no difference in mortality between groups statistically. Mortality rates were different in each group. (60%, 0%, 100% and 60% in control, PGA, fibrin glue and fibrin glue+PGA group, respectively, p=0.015) In gross and histologic review, liver commonly covered perforated site of anastomosis in survived individuals in control group. The formation of granulation tissue covered and foreign body reaction with inflammatory cell was observed.
at the perforated anastomosis site in PGA sheet used rats. (Conclusion) The foreign body reaction by PGA sheet could cover free perforation and prevent anastomotic leakage. When we use PGA sheet for reinforcement of anastomosis, PGA sheet alone is better than fixation with fibrin glue because fibrin glue may disturb natural healing process.

(Conclusion) According to this study, hydrogel patch enhances the proliferation stage of wound healing in terms of wound size. Therefore, this can be a good candidate as a dressing material for effective wound healing, especially in early phase.

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**PE-176**

**Radiation Induced Crosslinking Hydrogel: An Effective Wound Healing Dressing Material in Skin-Wound Models in Rats**

Department of Surgery, Hanyang University College of Medicine, Korea

**Sung Ji Choi, Tae Kyung Ha***

(Purpose) The purpose of this study was to investigate the effect of radiation induced crosslinking hydrogel on wound healing based on skin-wound models in rats. (Methods) The therapeutic efficacy and wound healing behavior of the radiation induced crosslinking hydrogel were compared with those of standard wound dressing with sterile gauze, using a full-thickness skin wound of 1.5cm square in 6-week-old fourteen Spargue-Dawley (SD) rats. These SD rats were randomly divided into the following 2 groups (n=7 each): control group received conventional standard dressing and experimental group was treated with the radiation induced crosslinking hydrogel patches. Every three days during two weeks of experimental period, each rat had their dressing change performed and monitored by the wound healing process; abnormal wound healing in each group were compared. The efficacy of hydrogel patch on wound healing was evaluated by measuring the largest diameter of wound following every dressing change. (Results) In both control and experimental group, impaired wound healing process was not recorded. The result shows that there was a statistically significant difference between two groups on both postoperative day (POD) 6 and POD 9 (1.3cm vs 1.0cm and 1.0cm vs 0.8cm, p=0.001 and p=0.026, respectively). However, other follow-up days, POD 14 and POD 15, showed no significant difference in wound size. Any complications or mortalities following surgery were not observed. (Conclusion) According to this study, hydrogel patch enhances the proliferation stage of wound healing in terms of wound size. Therefore, this can be a good candidate as a dressing material for effective wound healing, especially in early phase.

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**PE-177**

**Delirium Prediction Based on Hospital Information (Delphi) in General Surgery Patients**

Department of Nursing, Ulsan University, ¹Department of Surgery, Dongsan Medical Center, Keimyung University, Korea

**Min Young Kim, Ui Jun Park¹*, Hyoung Tae Kim¹, Won Hyun Cho¹**

(Purpose) Postoperative delirium, although transient, is associated with adverse outcomes after surgery. The aim of this study was to develop a simple and accurate delirium prediction score that would allow identification of individuals with a high probability of postoperative delirium on the basis of preoperative and immediate postoperative data. (Methods) This was a prospective observational single-center study, which consisted of the development of the DELirium Prediction based on Hospital Information (Delphi) score and its validation in a different cohort (533 patients) in the same hospital. We collected hospital information on potential risk factors for postoperative delirium were identified by conducting a comprehensive review of the literature. (Results) Age, low physical activity, hearing impairment, heavy alcoholism, history of prior delirium, intensive care unit (ICU) admission, emergency surgery, open surgery, and increased preoperative C-reactive protein were identified as independent predictors of postoperative delirium by using multiple logistic regression. The Delphi score was generated using logistic regression coefficients. The maximum Delphi score was 15 and the optimal cut-off point identified with the Youden index was 6.5. Generated area under the (AUC) of the receiver operating characteristic (ROC) curve.
was 0.911 (95% CI: 0.88-0.94). Validation of the Delphi score did not reveal statistically significant differences between the development and validation cohorts in terms of the distribution of the nine predictors. The calculated AUC based on the Delphi score was 0.938 (95% CI: 0.91-0.97). We divided the validation cohort into the low-risk group (Delphi score 0-6) and high-risk group (7-15). Sensitivity of the delirium prediction model was 80.8%, specificity 92.5%, positive predictive value 70.2%, and negative predictive value 95.7%. (Conclusion) Our proposed Delphi score could help surgeons and nursing staff to predict the development of delirium and make possible targeted intervention to prevent delirium in high-risk patients.

PE-178

A Case of Intra-Abdominal Paragonimus Westermani Infection with Peritonitic Symptom

Department of Surgery, Gangneung Asan Hospital, University of Ulsan College of Medicine, Korea

Cheon-Soo Park, Kun-Moo Choi, Hyuk-Jai Jang, Myeong Sik Han, Jin Ho Kwak, Eun Hwa Park, Jae Young Kwak, Ji Hoon Kim*

(Purpose) Paragonimiasis is a parasitic infection, which is caused by lung fluke (Paragonimus westermani). It is usually infected in endemic areas such as south-east Asia, south America and Africa. Paragonimus westermani (PW) is infected by ingestion of raw river crabs, crawfish and fresh-water snail with the larvae of PW have been carried out. Lung is commonly organ to cause problem, however 45% of PW infected human can cause heterotopic infection in brain, liver, peritoneum, ovary, subcutaneous tissue, retroperitoneum, mesentery and omentum. (Methods) This report represent a 45-year-old Korean man who had ingested history of raw trout and cooked frog fourteen years ago and suffered from acute left lower quadrant (LLQ) abdominal pain started from five days ago. (Results) Computed tomography was revealed infiltrating large (8cm) cystic mass in LLQ area. Laboratory finding represented eosinophilia (10.4%). He was performed excisional operation of two intra-abdominal masses and partial omentum. The pathologic report confirmed that parasitic cyst and mass infected PW. (Conclusion) He was taken additional medication, praziquentel. We report that abdominal paragonimiasis with peritonitic symptom who has ingested history of raw trout and cooked frog which was completely cured by operation and medication.

PE-179

Spontaneous Free Perforated Small Bowel (Jejunum) in Crohn’s Disease: A Case Report

Section of Colon and Rectal Surgery, Department of Surgery, 1Department of Pathology, Soonchunhyang University College of Medicine, Soonchunhyang University Bucheon Hospital, Korea

Dae Ro Lim, Jung Cheol Kuk, Taehyung Kim, Chang Gok Woo1, Hee Kyung Kim1, Eung Jin Shin*

(Purpose) Free perforation of the bowel in Crohn’s disease (CD) is one of the indications for emergency surgery. Spontaneous free perforation is an uncommon event and perforation of the small bowel (jejunum) is very rare in CD. The present study reports a case of spontaneous free perforation of the jejunum in CD before diagnosis of CD. (Case report) A 24-year-old female presented with a one month history of intermittent abdominal pain and diarrhea. She had severe abdominal pain and fever and visited the emergency center. An abdominal computed tomography (CT) scan showed small bowel perforation. Emergency exploratory laparotomy was performed. Jejunal perforation was present, with inflammation, and inflammation was also found intraoperatively at the long segment of the jejunum. Segmental resection was performed on the jejunum. Final pathology of the resected jejunum showed chronic transmural inflammation with 1) ulcer, 2) perforation, 3) stricture, and 4) lymphoid follicles, consistent with Crohn’s disease. (Conclusion) The present case is very rare experi-
ence of a complication of CD before diagnosis of CD. The present case reports spontaneous solitary free perforation of the small bowel (jejunum) in CD.

**PE-180**

**Unusual Case of Rapid Growing Intraabdominal Abscess Caused by Stenotrophomonas Maltophilia after Laparoscopic Appendectomy Due to Perforated Appendicitis: A Case Report**

Section of Colon and Rectal Surgery, Department of Surgery, Soonchunhyang University College of Medicine, Soonchunhyang University Bucheon Hospital, Korea

Dae Ro Lim, Jung Cheol Kuk, Taehyung Kim, Eung Jin Shin*

(Purpose) Intra-abdominal abscess formation of Stenotrophomonas maltophilia infection is very rare clinical manifestation. S. maltophilia is classified as one of the leading multidrug resistant organisms in hospital settings. Respiratory tract infection (pneumonia) and blood stream infection (bacteremia) are the most common clinical manifestations of S. maltophilia infection. S. maltophilia is very rare prevalence, opportunistic pathogen and also a glucose non-fermentative, aerobic, Gram-negative, mobile, biofilm-forming bacterium. The present case report is unusual case of rapid growing huge intra-abdominal abscess formation for just one week caused by S. maltophilia infection after 2 weeks later after laparoscopic appendectomy due to perforated appendicitis. (Case) A 14-year-old man presented with a three days history of intermittent abdominal pain and fever. He had history of laparoscopic appendectomy due to perforated appendicitis. (Conclusion) The present case is unusual rapid growing intraabsscess formation of multidrug resistant organism infection, Stenotrophomonas maltophilia after surgery.

**PE-181**

**Small Bowel Obstruction after Percutaneous Endoscopic Gastrostomy: A Rare Complication**

Department of Surgery, Gyeongsang National University School of Medicine and Gyeongsang National University Hospital, Korea

Jong-Man Kim, Ji-Ho Park*, Sang-Ho Jeong, Chi-Young Jeong, Young-Tae Ju, Eun-Jung Jung, Young-Joon Lee, Soon-Chan Hong, Sang-Kyung Choi, Woo-Song Ha

(Purpose) Here, we report a case of a patient who developed small intestinal obstruction due to percutaneous endoscopic gastrostomy (PEG), which was treated by surgery. (Methods) Enteral feeding is preferred over parenteral feeding in order to ensure proper nutritional support. Although there are several different methods of enteral feeding, PEG is the most widely accepted method for feeding patients with swallowing disabilities, because of its simplicity and safety. However, the placement of a PEG tube carries a risk of some complications. Small intestinal obstruction, which is common after major abdominal surgery, rarely occurs after place-
ment of a PEG tube. **(Results)** We report a case of a patient who developed small intestinal obstruction due to PEG, which was treated by surgery. **(Conclusion)** In conclusion, small intestinal obstruction is an uncommon complication of PEG; early identification and appropriate therapy is necessary for its successful management.

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**PE-182**

**Diaphragm Disease: NSAIDs Induced Multiple Small Bowel Strictures**

Department of Surgery, Catholic University of Daegu School of Medicine, Korea

**Hye Ryeon Choi, Chun-Seok Yang, Daedong Kim**

**(Purpose)** Multiple strictures of small bowel induced by nonsteroidal anti-inflammatory drugs (NSAIDs), also known as diaphragm disease, were first described by Lang et al. in 1988. Long-term use of NSAIDs is considered the single most important causative factor but several literatures have reported cases with multiple diaphragm-like strictures in the small bowel is not associated with the chronic use of NSAIDs. The purpose of these case reports is to present 3 cases of diaphragm disease of small bowel and summarize the clinical features of this disease entity. **(Methods)** From May 2012 to July 2016, 3 cases were diagnosed as having diaphragm disease of small bowel on radiologic, endoscopic, operative, and pathologic findings. **(Results)** A 34-year-old man, a 63-year-old man and a 66-year-old woman were admitted to our hospital because of recurrent intestinal obstruction. Two of these patients had taken heavy NSAIDs use. In one patient, routine abdominal CT scan showed thickening of bowel wall, circular stricture in the middle or distal segment of the ileum and dilated small bowel loop adjacent to the stricture but another two showed no abnormal results. Capsule endoscopy was performed in all cases and the all capsules were retained by circumferential stricture of the ileum. At laparotomy, there were multiple short, annular and fibrotic strictures with similar characteristics in all patients. Segmental resection of the strictures was performed in two patients and one underwent just enterotomy and capsule removal because of wide spread of diseased segment and acceptable patency of bowel lumen. The postoperative course was uneventful and all cases has remained asymptomatic without recurrence. **(Conclusion)** NSAIDs are the most commonly prescribed drugs in the world, but their effects on the small bowel have been underestimated. Clinicians should be aware that diaphragm disease might be a cause of small bowel obstruction especially in patients receiving long term NSAIDs therapy.

**Fig. 1.** Double-balloon colonoscopy shows a diaphragm-like stricture in the ileum and the retained capsule.

**Fig. 2.** Longitudinal section of small bowel revealed multiple circumferential strictures with a pinhole opening.
**PE-183**

**Three Cases of Successful Surgical Management for Encapsulating Peritoneal Sclerosis in Patients on Peritoneal Dialysis for End-Stage Renal Failure**

Department of Surgery, University of Ulsan College of Medicine and Ulsan University Hospital, Korea

_Song Soo Yang*, Yeong Chul Im, Kyu Yeol Kim_

**(Purpose)** Encapsulating peritoneal sclerosis (EPS) is a serious complication of long-term peritoneal dialysis (PD). The mortality rate for EPS has been high, primarily because of complications related to bowel obstruction. Effective medical treatment with tamoxifen and immunosuppressives (a steroid with or without azathioprine or mycophenolate) has been reported. Surgical enterolysis is needed when recurrent or refractory intestinal obstruction occurs but surgery is associated with high mortality rates. The aim of our study was to assess the outcomes in patients who underwent surgery for EPS.

**(Methods)** All patients (2 males; mean age, 59.6 years) had chronic glomerulonephritis as the underlying kidney disease and had undergone PD for between 29 months and 220 months (average: 113.9 months). All patients transferred to hemodialysis (HD) due to occurrence of EPS. At laparotomy, a definitive diagnosis of EPS was established in all patients by the presence of clumped intestine cocooned with a dense sclerotic membrane. In all cases, the small intestine was completely released by ablation of the capsules, resulting in resolution of the bowel obstruction symptoms. **(Results)** The average operating time was 5.3 hours (3.5-7 hours). Oral food intake was initiated average 3 days after surgery. There was no mortality case and one patient was developed postoperative complication. Perforation of the small intestine was detected and required reoperation. Fortunately, the patient was completely recovered and discharged without additional complication. The mean hospital stay was 12.3 days (6-17 days). All patients were followed for 7.6 month and no one experienced a recurrence of bowel obstruction symptoms that required a second laparotomy. **(Conclusion)** Though there was one postoperative complication, surgical treatment of EPS produced successful outcomes. In EPS with recurrent or refractory intestinal obstruction, surgical treatment can be actively treated by surgeons who genuinely understand this pathologic condition.

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**PE-184**

**Rectal Stent for Low Rectal Anastomosis**

Division of Colon and Rectal Surgery, Department of Surgery, Severance Hospital, Yonsei University College of Medicine, Korea

_Yoon Dae Han, Nam Kyu Kim*

**(Purpose)** For low rectal anastomosis, double stapled anastomosis method is worldwide used. As acute low rectal anastomosis disruption may occur mostly within postoperative 7 days, many surgeons do not hesitate to make diversion stoma to prevent severe complication results in anastomosis leakage. However, stoma repair will cause another surgery related morbidity. Therefore, rectal stent may be another option for preventing low rectal anastomosis disruption. This is an interim report of animal experimentation. **(Methods)** Three female porcines were used in each control and experimental group. They were 12 weeks old with weight range of 30-35 kg. Before surgery, 2 or 3 days for preoperative diet and colon preparation was done. Under general anesthesia, porcine was placed in supine position. A sterile drape and foley catheter insertion was done before operation. Periumbilical incision was made for camera port and CO2 inflation is done. Two of 5mm and 12mm working port were placed on both mid and low quadrant of abdomen each. After identifying colon, usual low anterior resection is done. Mini laparotomy was made to insert anvil (EEA, 25mm) in the end tip of resected proximal colon. Double stapling method applied and water-air leakage test was performed. Anastomosis was made between 6-12cm above the anal verge. Then Niti-S rectal full covered stent (Taewoong Medical Inc.) was inserted through guidewire and unfolded above the anastomosis line under direct vision of laparoscope. Stent was fixed near anus with few stitches by vicryl 3-0. All por-
cines were sacrificed within postoperative 7-10 days. Including anastomosis line, about 10cm length of bowel was obtained and water-air leak test, barium leakage test under x-ray were done to confirm integrity of anastomosis (Results) Among three control porcines, first porcine showed anastomosis leak with perirectal abscess. Due to lack of experience, bowel resection length was too long on first porcine. There were no leakage shown on other two porcines confirmed by water-air leak test and barium x-ray test. First two experimental porcines used 20mm diameter rectal stent. However, stent was self removed by migration on postoperative day 5 and 6. There was no leakage shown in both two tests. 28mm diameter stent was used for last porcine. During operation, water-air leak test was positive, however, after inserting stent it turned to negative. Stent was self removed on postoperative 5th day, and two leak tests have shown no leakage. Nevertheless, gross finding of anastomosis leak was seen from mucosal side (Conclusion) To overcome porcine’s rectal pressure and bulky feces, stent diameter should be bigger and fixation should be more firm. As this is an interim report of animal experimentation, effort to obtain proper rectal stent should be more investigated.

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**PE-185**

**Indomethacin Aggravates Ischemic Acute Kidney Injury by Deactivation of the Adenosine Signaling Pathway**

Department of Surgery, 1Department of Pathology, 2Department of Medicine, Inje University Busan Paik Hospital, Korea

Hyungjoo Baik, Hyejung Kim, Sun-Hee Kim, Mi Seon Kang1, Seok Ju Park2, Min Sung An, Ki Beom Bae*

(Purpose) Ischemia-reperfusion injury (IRI) is a leading cause of acute kidney injury (AKI). Under ischemic condition, activation of purinergic signaling pathway mediated by ATP and adenosine is associated with the protection of renal injury. It is generally known that Indomethacin, a cyclooxygenase (COX) inhibitor, decreases the production of prostaglandins. Prostaglandins have a variety of effects on ischemic acute kidney injury. In this study, we investigated the effects and mechanisms of the action of indomethacin on adenosine signaling pathway in AKI. (Methods) Male C57/BL6 mice (8-10 weeks old, weight 20-25 g) were used. Acute kidney injury was induced by clamping bilateral kidneys’ pedicle of renal arteries for 20, 30 or 35 min followed by reperfusion for 24 hr in mice. Indomethacin was given at 2.5 mg/kg or 5 mg/kg at before and after the end of clamping. Renal damage and function were assessed by the levels of creatinine, N-gal and Kim-1 in serum, and by HE staining and TUNEL in kidney tissue. The expression level of PGE2, cAMP and adenosine were also detected in kidney. Statistical analyses were performed using one-way analysis of variance (ANOVA) followed by the Boneferroni post-test. (Results) In comparison of post-operative survival curves, all of indomethacin (2.5 mg/kg) treated mice have died at 1.66±0.15 days in bilateral AKI 35 min mice, whereas 100% of the non-treated AKI 35 min mice have survived at day 30 (indomethacin treated mice, n=9; the non-treated mice, n=10). In bilateral AKI 30 min mice, indomethacin aggravates ischemic acute kidney injury as assessed by increased NGAL, creatinine, tubular injury score (HE) and apoptosis (TUNEL). (NGAL, 488.6±8.2 ng/ml [indomethacin] vs. 449.3±3.8 ng/ml [control], p=0.042; creatinine, 1.12±0.06 mg/dl [indomethacin] vs. 1.65±0.11 mg/dl [control], P<0.001; tubular injury score, 2.5±0.14 [indomethacin] vs. 3.0±0.15 [control], p=0.025; apoptosis, 17.29±3.30% [indomethacin] vs. 3.31±0.54% [control], P<0.001). In addition, indomethacin inhibited the production of PGE2 and cAMP in kidney as well as adenosine compared to non-treated mice (PGE2, 27.8±3.31 [indomethacin] vs. 50.4±6.75 [control], p=0.031; cAMP, 37±0.83 pmol/mg [indomethacin] vs. 15.3±1.24 [control], p=0.009; adenosine, 168.0±7.47 pmol/μl [indomethacin] vs. 210.8±6.28 [control], p=0.011). (Conclusion) Indomethacin aggravates ischemic acute kidney injury by inhibiting prostaglandins production and adenosine signaling pathway through mice.
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Poster Exhibition

Surgical Oncology
PE-186

**Location of Tumor, is the Another Prognostic Factor for Colon Cancer?**

Department of Surgery, Korea Cancer Center Hospital, Korea Institute of Radiological and Medical Sciences, Korea

Myungkyu Jung, Young-Jun Ki, Yong-Bae Kim, Sun-Mi Moon, Se-Jin Sung, Ui-Sup Shin*

**(Purpose)** Recent studies have highlighted a survival difference between right- and left-sided colon cancers, with a worse outcome for the former. In this study, we investigated the characteristics of right colon cancer (RTCC) against the left colon cancer (LTCC) and the impact of tumor location on prognosis of colon cancer. **(Methods)** From Jan. 2001 to Dec. 2011, we retrospectively reviewed 974 colon cancer patients underwent curative intent operation. RTCC was defined when the tumor located proximal to splenic flexure. The characteristic of RTCC was investigated by descriptive analyses and the survival difference and prognostic impact of tumor location were assessed with median 74 months of follow up. **(Results)** Among the 974 patients, 329 (33.8%) patients were RTCC and 645 (66.2%) were LTCC. The median age of patients was 63 (interquartile range(IQR) 54-70) year, and the male to female ratio was 1.3:1. Patients determined as stage I were 130 (13.3%), stage II were 436 (43.7%) and stage III were 418 (42.9%). Comparing with LTCC, there were no statistically significant differences of median age and stage distribution of RTCC. The frequencies of lymphatic, vascular or perineural invasion were not different between groups also. However, the frequencies of pathologic T4 stage, and the median number of total retrieved lymph node were significantly higher in RTCC. Also, undifferentiated histology including mucinous or signet ring cell features were more frequently identified among the RTCC. During follow up, 154 recurrences were observed. Among the 22 peritoneal recurrence, 15 patients were RTCC, which was significantly outnumbered LTCC (p=0.001). Among the stage III subgroup, disease free (DFS) and overall survival (OS) rate was significantly worse in RTCC comparing with LTCC (DFS; 58% vs. 72.7%, p=0.01, OS; 66.6% vs. 82.3%, p=0.0026). Univariate analysis for DFS revealed that right side location was associated with increased risk of recurrence or death (hazard ratio (HR) 1.21, 95% confidence interval (CI) 0.92-1.58) together with other clinico-pathologic factors. After multivariate analysis adjusting with other clinico-pathologic factors, right side location was independent poor prognostic factor for DFS (adjusted HR, 1.49; 95% CI, 1.11-2.0, p=0.009). Cox regression for OS, the right side location showed significant association with the risk of death at both uni- and multivariate analyses (adjusted HR, 1.64; 95% CI, 1.15-2.36; p=0.007). **(Conclusion)** We found that RTCC showed the unique clinico-pathologic features and poorer prognosis. The reason of these results remained to be revealed, although those have been thought be due to different biological and/or environmental factors of RTCC.

PE-187

**Colon Perforation Associated with Bevacizumab in a Case with Hepatic Metastases of Sigmoid Colon Cancer**

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**(Purpose)** Bevacizumab is a monoclonal immunoglobulin G1 antibody against vascular endothelial growth factor (VEGF) that inhibits angiogenesis. Bevacizumab was U.S. Food and Drug Administration approved for use in metastatic colon cancer. Since then it has been approved for treatment of a variety of malignancies, including ovarian cancer, renal cell carcinoma, and non-small cell lung cancer. But, bevacizumab therapy has been reported serious adverse effects, especially
bowel perforation. In the clinical trials, incidence rate of bowel perforation has ranged from 0.3 to 2.4%. We present the case of a 53-year-old man had colon perforation with adjuvant bevacizumab therapy previously. (Case report) A 53-year-old male patient diagnosed with sigmoid colon cancer and hepatic metastasis. He underwent anterior resection with left hemihepatectomy, and the patient was treated with irinotecan, folinic acid, and 5-fluorouracil (FOLFIRI) plus bevacizumab chemotherapy for 2 months. Two days after the 2-2 cycle of combination chemotherapy, he aggravated abdominal pain and was rushed to the emergency room for further evaluation. The laboratory work-up was normal except for C-reactive protein, which was 12.4 mg/l. He had findings of gastrointestinal perforation such as free intraperitoneal air, fluid collection, and bowel wall thickening on abdominal computed tomography (CT). The patient underwent emergent laparotomy, and the perforation occurred at the site of colon anastomosis. Hartmann’s operation was performed immediately. The post-operative period was uneventful. On the 10th post-operative day, he started feeding orally and drain tube was removed. The patient was discharged two weeks after operation and referred to an outpatient clinic for follow-up. (Discussion) Although bevacizumab has been shown to be effective for treatment of many different malignancies including colon cancer, it is occasionally associated with serious adverse effect. Bowel perforation is a rare but potentially fatal adverse effect of bevacizumab therapy. The mechanism of bowel perforation in patients treated with bevacizumab is obscure. Inhibition of VEGF by bevacizumab could cause necrosis and perforation of the adjacent bowel. About 50% of bowel perforations occur at the primary tumor site, but any part of the bowel can be perforated. Bowel perforation may be hard to detect, so clinical signs or symptoms should be carefully watched. Abdominal CT scans can be useful imaging tools for the diagnosis of bowel perforation. (Conclusion) Bevacizumab induced bowel perforation has been frequently reported and it can be a fatal event for the patients. Thus, physicians should be careful consideration during bevacizumab therapy.

**PE-188**

**Case Report: Surgical Excision of An Abdominal Wall Fibromyxoid Sarcoma with Reconstruction of Mesh, TAR & TRAM**

Department of Surgery, Division of Colorectal Surgery, ¹Department of Plastic Surgery, Korea University Guro Hospital, Korea

Sung Yup Joun, Young Hyun Na, Sang Hee Kang, Sun Il Lee, Byung Wook Min*, Duck Yul Kim¹

(Purpose) Low grade fibromyxoid sarcoma (other names: Evan’s tumor, hyalinising spindle cell tumor with giant rosettes) is a rare, low grade malignant tissue neoplasm with a potential for local recurrence as well as distant metastases. This tumor is commonly located in the lowerextremities. Other sites include neck, axilla, chest wall, shoulder, inguinal region and rarely mediastinum, retro peritoneum, mesentery and pelvis. We report a rare case of low grade fibromyxoid sarcoma of anterior abdominal wall after previous repeated resection with reconstruction of Mesh, TAR & TRAM (Methods) Case reportA 63-year old male presented to surgery OPD with chief complaint of palpable mass on left upper quadrant region for last 2 years. Palpable mass was associated with mild pain and discomfort when positional change. He had history of repeated surgery for palpable mass at same site 4 times during past 10 years. Physical examination was revealed that hard, fixed mass was palpable about 12x10 cm in size. (Results) Due to history of recurrence, wide excision was done with 1 cm of free resection margin. The large abdominal wall defect was closed using a sheet of Proceed surgical double composite® mesh (Ethicone) after decreased defect size by transverse abdominus muscle release. The Proceed surgical double composite® mesh (Ethicone) was fixed to the posterior leaf of the rectus sheath medially and the internal oblique laterally using a non-absorbed sutures and Tacker. The remaining subcutaneous defect was closed by TRAM flap. The surgical specimen measured 15x14.5cm. On section, the cut surface shows a relatively well-demarcated yellowish, partially hemorrhagic mass, measuring 13.5x5x10.5 cm.
Hisotopathological examination showed low grade fibromyxoid sarcoma, FNCLCC grade 2 with size of 3.5x10.5x5 cm, and 1/10 HPF in mitotic count. **(Conclusion)** Careful consideration of the morphological and immunohistochemical features of these tumors permits a positive diagnosis of low grade fibromyxoid sarcoma. It is characterized by bland histologic features and a paradoxically aggressive clinical course. For prevention of recurrence, radical wide excision is important. The closure of large defects, after surgical resection of abdominal wall tumors, may be a big surgical challenge. We used a complex way of double composite® mesh, TAR and TRAM to close the large abdominal wall defect and this appeared to be feasible for this particular situation.

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**PE-189**

**Heat Shock Protein 20 Induces the Apoptotic Cell Death Through Control of Heat Shock Protein 27 Stability in HCT 116 Cells**

Department of Surgery, Postgraduate School of Medicine, Gyeong-Sang National University Hospital, Korea

Seung-Jin Kwag, Sang-Kyung Choi, Jin-Kwon Lee, Young-Tae Ju*

**(Purpose)** Heat shock protein 20 (HSP20), which is a member of the small heat shock protein family, is known to participate in many pathological processes, such as asthma, intimal hyperplasia and insulin resistance. However, the function of HSP20 in cancer development is not yet fully understood. In the previous study, we identified that Heat shock protein 20 (HSP20) overexpression activates the pro-apoptotic signaling pathways in HCT ii16 cells (a human colorectal cancer cell line) and reduced HSP20 expression was related to advanced TNM stage, lymph node metastasis and tumor recurrence. To further understand the mechanism of how HSP20 regulates cancer cell apoptosis, we sought to identify the proteins that interact with HSP20 in cancer cells. **(Results)** Heat shock protein 20 (HSP20), which is a member of the small heat shock protein family, is known to participate in many pathological processes, such as asthma, intimal hyperplasia and insulin resistance. However, the function of HSP20 in cancer development is not yet fully understood. In the previous study, we identified that Heat shock protein 20 (HSP20) overexpression activates the pro-apoptotic signaling pathways in HCT ii16 cells (a human colorectal cancer cell line) and reduced HSP20 expression was related to advanced TNM stage, lymph node metastasis and tumor recurrence. To further understand the mechanism of how HSP20 regulates cancer cell apoptosis, we sought to identify the proteins that interact with HSP20 in cancer cells. **(Conclusion)** HSP20 induces the apoptotic cell death through control of HSP27 stability. Further studies that investigate the precise role and signaling pathways of interaction between HSP20 and HSP27 in colorectal cancer would be necessary to use HSP20 as a target for cancer therapy.

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**PE-190**

**Case Report: Mixed Adenoneuroendocrine Carcinoma of the Descending Colon**

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Sung Yup Joung, Young Hyun Na, Sang Hee Kang, Sun Il Lee, Byung Wook Min*, P Young-Jae Park

**(Purpose)** Lower gastrointestinal (GI) neuro-
endocrine cell carcinoma is a rare malignancy of the GI tract. The disease is famous for its poor prognosis due to high proliferative capability and early vascular invasion leading to multiple organ metastases. Neuroendocrine cell carcinoma is sometimes classified as “mixed adenoneuroendocrine carcinoma (MANEC)” in the 2010 World Health Organization (WHO) guidelines. MANECs have been described in several organs. Beside gastrointestinal segments, it was also reported in the pancreas, gallbladder, and uterine cervix. Here, we report a case of mixed neuroendocrine cell carcinoma of rare site, descending colon. *(Case report)* A 52-years-old male was admitted to the hospital with symptoms of abdominal pain, partial intestinal obstruction and weight loss. He had history of abdominoperineal resection due to rectal cancer 20 years ago. The laboratory findings were all within normal limit including tumor marker, except increased CRP of 65.28 mg/L. Abdominopelvic computed tomography (CT) showed that about 8.5 cm infiltrative heterogeneous mass in LUQ abdominal cavity, abutting small bowel loops with encasing splenic flexure colon. Total colonoscopy via colostomy sites was revealed to a diffuse mucosal swelling with ill-defined mass-like lesion on the remnant colon, 30cm from colostomy site. *(Results)* After conservative management, there was no symptomatic regression, so explorative laparotomy was decided. In operative findings, there were direct invasions to distal pancreas, splenic flexure colon and perforation & abscess formation of descending colon. The mass was located in desending colon mainly. Palliative extended left hemicolectomy, palliative distal pancreatectomy with splenectomy and end transverse colostomy were performed. The specimen showed a huge encircling mass, measuring 15x8.5x5cm sized invaded serosa and made a mass-like lesion. The pathologic reports showed that mixed adenoneuroendocrine carcinoma (MANEC) with size of 8.1x8x6.1cm, direct invasion of pancreas, and present lymphatic and venous invasion. The results of immunohistochemical staining of tumor cells were CD56 (+), synaptophysin(+), and chromogranin (+), which correspond to high-grade large-cell-type endocrine cell carcinoma. However, more than 30% of the tumor comprised a moderately differentiated adenocarcinoma. The Ki-67 labeling index was 30%. *(Conclusion)* In conclusion, this is the report of a MANEC of descending colon. Independently by the localization and tumor stage, MANECs appear to be highly malignant tumors, with high risk for distant metastases and poor prognosis. We hope this report for help improving the treatment outcome and overall prognosis of MANECs.
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Poster Exhibition

Hernia
PE-191

How Spermatic Cord Lipomas Should be Managed?

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Min Chung*

(Purpose) Significance of that lipoma is neglected by some surgeons. In these days, laparoscopic surgeons for inguinal hernia have concern on spermatic cord lipoma, because neglect of lipoma makes postoperative bulging around inguinal area. This clinical review describes prevalence, proper management, and importance of spermatic cord lipoma to make right decision during inguinal hernia repair. (Methods) Inguinal hernia repair cases between December 2009 and July 2015 were reviewed via electronic medical record system. All hernia repairs were performed by single surgeon. (Results) During the study period, 928 cases of inguinal hernia repair were performed. Repairs were undertaken via open technique. Two kinds of preformed mesh were used for inguinal hernia repair. Meshes were polypropylene mesh. Lipoma with vasculature or other main anatomical structure was not removed. Lipoma protruding from preperitoneal space that was separated easily was removed. Male was 871 cases and female was 57 cases. Male patients of lipoma (-) group were 884 cases (93%) and female patients were 50 cases (7%). Male patients of lipoma (+) group were 207 cases (96.7%) and female patients were 7 cases (3.3%). There was no sex ratio difference between lipoma (+) group and lipoma (-) group. Average age of lipoma (-) group was 57.7 and lipoma (+) group was 61.5. Difference was statistically meaningful (p=0.001). Average body weight of lipoma (-) group was 64.0 Kg and lipoma (+) group was 67.5 Kg. Body weight of lipoma (+) was heavier than lipoma (-) group with statistical difference (p<0.001). Average height of lipoma (+) group was 166.3cm and lipoma (-) group was 167.4cm. Median BMI (body mass index) of lipoma (+) group was 23.5 and lipoma (-) group was 22.8. There was no statistical difference at those items. Analyze according to Rutkow classification of this study revealed statistical difference of lipoma (+) group and lipoma (-) group (p=0.041). Type 1, 2, and 3 is indirect inguinal hernia. In the lipoma (+) group, type 1 was less, type 2 and 3 were more than the lipoma (-) group. It means size of inguinal hernia of the lipoma (+) group was larger than the lipoma (-) group. Incidence difference of femoral hernia was prominent. This result could affect the difference of both groups. Mesenteric fat, Omental fat and indirect inguinal hernia must be differential diagnosed with inguinal canal lipoma. (Conclusion) Lipoma can be found relatively easily in the patients with old age, heavy body weight and large hernia. A spermatic cord lipoma should be removed and the inguinal canal repaired using inguinal hernia repair technique. Even though herniation of preperitoneal fat via inguinal canal does not have a hernia sac, it should be considered as a variation of inguinal hernia.

PE-192

Is It Essential to Confirm Routine Pathologic Examination in Adult Inguinal Hernia?

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(Purpose) Some study suggested that routine histologic examination on hernia sac is necessary because there are several incidental findings can be found. However, hernia sac resection has become an additional step in tension-free repair such as plug mesh method or laparoscopic herniorrhaphy which are dominant methods in inguinal hernia repair. Therefore it is necessary to confirm the efficacy of routine pathologic examination. (Methods) We reviewed retrospectively 406 people who got surgery on inguinal hernia by a single surgeon for 3 and a half year from July 2010 to December 2013. (Results) 406 people were reviewed and 25 people had bilateral inguinal hernia, and 164 specimens(38%) were pathologically examined. Abnormal
pathologic finding was found in 4 patients (0.9%), however all of them were suspicious other diagnosis rather than consistent of hernia sac intraoperatively. Finally, the rest were consistent of hernia sac. Additionally, gross findings of lipomas were later pathologically examined and confirmed as lipomas in all cases. \textbf{(Conclusion)} Routine pathologic examination of inguinal hernia sac is not essential to diagnosis. Performing pathologic examination is necessary only when the grossly abnormal findings were found.

\textbf{PE-193}

**Vertical Intermittent Suture Repair of Primary Small Umbilical Hernia**

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\textbf{(Purpose)} Umbilical hernias are common in the adult population and prompt repair is advised. We aimed to evaluate the outcome of patients who underwent vertical intermittent sutured fascia closure of umbilical hernia without mesh. \textbf{(Methods)} We performed a retrospective analysis of 100 consecutive adult patients who had undergone vertical intermittent suture repair of small (<2cm) primary umbilical hernias with respect to complications, recurrence, and chronic pain. \textbf{(Results)} In total, 100 patients (BMI 27.2 kg/m², 61% female) underwent vertical intermittent suture repair. There was 1 recurrence (1.0%); average follow-up 1.3 years. There were 4 post-operative wound infections (4.0%) and 2 chronic pain patients (2.0%). \textbf{(Conclusion)} Vertical intermittent suture repair is a feasible for small (<2cm) primary adult umbilical hernia patients.

\textbf{PE-194}

**Laparoscopic Repair with Mesh of Transdiaphragmatic Intercostal Hernia following Blunt Trauma**

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\textbf{(Purpose)} Transdiaphragmatic intercostal hernia (TIH) is a rare clinical entity and is the herniation of abdominal contents through the thoracic wall as the result of the disruption of diaphragmatic and intercostal muscles, frequently is accompanied by rib fractures. It can occur following trauma (blunt or penetrating) or surgical intervention and it may occur in a condition with a sudden increase in abdominal pressure, such as cough. Computed tomography (CT) scan is the best means for confirming the diagnosis and it is necessary for determining the curative strategy. Surgical repair is necessary in nearly all cases due to risk of incarceration and strangulation of the involved organs. Recently, minimally invasive surgery is being applied in various fields by the advance of medical equipment and its advantage. We present here a case of acute TIH following blunt trauma that was treated laparoscopically with a prosthetic mesh and we review the clinical aspects of this disease. \textbf{(Methods). (Results)} A 82-year-old man presented to the emergency room of our hospital with a left-sided chest pain after the cultivator accident. The physical examination revealed a painful swelling with bruise in the left lower chest wall and the swelling was not changed by his respiration. The abdomen was not distended and soft. The CT scan showed a large defect of the left 7th intercostal space with multiple rib fractures (7th, 9th, and 10th) and diaphragmatic discontinuity, and herniation of the transverse colon and fatty tissue into the chest wall through this defect. We performed emergent laparoscopic exploration under impression of TIH. Laparoscopic exploration showed herniated viable omentum and transverse colon through about 10
cm sized injured diaphragm, rib and intercostal muscles. The omentum and colon were easily reduced into the peritoneal cavity and the injured diaphragm was repaired laparoscopically with a prosthetic mesh. The peritoneum cannot brought together without tension and was torn, so we added a prosthetic mesh coated with absorbent collagen tissue to the previous mesh with helical tacks. The postoperative period was uneventful and he was discharged on the 20th postoperative day. He had a follow-up CT 4 week after operation and showed a large amount of the right pleural effusion and no recurrence of the repaired left diaphragm and chest wall. He was admitted and treated conservatively and by closed thoracostomy. He was discharged on the 19th postadmission day. (Conclusion) We consider the laparoscopic repair with a prosthetic mesh is a good modality in treatment of traumatic TIH.

PE-195

Delayed Presentation of Bochdalek Hernia in Adult after Colonoscopy

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(Purpose) Bochdalek hernia is congenital anomaly of diaphragm. It is caused by failure of closure of the pleuroperitoneal cavity in posterolateral area. Bochdalek hernia in adult is very rare and is asymptomatic in over half of cases. Usually, it is diagnosed incidentally on plain chest X ray. We experienced accidentally diagnosed Bochdalek hernia after colonoscopy. (Methods) We performed laparoscopic herniorrhaphy to a man with left diaphragmatic hernia after colonoscopy. (Results) A 35-year-old man presented to our emergency room with epigastric pain after colonoscopy. He got open heart surgery 30 years ago and didn’t have any trauma history. Blood pressure was 143/78 mmHg, heart rate was 78 beats/min, and body temperature was 36.6°C. On physical examination, abdomen was soft, however focal tenderness was noticed on epigastric area. Plain chest X-ray showed bowel gas patterns and haziness on left lower lung field. Abdominal computed tomography revealed diaphragmatic defect in posterolateral area with herniation of omentum and colon. He underwent the laparoscopic herniorrhaphy. The Operative findings were 5 X 3cm size defect on posterolateral portion of left diaphragm and the margin of defect was lined by smooth peritoneum without acute torn lesion. Primary closure of defect was performed by interrupted suture with a non-absorbable poly-filament. The patient made an uneventful recovery. (Conclusion) Bochdalek hernia is a congenital anomaly presenting during neonatal period. In the silent adult patient with congenital diaphragmatic defect, diaphragmatic herniation was induced by the difficult insertion of colonoscopy.

PE-196

Internal Herniation Due to An Omphalomesenteric Duct Cyst in a 69-Year-Old Man

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(Purpose) Small bowel obstruction is a common surgical problem in abdominal surgery. A previous abdominal operation is the most common cause of SBO. Although SBO is commonly noted, the development of SBO due to an omphalomesenteric duct (OMD) remnant in an older patient is extremely rare. (Methods) Previous abdominal surgery is the most common cause of mechanical small bowel obstruction. However, in patients with no history of abdominal surgery, the diagnosis and treatment of mechanical small bowel obstruction is difficult. A persistent omphalomesenteric duct remnant is a rare finding that typically presents in the pediatric population and is extremely rare in patients aged >60 years. (Results) We describe the case of a 69-year-old man with abdominal pain and computed tomography(CT) findings of small bowel obstruction. Onsisting of a pinched small bowel in the umbilical region. This structure, subsequently
diagnosed as an OMD cyst, was successfully treated via surgery. (Conclusion) In the present report, we describe the case of an omphalomesenteric duct cyst causing small bowel obstruction in a 69-year-old man with no history of a surgical procedure.
Annual Congress of KSS 2016

Poster Exhibition

Vascular
Surgical Management for a Symptomatic Nutcracker Syndrome (NCS)

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(Purpose) Compression of the left renal vein (LRV) between the superior mesenteric vein (SMA) and the aorta is referred to as the nutcracker phenomenon (or LRV entrapment) and was first described by Grant in 1937. The symptomatology associated with venous stasis in the left kidney is the nutcracker syndrome (NCS) named by De Schepper. The main symptoms are left flank pain radiating to the buttock and hematuria (from microscopic to gross hematuria). Only symptomatic NCS with severe symptoms should be treated with endovascular or open surgical techniques. It is a rare condition that in patients with severe symptoms may need open surgical or endovascular treatment.

(Methods) So, we report the case of a 61-year old woman performed a LRV bypass for symptomatic NCS. He complained gross hematuria for several years. A CT showed a NCS with compression of LRV. So, we performed a renocaval bypass (LRV bypass).

(Results) There were no complications during the surgery. At 2 days after a renocaval bypass, gross hematuria was disappeared. The patient was discharged without other complication. During 3 months after a surgery, there was no problem. At 3 months after the surgery, the CT showed no problem. (Conclusion) So, a LRV bypass can be an effective modality for management of a symptomatic NCS.

Surgical Excision of Huge Aneurysm of Persistent Sciatic Artery

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Jong Oh Lee, Oh Jung Kwon*

(Purpose) Persistent sciatic artery is a very rare developmental anomaly. These aberrant arteries are associated with a predisposition for aneurysm formation. Aside from the risk of rupture, sciatic artery aneurysms pose a risk of distal embolization and subsequent limb loss.

(Methods) A fifty-eight-year-old male presented right leg pain. He was undertaken femoro-posterior tibial bypass surgery previously 8 years ago. Bilateral persistent sciatic artery and thrombotic occlusion and aneurysmal change of right sciatic change was observed on computed tomography (CT) checked previously to bypass. Extent of occlusion and aneurysmal change was not changed during follow up for three years. CT was checked for evaluation and blood flow of bypass was intact but aneurysm of right sciatic artery was enlarged to 12 cm. (Results) Surgical excision of aneurysm was performed. Huge pseudoaneurysm arise from sciatic artery was found and excision was done. It’s draining vessels were ligated and no injury was occurred to nearby nerves and vessels. Three Jackson-Pratt drain (JP drain) were inserted and they removed on post-operative day 5. No complications occurred after operation and pain was relieved. (Conclusion) Persistent sciatic artery is a rare aberration. The most frequent complication of a persistent sciatic artery appears to be aneurysm formation. These aneurysms commonly present as thromboembolic events or compression effects. Most incidental asymptomatic cases do not require treatment but our case was symptomatic and treated with surgical procedure. Surgical excision was performed without complications and outcome was satisfactory. In conclusion, huge persistent sciatic aneurysm can be treated safely with surgical excision.
Treatment of Type V Endoleak by Endovascular Relining Technique

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Jong Oh Lee, Oh Jung Kwon*

(Purpose) Type V endoleak, or endotension, is characterized by continuous enlargement of the aneurysmal sac after endovascular aneurysm repair (EVAR) of abdominal aortic aneurysms (AAA) without direct radiologic evidence of a leak. This type of endoleak is an unpredictable late complication of EVAR. (Methods) Eight years ago, a sixty-five-year-old patient male was diagnosed with continuously growing AAA of maximum diameter 5.7cm and this was treated with EVAR. After EVAR, Type II endoleak was seen after 2 months and no evidence of any type of endoleak was seen after 6 months. No growth of aneurysm or endoleak was seen on the computed tomography (CT) after 3 years. Surveillance was not done after third year. On February 2016, he visited hospital because of persistent abdominal pain and enlargement of aneurysm up to 7cm was seen. There was no evidence of leakage of contrast on the CT. (Results) Endovascular relining was performed on the patient to treat the type V endoleak. There was no leakage of contrast on abdominal aortography during intervention. Relining technique was performed with 25mm of main body, 16/24mm of left iliac limb and 16/20mm of right iliac limb. Completion angiogram was performed and no endoleak was detected after the relining. Abdominal pain was relieved after endovascular relining. (Conclusion) Type V endoleaks are low-risk lesions in the short term but it may lead to aneurysm rupture in the long term. So continued type V endoleaks requires treatment. But there is no definitive guideline for treating type V endoleaks. Many treatment methods exist including surgical conversion, aspiration of the aneurysm sac, endograft relining. In this case, endovascular relining was selected for treatment option for type V endoleak and performed successfully. The relining technique is effective method for treating type V endoleak.

Evaluation of Angiogenesis with Hypoxia-Cultured Human Umbilical Cord Blood-Derived Mesenchymal Stem Cells on Hindlimb Ischemia Based on Protein Antibody Array

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(Purpose) Mesenchymal stem cells (MSCs) have been studied as potential therapeutic tools for many diseases, including ischemic diseases. In this study, we performed protein profiling of human umbilical cord blood-derived mesenchymal stem cells (hUCB-MSCs) cultured in hypoxic conditions, and evaluated their effects on angiogenesis in an ischemic hindlimb mouse model. (Methods) hUCB-MSCs were cultured at 21% O2 as normoxic condition and at 21% O2 as hypoxic condition in a 5% CO2 incubator at 37℃. Phenotype markers of hUCB-MSCs were analyzed with flow cytometry. Cell proliferation was analyzed using cell counting with trypan blue staining, and cell migration ratio was analyzed using in a μ-Dish 35-mm culture insert. Phosphorylation of proteins in hUCB-MSCs and secretory proteins in conditioned medium from hUCB-MSCs were measured using protein based antibody array with KEGG or Gene Ontology analysis. Ischemic induction in the hindlimb of mice was conducted using BALB/c nude mice, and 1x106 cells of normoxic or hypoxia hUCB-MSCs were injected in the muscle of hindlimb of mice. At 28 days, the muscle tissue of hindlimb was harvested, and capillary was confirmed with immunohistochemistry using anti-vWF antibody. Modified ischemic scoring system for measuring morphological progress in the ischemic hindlimb was established in our lab. (Results) In vitro, hypoxic culture conditions induced the proliferation and migration of hUCB-MSCs without changing the expression of phenotypic markers. In KEGG pathway analysis of a protein antibody array, sig-
significant enrichment of the phosphorylation of ABL1 (Phospho-Tyr204) and BCL-XL (Phospho-Thr47) was observed in hypoxic hUCB-MSCs. Further, the up-regulation of secretory proteins including Angiogenin, EGF, PD-ECGF, PIGF, PECAM-1, TGF-alpha, TGF-beta RII, TGF-beta RIII and VEGF was detected in the conditioned medium of hypoxic hUCB-MSCs. In Gene Ontology analysis, these proteins were identified with terms such as vasculature development, blood vessel development and angiogenesis. Based on the results of the phosphorylation and secretory protein antibody arrays, angiogenic effects of injecting normoxic or hypoxic hUCB-MSCs into the ischemic hindlimb muscles of mice were evaluated. Ischemic scores with our modified ischemic scoring system and capillary generation were significantly greater in the hypoxic hUCB-MSC injection group than in the normoxic hUCB-MSC group at 28 days of ischemic induction. (Conclusion) Our findings demonstrate that culturing hUCB-MSCs in hypoxic conditions not only significantly enriches phosphorylation in the anti-apoptosis pathway and enhances the secretion of several angiogenic proteins based on protein antibody array, but also alleviate ischemic injury in an ischemic hindlimb mouse model.

PE-201

Remote Ischemic Preconditioning Enhances the Expression of Genes Encoding Antioxidant Enzymes and Endoplasmic Reticulum Stress-Related Proteins in Rat Skeletal Muscle

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(Purpose) Ischemic preconditioning (IPC), including remote IPC (rIPC) and direct IPC (dIPC), is a promising method to decrease ischemia-reperfusion (IR) injury. This study tested the effect of both rIPC and dIPC on the genes for antioxidant enzymes and endoplasmic reticulum (ER) stress-related proteins. (Methods) Twenty rats were randomly divided into the control and study groups. In the control group (n=10), the right hind limb was sham-operated. The left hind limb (IscR) of the control group underwent IR injury without IPC. In the study group (n=10), the right hind limb received IR injury after 3 cycles of rIPC. The left hind limb received IR injury after 3 cycles of dIPC. Gene expression was analyzed by qPCR from the anterior tibia muscle. (Results) The expression of the antioxidant enzyme genes including glutathione peroxidase (GPx), superoxide dismutase (SOD) 1 and catalase (CAT) were significantly reduced in IscR compared with sham treatment. In comparison with IscR, rIPC enhanced the expression of GPx, SOD2, and CAT genes. dIPC enhanced the expression of SOD2 and CAT genes. The expression of SOD2 genes was consistently higher in rIPC than in dIPC, but the difference was only significant for SOD2. The expression of genes for ER stress-related proteins tended to be reduced in IscR in comparison with sham treatment. However, the difference was only significant for C/EBP homologous protein (CHOP). In comparison with IscR, rIPC significantly up-regulated activating transcription factor (ATF) 4 and CHOP, whereas dIPC up-regulated CHOP. (Conclusion) Both rIPC and dIPC enhanced expression of genes for antioxidant enzymes and ER stress-related proteins.

PE-202

Arterial Replacement using GSV Autologous Conduit in Peripheral Arterial Disease

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(Purpose) Greater saphenous vein (GSV) was the
conduit of choice for arterial replacement of peripheral arterial occlusive diseases and CABG, and furthermore, it was used in the many situations for hepatobiliary surgeries or liver transplantation such as hepatic artery replacement. GSV, without any chronic phlebitis, calcification or organized intraluminal thrombus, has more durable and patent than other venous conduit and especially, at infragenual bypass it is the best conduit compared to any artificial grafts. We reported successful cases of arterial replacement using GSV autologous conduit (Case 1) A 30-year-old male patient had 3cm-sized growing pseudoaneurysm of left radial artery on the left wrist due to stab wound 3 months ago. The short segment of radial artery was removed and the arterial replacement was performed successfully using GSV autologous GSV conduit. The patency of radial artery and flow were excellent at postoperative 6 months and anticoagulant was used for 1 year. (Case 2) A 59-year-old male patient has admitted for claudication of right lower extremity. The cystic adventitial disease of right popliteal artery was suspicious. The cystic lesion was removed and the arterial replacement was performed. At the postoperative 3 months, the patency of right popliteal artery was good and claudication was more improved. (Case 3) A 40-year-old female patient was admitted for 3*1.2 cm sized aneurysmal dilatation of left radial artery without any trauma histories. The aneurysm was removed and the replacement was done. (Results) The GSV harvesting was performed with no-touch technique and the obtained segment was anastomosed reversely to avoid the valve lysis without intima injuries. The anastomosis was performed interruptedly for less 2mm sized arteries and continuously for more 3mm sized arteries. (Conclusion) GSV was the very useful graft conduit for arterial replacement of peripheral artery disease because the technique of harvest was easier, the vein wall was thicker than any other vein for continuity and the size matching was suitable. The more experiences and researches were needed to maintain the long-term patency and to avoid the graft failure.

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**PE-203**

**Rheologic Features in Peripheral Arterial Occlusive Disease: Analysis of Blood Viscosity using Capillary Tube Viscometer**

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(Purpose) To evaluate rheologic characteristics in peripheral arterial occlusive disease patients with analysis the blood viscosity using capillary tube viscometer (Methods) The analytical performance of the scanning capillary tube viscometer was evaluated using different levels of blood viscosity specially diastolic, systolic shear rates and sixty peripheral arterial occlusive disease patients EDTA-blood samples. (Results) The normal viscosity level was 231.5-364.5 mP in diastolic shear rates and 36.6-54.1 mP in systolic. Abnormal levels was revealed 55.7% in diastolic shear rates and 42.6% in systolic rates. The median level was 263.4 in diastolic shear rates and 42.1 in systolic shear rates. There was no statistical significant differences shear rates in peripheral arterial disease patients compared with normal. (Conclusion) This is first trial for evaluation of rheologic feature in peripheral arterial occlusive disease. The viscosity level was not significant difference in peripheral arterial occlusive disease patients and further detailed planed study is needed
**PE-204**

**Case Report: Cystic Adventitial Disease of Popliteal Artery**

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(Purpose) The cystic adventitial disease is a rare vascular condition that mainly affects the popliteal artery, and the etiology was not unknown, but it may present as calf intermittent claudication, usually unilateral, in healthy middle-aged individuals, who do not smoke and have no risk factors for atherosclerotic disease. We experienced and reported a case of cystic adventitial disease of the right popliteal artery and successful management. (Case reports) A 59-year-old male patient had admitted for claudication of right lower extremity. He had histories of DM, HTN without any trauma histories. At the private clinic, DM foot or radiating pain from herniated intervertebral disc was suspected and although 2-week physiotherapy was done, claudication was more aggravated. On surveillance CT and MRI, the atherosclerotic change was minimal, but abrupt short segmental popliteal luminal stenosis from external compression of cystic lesions from suprapatellar to infrapatellar level was identified. And adjacent several synovial cystic lesion near posterior medial femoral recess. (Results) The cystic adventitial disease of the right popliteal artery was suspicious and exploration was planned. At first, the GSV harvesting was performed on supine position with no-touch technique. And then the position was changed to prone and the popliteal fossa was exposed. The S-shaped incision was made on right popliteal fossa and popliteal vessels were exposed. The adhesion around cystic changed popliteal artery was severe and gently dissection was done. The both ends were isolated and clamped. The diseased segment was removed, and autologous reversed GSV conduit was replaced and anastomosed with continuous prolene 5-0 sutures. At the postoperative 3 months, the patency of right popliteal artery was good and claudication was more improved. The postoperative low dose aspirin and clopidogrel was started and only aspirin was continued 3 months later. (Conclusion) We described a patient with cystic adventitial disease of the popliteal artery. Because cystic adventitial disease of the popliteal artery is an uncommon but important cause of peripheral vascular insufficiency in younger individuals without specific atherosclerotic risk factors, it should be considered when relatively young individuals present with intermittent claudication. Long-term follow-up is mandatory because of the potential for recurrence or graft occlusion.

**PE-205**

**Fabrication of Artificial Arteriovenous Fistula and Its Flow Field and Shear Stress Analysis using U-PIV Technology**

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(Purpose) Radio-cephalic arteriovenous fistula (RC-AVF) is an operation performed to achieve vascular access for hemodialysis. Although it is a very reliable and well-known method, RC-AVF still has high rates of early failure depending on the vessel condition. The blood shear stress around the anastomosis site and the vascular access failure caused by thrombosis secondary to stenosis formation, as well as vascular access re-occlusion after percutaneous interventions contributes to failures. (Methods) We fabricate in-vitro 3D RC-AVF using poly(dimethylsiloxane) (PDMS) and 3D printing technology to understand this mechanism and predict AVF failure. The micro-particle image velocimetry (μ-PIV) considering the cardiac pulse cycle is used to measure the velocity field within the artificial blood vessel. (Results) The results are confirmed by a numerical simulation. Accordingly, the in-vitro AVF model agrees well with the simulations. (Conclusion) This research would provide the future possibility of using the proposed method to reduce in-vivo AVF failure for various conditions in each patient.