Liver

간담췌 P-01

Clinicopathologic factors associated with early liver regeneration after right hepatectomy in patients with hepatocellular carcinoma

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(Purpose) This study was conducted to evaluate liver regeneration by comparing preoperative computed tomographic (CT) volumetry and CT volumetry on postoperative day (POD) 7 after right hepatectomy in patients with hepatocellular carcinoma. We sought for clinicopathologic factors that could be correlated with liver regeneration **(Methods)** Between Jan, 2008 and Oct, 2012, 72 patients with hepatocellular carcinoma underwent right hepatectomy in our division. All but 1 patient were CTP were Child- Turcotte-Pugh (CTP) class A. Volumes of liver were measured for future liver remnant (FLR), and liver remnant (LR). Early regeneration index (ERI) was defined as [(VLR-VFLR)/VFLR)] x 100, where VLR means volume of the liver remnant and VFLR is volume of the FLR. Clinicopathologic factors that could be linked to liver regeneration were assessed retrospectively. **(Results)** The mean early regeneration index was 49%Age, prothrombin time, bilirubin did not influence early liver regeneration. Remnant liver volume to body weight ratio (RLV-BWR) (R2=0.124, P=0.001) and preoperative serum albumin level (R2=0.114 P=0.004) were correlated with the early regeneration index. Interestingly, patients with low RLV-BWR ($\leq$0.5) ratio showed higher ERI compared with those who had high RLV-BWR ($\geq$0.5) that means inversely correlated. (ERI 0.95 vs 0.41 p=0.001). In subgroup analysis (total of 20 patients), after excluding patients with large tumor ($\geq$10cm), right portal vein thrombus or history of transarterial chemoembolization (TACE) that might induce compensatory hypertrophy of the remnant liver, serum albumin and RLV-BWT still significantly linked to the ERI. ($p<0.05$) **(Conclusion)** Remnant liver volume to body weight ratio (RLV-BWR) and preoperative serum albumin level were significantly correlate with early liver regeneration. To avoid postoperative liver dysfunction, these parameters can be used as a reference measure in major hepatectomy.

간담췌 P-02

Survival analysis of resection of metachronous adrenal metastasis after HCC resection: Single-institution experience of 19 cases

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(Purpose) Metachronous recurrence at the adrenal gland seldom occurs after curative HCC resection, but many of them have not been indicated for surgical resection due to concurrent other site recurrence. If other recurrence lesions are controlled or adrenal metastasis is the only lesion, this situation is regarded as indication of adrenalectomy. We herein present the survival outcome of 19 cases undergone adrenalectomy for metachronous adrenal metastasis after HCC resection. **(Methods)** A retrospective review was undertaken of clinical data for 19 patients with huge HCC who underwent liver resection from January 2001 to December 2011. Adrenalectomy was

performed between March 2002 and September 2012. **(Results)** Patient age at the time of adrenalectomy was 55.3±9.1 years and male gender was 16. Hepatitis B virus infection was associated in 18. Sites of adrenal recurrence were left in 10, right in 6 and bilateral in 3. The types of adrenalectomy were open surgery in 10 and laparoscopic surgery in 9. The interval between initial hepatectomy and adrenal metastasectomy was 18.3±14.4 months (range: 1-61 months). HCC recurrence rate after adrenalectomy was 72.2% at 1 year and 100% at 2 years, in which all patients showed further recurrence. Patient survival rate after adrenalectomy was 94.1% at 1 year. 38.0% at 3 years and 20.3% at 5 years. Overall patient survival rate after initial HCC resection was 94.7% at 1 year. 77.3% at 3 years and 39.6% at 5 years. **(Conclusion)** Isolated metachronous adrenal metastasis appears to be the reasonable indication for adrenal metastasectomy although further recurrence usually happens within 1 year. Further studies comparing with other locoregional therapies such as radiotherapy should be followed to validate the role of adrenal metastasectomy.

간담췌 P-03

Surgical outcomes of patients with spontaneous ruptured HCC

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(Purpose) The purpose of this study is to evaluate the clinical characteristics of ruptured hepatocellular carcinoma (HCC) and compare ruptured HCC with current TNM staging system. **(Methods)** 18 patients who were treated surgically after diagnosis as spontaneously ruptured HCC at Asan Medical Center between 2003 and 2012 were enrolled and their clinicopathological records were reviewed retrospectively. The survival curves for ruptured and nonruptured HCC were generated and compared to evaluate the impact of the rupture itself on patient prognosis. HCC ruptured was defined as disruption of the peritumoral liver capsule with enhanced fluid collection in the perihepatic area adjacent to the HCC by abdominal computed tomography. **(Results)** The 18 patients underwent liver resection after diagnosis of spontaneous rupture of HCC. The overall survival of the ruptured HCC group was significantly poorer compared with that of the nonruptured HCC group. The 1-year, 3-year, 5-year overall survival rates were 64.2%, 46.8%, and 23.4%, respectively, in the ruptured HCC group, and 89.9%, 74.5%, and 62.5%, respectively, in the nonruptured HCC group. The median survival time in the ruptured HCC group was 14 months (95% CI: 20.2-46.8 months). In ruptured HCC group, there was significant difference of survival rate between patients who have tumor thrombus in portal vein or vascular invasion without distant metastasis (ruptured group with invasion) and patients who have only ruptured HCC (pure ruptured group) (p=0.011). Median survival time was 7 months and 46 months, respectively. The survival of patients with ruptured HCC was better than that of patients with nonruptured HCC stage IVb, with a difference that was borderline significant (p=0.063). The survival curves for pure ruptured group and for ruptured HCC stage IVa were similar (p=0.421). However, the survival curves for pure ruptured group was different from the curve for nonruptured HCC stage IVb (41.3 months vs. 8 months, p=0.026). And the survival curves for ruptured group with invasion and for nonruptured HCC stage IVb were similar (p=0.670). However, the survival curve for ruptured group with invasion was poorer than that for ruptured HCC stage IIIc (p=0.009). **(Conclusion)** As we know, the survival of spontaneous ruptured HCC is very poor. Spontaneous tumor rupture itself has an additional negative impact on the baseline tumor status. Moreover, if other conditions such as tumor thrombus of portal vein, vascular invasion or distant metastasis are added, the prognosis of ruptured HCC is even worse.

간담췌 P-04

Surgical outcome of intraoperative radiofrequency ablation of hepatocellular carcinoma

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(Purpose) Although surgical resection is the treatment of choice for the treatment of hepatocellular carcinoma (HCC), its application is often limited by underlying liver function. In the meantime radiofrequency ablation (RFA) is also considered as an optimal therapy for early diagnosed HCC. However, percutaneous RFA is limited by tumor location. Herein we conducted our study to analyze the outcome of intraoperative RFA. **(Methods)** From September 2007 to September 2012, 58 consecutive patients with HCC underwent intraoperative RFA. We decided RFA as opposed to liver resection for the patient with severe liver dysfunction on preoperative examination or severe gross liver cirrhosis on operative findings and with tumor location difficult to perform percutaneous RFA. Among these patients, 37 patients got intraoperative RFA under open laparotomy status, 16 patients got laparoscopic RFA, and 5 patients gout dual-scopic intraoperative RFA under the guidance of a combination of thoracoscopic and laparoscopic approaches. **(Results)** There was one intraperitoneal seeding metastasis and 28 of 29 recurred patients had intrahepatic recurrence after intraoperative RFA. There was one perioperative mortality caused by liver failure after RFA. 1-, 3-, 5-year disease-free survival rated were 62.4%, 47.1%, and 24.7%, respectively. 1-, 3-, 5-year overall survival rated were 92.7%, 69.9%, and 69.9%, respectively. **(Conclusion)** Intraoperative RFA might be considered as reliable treatment option for unresectable HCC patients with severe liver dysfunction and tumor location difficult to approach by percutaneously. In terms of operative morbidity, laparoscopic or dual-scopic RFA might have advantage of a minimally invasive procedure concerning liver dysfunction.

간담췌 P-05

Evaluation of diabetes and other clinicopathologic factors' influence on the outcome of patients with hepatocellular carcinoma undergoing hepatic resection

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(Purpose) We investigated the relationshop between diabetes mellitus and postoperative outcomes of hepatocellular carcinoma and other clinicopathologic factors that have influenced on postoperative outcomes of hepatocellular carcinoma. **(Methods)** From August 2000 to December 2012, there were 195 hepatocellular carcinoma patients underwent hepatic resections, Department of Surgery, Anam Hospital, Korea university medical center, Seoul, Korea. There were 152 males (77.9%) and 43 females (22.0%) with mean age of 58.3 +- 10.1 years (ranges from 22 to 81). **(Results)** Total 195 patients, 142 non-diabetes patients and 53 diabetes patients were involved. There were 27 patients with hypertention. TMN stage I were 120 patients, stage II : 44 patients, stage IIIa : 14, stage IIIb : 5, stage IIIc : 4, and stage IV : 8. Perioperative transfusion was done for 54 patients. Total 171 patients had hepatitis (hepatitis B; 140, hepatitis C; 16, hepatitis B & 5, other hepatitis; 10) and 24 patients didn't have hepatitis. Ten patients had positive margin. 121 patients had liver cirrhosis. Most patients (181)

were Child A. In univariate analysis, there was no difference in overall survival (OS) and disease free survival (DFS) between diabetes and non-diabetes patients. Hypertention, BCLC score B, major Surgery, hospital days after operation and tumor size were risk factors for OS. And Hypertention, perioperative transfusion, differentiation II and tumor size were risk factors for DFS.In multivariate analysis, hypertention (HR 3.885, CI 1.736-8.694, p=0.001), perioperative transfusion (HR 4.611, CI 1.95-10.904, p=0.0005), hospital days after operation (HR 1.018, CI 1.009-1.026, p<0.001) and tumor size (HR 1.161, CI 1.05-1.284, p=0.0035) were risk factors for OS. And hypertention (HR 5.05, CI 2.58-9.88, p<0.0001), perioperative transfusion (HR 3.05, CI 1.66-5.62, p=0.0003), and hepatitis (non-hepatitis compare with hepatitis B : HR 0.19, CI 0.06-0.61, p=0.005) and albumin (HR 2.34, CI 1.11-4.91, p=0.0254) were risk factors for DFS. **(Conclusion)** Hepatocellular carcinoma patients undergoing hepatic resection had diabetes more than general population in our study, but there were no influence on outcomes. But the hypertention, perioperative transfusion, hospital days after operation and tumor size were important to OS, and hypertention, perioperative transfusion, hepatitis and albumin were important to DFS.

간담췌 P-06

Long-term survival analysis of liver transplantation for hepatocellular carcinoma with bile duct tumor thrombus

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(Purpose) Long-term prognosis of liver transplantation (LT) for hepatocellular carcinoma (HCC) with macroscopic bile duct tumor thrombus (BDTT) has not been well assessed. This study intended to analyze the posttransplant outcomes in patients having HCC with macroscopic BDTT. **(Methods)** A retrospective study was performed with 14 patients who underwent LT for HCC with BDTT (0.7%) after selection from institutional database of 2052 adult LT cases. **(Results)** Types of LT were living-donor LT in 13 and deceased-donor LT in 1. The extents of BDTT were Ueda type 1 in 4, type 2 in 3, and type 3 in 7. Milan criteria were met in 8 (57.1%). Concurrent bile duct resection was performed in 7 (50%). Mean model for end-stage liver disease score was 18.7±4.9. Mean graft-recipient weight ratio was 1.2±0.3. There were one case of perioperative mortality and one case of HCC-unrelated late mortality. Cumulative HCC recurrence rates were 15.4% at 1 year, 46.2% at 3 years and 46.2% at 5 years. Overall patient survival rates were 92.9% at 1 year, 57.1% at 3 years and 50% at 5 years. Univariate risk factor analyses revealed that only macrovascular invasion was a significant risk factor for HCC recurrence (p=0.019). **(Conclusion)** The results of this study revealed

that LT for HCC with macroscopic BDTT carries a high risk of posttransplant HCC recurrence, thus further large-volume studies are necessary to elucidate the risk factors.

간담췌 P-07

Expression pattern analysis of hepatocellular carcinoma tumor markers in viral hepatitis B and C patients undergoing liver transplantation and resection

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(Purpose) This study was conducted to compare the expression patterns of serum alpha-fetoprotein (AFP) and proteins induced by vitamin K absence or antagonist-II (PIVKA-II) in hepatocellular carcinoma (HCC) patients undergoing liver transplantation (LT) and resection at a high-volume single institution. **(Methods)** First, 663 liver transplant recipients with HCC were selected. They were divided into hepatitis B virus (HBV) (n=628) and C (HCV) groups (n=35). Their medical records were retrospectively reviewed. Second, another cohort of 2709 patients who underwent HCC resection included 2258 HBV, 143 HCV and 308 non-HBV non-HCV (NBNC) patients. **(Results)** In transplantation group, pretransplant AFP level >20 ng/mL was observed in 42.5% of HBV patients and 60% of HCV patients (p=0.042). PIVKA-II level >40 mAU/mL was observed in 30.6% of HBV patients and 42.9% of HCV patients (p=0.127). In resection group, preoperative AFP level >20 ng/mL was observed in 51.7% of HBV patients and 43.3% of HCV patients (p=0.052). PIVKA-II level >40 mAU/mL was observed in 59.7% of HBV patients and 56.6% of HCV patients (p=0.47). Preoperative AFP level >20 ng/mL and PIVKA-II level >40 mAU/mL were observed in 35.7% and 61% of NBNC patients, respectively. **(Conclusion)** This study indicates that serum AFP and PIVKA-II may be expressed variably regardless of the types of background liver disease. Further large-volume multicenter studies are needed to evaluate the possibility of the etiology-dependent expression of tumor markers.

간담췌 P-08

Role of 1-month protocol transarterial chemoinfusion to detect intrahepatic metastasis after resection large hepatocellular carcinoma greater than 10cm

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(Purpose) Tumor recurrence is very common after hepatic resection of hepatocellular carcinoma (HCC) ≥10 cm. The purpose of this study was to validate the prognostic significance of preoperative alkaline phosphatase (ALP) level and early intrahepatic metastasis in HCC patients who underwent resection of large HCC. **(Methods)** Clinical data of 100 large HCC patients who underwent liver resection were retrospectively reviewed. All of them underwent protocol transarterial chemoinfusion (TACI) at 1 month. **(Results)** Median tumor diameter was 13.8, and 94% were single lesions. Systematic and non-systematic resections were performed in 91% and 9%, re-

spectively, with R0 resection achieved in 84%. Overall 1-, 3- and 5-year survival rates were 76%, 38.5%, and 30.4%, respectively. Univariate analyses on patient survival revealed that intrahepatic metastasis on 1-month protocol TACI was the only significant risk factor (p=0.002). Mean ALP values according to intrahepatic metastasis on 1-month protocol TACI were 124.6±76.9 IU/L and 145.1 ±92.6 IU/L, which did not show a statistical difference (p=0.23) **(Conclusion)** In patients with large HCC, 1-month protocol TACI combined with hepatic resection may contribute to early detection and timely treatment of potentially preexisting metastatic lesions.

간담췌 P-09

Double primary hepatic cancer (Sarcomatoid carcinoma and Hepatocellular carcinoma)

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(Purpose) Primary sarcomatoid carcinoma (SC) of liver is very rare and aggressive tumor showing a rapid growth and high recurrence rate after resection. There have been no reports to date of hepatic SC simultaneously occurring with hepatocellular carcinoma (HCC). **(Methods)** Herein we describe a 54-year-old man with liver cirrhosis due to Hepatitis B virus infection and alcoholic hepatitis. The abdominal CT and MRI showed 2 distinct hepatic mass with background of cirrhotic liver and esophageal varices. **(Results)** Under a clinical diagnosis of 2 HCC, a right lobectomy was carried out. Grossly, there were 2 distinct lesion, the larger one of segment 5~6 was 2.5*2.0cm-sized, gray to white, and well-demarcated mass, and the other was 1.3*1.0cm-sized, gray to whitish nodule. Microscopic analysis revealed that the larger one was a SC, which was immunoreactive for CK and vimentin and negative for HSA. The other was located in S8 and histologically showed hepatocellular carcinoma, which was positive for HSA and CK and negative for HSA, VMT, CK7 and CK19. There was no transition or intermingling lesion between the two tumors. **(Conclusion)** To the best of our knowledge, the present case is first case of double primary liver cancer composed of SC and HCC.

간담췌 P-10

A case of ruptured Undifferentiated embryonal sarcoma of the liver in a child

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(Purpose) Undifferentiated embryonal sarcoma (UES) of the liver is a rare primary hepatic malignancy. It is highly malignant neoplasm of mesenchymal origin and occurs predominantly in children, especially between the ages of 6 and 10. UES is rapidly growing tumor and tumor rupture does occur. We treated a 8-year-old boy with ruptured UES of the liver who had been admitted to our hospital for RUQ pain. **(Methods)** A 8-year-old boy suffering RUQ pain for 2 days was first seen at a local hospital. Abdominal computed tomography (CT) revealed a liver tumor of 8cm in right lobe. He was transferred to our hospital. On physical examination, there were no palpable mass on abdomen. Routine laboratory test and tumor marker (AFP) were within normal limits. Hepatitis B virus surface antigen and anti-hepatitis C virus antibody were negative. Abdominal ultrasonography (US) revealed a 8.6x7.3cm

solid mass with multiseptated cystic of necrotic portion in right hepatic lobe. Liver magnetic resonance imaging (MRI) revealed a 8.1x6.1cm well defined cystic and enhancing solid tumor in right hepatic lobe without daughter nodules nor metastatic lymphadenopathy. Mesenchymal harmatoma was diagnosed initially, so we decided to perform operation. **(Results)** On the day of operation morning, he complained abdominal pain. At operation field, there were fresh blood about 300cc around liver, and huge ruptured cystic mass on right liver. We performed liver wedge resection. He was discharged 12 days after the operation without any surgical complication. The pathologic finding was undiffentiated embryonal sarcoma. Immunohistochemically, the tumor cells were positive for vimentin, glypican-3, Ki-67. Immunostainings for S-100, CK, HAS, actin, desmin, arginase, CD34, myogenin, AFP were all negative. One month later after operation, PET-CT revealed both lung metastasis. He was referred to pediatrics and received chemotherapy. **(Conclusion)** UES is a rare disease, and it can be ruptured unexpectedly. Ruptured UES prognosis is very poor. Therefore, a differential diagnosis should be made because early diagnosis and a curative resection of the tumor are essential for a favorable outcome.

간담췌 P-11

Two-stage hepatectomy using various interventions in the portal vein for patients with multiple and bilobar colorectal liver metastases

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(Purpose) The definition of resectability for colorectal liver metastases (CLM) has been recently changed to the possibility for both curative resection of tumor (R0 resection) and adequate volume of the residual liver. A two-stage hepatectomy is one of the aggressive approaches for curative treatment in patients with CLM. In this study, we attempted to investigate the feasibility and short-term outcomes after two-stage hepatectomy using various methods in our institute. **(Methods)** From August 2010 to April 2013, 16 patients were planned for two-stage hepatectomy. Patients were eligible when single hepatectomy could not achieve R0 resection, even in combination with preoperative portal vein embolization (PVE) or intraoperative radiofrequency ablation (RFA). Feasibility and outcomes were prospectively evaluated. **(Results)** Two-stage procedures were completed in 14 of 16 patients (87.5%). Two patients failed to complete the second hepatectomy because of tumor progression (n=1) and patient's refusal (n=1). To increase the residual volume, 14 patients received various interventions in the portal vein including percutaneous PVE (n=11), intraoperative ligation of the right anterior portal vein (n=1), intraoperative ligation of the right posterior portal vein (n=1) and intraoperative ligation of the right portal vein with parenchymal splitting (n=1). Among 14 patients who underwent second stage hepatectomy, R0 resection was achieved in 13 patients (92.9%). There was no postoperative mortality. Postoperative complications were 7.1% (portal vein thrombosis) and 35.7% (two bilomas, one abscess and two ascites) at 1st and 2nd hepatectomy, respectively. During a median follow-up of 11 months (2-33 months), 10 (76.9%) of 13 patients who received R0 2nd resection developed recurrence. Among 10 recurrent patients, 7 patients received percutaneous RFA (n=1) or 3rd operation (n=6). Six of seven patients were disease -free status after 3rd curative aimed treatments. **(Conclusion)** Two-stage hepatectomy using various interventions in the portal vein was feasible and safe procedure, but recurrence rate was high after 2nd hepatectomy. Although aggressive treatments of recurrent tumors might be a hope for cure, long-term follow-up is needed.

간담췌 P-12

Laparoscopic treatment of hepatic cysts located in the posterosuperior segments of the liver

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(Background) Laparoscopy is considered the treatment of choice for hepatic cysts, especially those located in anterolateral segments (AL: segments II, III, IVb, V, and VI) because of the ease of laparoscopic access. Here, we evaluated the feasibility and safety of laparoscopic treatment of hepatic cysts in posterosuperior segments (PS: segments I, IVa, VII, and VIII). **(Methods)** We retrospectively analyzed clinical data for 34 patients who underwent laparoscopic treatment of hepatic cysts between September 2004 and December 2012. Patients were divided into two groups depending on whether the main largest cyst was located in AL (n=20) or PS (n=14). Laparoscopic cyst unroofing was performed in 34 patients with symptomatic simple cysts. Laparoscopic resection was performed in 5 patients with suspected cystic neoplasms. **(Results)** There were no deaths or major complications. The mean operation time was 110mins and the mean hospital stay was 4.4 days. The mean cyst size was not significantly different (P=.511) but the frequency of multiple cysts was significantly greater in group PS (P=.003). The predominant type of resection was unroofing in both groups (P=.251). The conversion rate, mean blood loss (P=.747), mean hospital stay (P=.812), mean operation time (P=.669), morbidity rate (P=.488), and relapse rate (P=.448) were not significantly different. Relapse occurred in one patient who underwent re-unroofing 17 months later. The median follow-up is 62 months. **(Conclusion)** Laparoscopy is a safe procedure for hepatic cysts located in posterosuperior segments.

간담췌 P-13

Laparoscopic left hepatectomy in patient with prior distal gastrectomy and radical lymph node dissection

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(Purpose) A history of intra-abdominal surgery has been considered a relative contraindication for laparoscopic Surgery, especially in major liver resections, because of an increased risk of conversion to open Surgery, intra-abdominal complications, and a longer operative time. **(Methods)** We performed a laparoscopic left hepatectomy in 48 year old man with history of prior gastrectomy. At May 2012, he received the open distal gastrectomy and Billroth I anastomosis because of advanced gastric carcinoma. The complete D2 dissection was combined and right & left gastric artery was ligated at the origin from the hepatic artery and celiac artery. **(Results)** At September 2013, 4.4 cm sized round mass in S4b of liver was detected from regular follow-up CT imaging. In laparoscopic exploration, severe adhesion was confirmed around the left hemi-liver. Laparoscopic left hepatectomy was performed after the meticulous dissection. The operation time was 240 minutes. The postoperative course was uneventful and he discharged at 5 days after surgery.

(Conclusion) Conclusively, severe fibrotic adhesion and anatomical deviation due to aggressive radical gastrectomy is, to a certain extent, beyond our control. Hence, periporal dissection should pay special attention to avoid the injury of portal vein or hepatic artery. Also, whether the periportal dissection was performed during prior Surgery, or not and whether or not major hepatectomy with inflow control is necessary, may be the most significant factors in the successful of laparoscopic major hepatectomy.

간담췌 P-14

How to treat liver metastases from breast cancer in surgical aspect

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(Purpose) Liver resection offers the only chance of cure in metastatic liver tumors. However, Breast cancer liver metastases (BCLM) are generally considered as systemic disease. So, the role of liver resection was limited and controversial for liver metastases of breast cancer. **(Methods)** We retrospectively reviewed 17 consecutive patients who underwent hepatectomy for BCLM between January 2008 and August 2013 at Asan Medical Center, Seoul. Kaplan Meier curves were used for the survival analysis and the logrank method used for univariate survival analysis. **(Results)** The mean age was 49 years. The liver resection was R0 in 13 patients. The disease free survival and overall survivals were 14.2 and 26.1 months. Most recurred event occurred between 6 and 12months. Only R0 resection (p=0.021) was associated with better survival outcomes on univariate analysis. **(Conclusion)** Liver metastases from breast cancer are not an absolute contraindication of hepatectomy. With R0 resection of breast cancer liver metastass, in a few patients the chance of cure can be obtained. Also, recent advances of surgical technique enabled R0 resection of liver metastased from breast cancer.

간담췌 P-15

Primary hepatic leiomyoma arising in healthy patient: A case report

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(Purpose) Hepatic leiomyomas are very rare, benign tumors developed from the smooth muscles of the vessels or bile ducts. (1) It can be more observed in patients with immunosuppression or organ transplantation. Because of the rareness of disease, the preoperative diagnosis of primary hepatic leiomyoma is often difficult. Herein, we report a case of primary hepatic leiomyoma arising in healthy patient. **(Methods)** A 42-year-old woman was referred to our hospital for further evaluation of the presence of hepatic mass, detected on ultrasonogram (US) performed for routine screening examination. The patient was asymptomatic. She had no history of liver disease, high alcohol intake, or oral contraceptive usage. Physical examination revealed a palpable mass in epigastic area of abdomen. All the routine laboratory tests including liver function tests and tests for tumor markers (carcinoembryonic antigen, α -fetoprotein) yielded normal findings.Abdominal computed tomography (CT) scan demonstrated a 7.4x7.1 cm sized well-defined mass in left subhepatic space that showed heterogenous enhancement in arterial phase, homo-

genous and delayed enhancement in delayed phase. (Fig. 1) Liver magnetic resonance images (MRI) scan demonstrated a 7.5x7 cm sized mass showed low signal intensity on T1 and T2 weighted images. (Fig. 2) Image study showed displacement of portal triad, but there was no evidence of hepatic artery or portal vein involvement. The finding suggested hepatic adenoma or neurogenic tumor. **(Results)** At laparotomy. We found a 8x6x6 cm size tumor in the caudate lobe of the liver with a clear border adjacent to the hepatic parenchyma. We performed caudate lobe wedge resection and resected tumor with a clear surgical margin. Microscopically, the tumor is composed of bland-looking spindle cells with whirling pattern and showed negative margin for tumor. Immunohistochemical staining was positive for Actin, Desmin, Vimentin, Caldesmon. Stains for CD34, C-kit, CK, S-100, HMB-45, EMA were negative. Pathologically, the tumor was identified as a primary hepatic leiomyoma. The patient tolerated the procedure well and was discharge 1 week following surgery without any problems. **(Conclusion)** Primary hepatic leiomyoma is a rare neoplasm and it should be considered differential diagnosis of other liver lesions.

간담췌 P-16

Clinical outcome of internal stent for biliary anastomosis in liver transplantation

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(Purpose) This study analyzed the incidence and management of biliary complications after liver transplantation (LT) with internal stent or without stent. **(Methods)** The medical record of all patients who underwent LT and were hospitalized between December, 2009 and March, 2013 were reviewed. All patients were grouped into two groups (internal stent group vs no stent group). **(Results)** There were 29 deceased donor liver transplantation (58%) and 21 living donor liver transplantation (42%). There were 2 perioperative mortalities, and these 2 patients were excluded for this study. The overall biliary complication rate was 6.45% in the internal stent group and 17.65% in the no stent group. The rate of anastomotic stricture was 3.23% (n=1) in the stent group and 11.76% (n=2) in the no stent group. The rate of bile leak in the stent group was 3.23% (n=1), in contrast, bile leak never occurred in the no stent group. The rate of biliary obstruction was 0% in the stent group and 5.88% (n=1) in the no stent group. **(Conclusion)** The overall rate of biliary complication in the internal stent group was lower than in the no stent group and most of the biliary complications can be treated successfully with endoscopic or radiologic intervention.

간담췌 P-17

Effect of hepatitis B core antibody positive graft on adult liver transplantation

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(Purpose) Because of the disparity between donors and recipients, the use of marginal donor such as hepatitis B core antibody (HBcAb) positive graft has been increasing, especially where hepatitis B is endemic. However, it is still controversial to use of the HBcAb positive graft to the hepatitis B antigen (HBsAg) negative recipient, because of the risk for

de novo hepatitis B virus (HBV) infection. **(Methods)** From January 2000 to December 2012, we analyzed retrospectively 187 HBsAg negative recipients and donors who had undergone liver transplantation (LT) at our hospital. De novo HBV virus infection was defined as positive serum HBsAg with/without HBV DNA detection. The median follow up duration after LT was 46.9 (6~134) months. We analyzed the incidence and risk factors of de novo HBV infection and survival rate according to the recipient hepatitis B surface antibody (HBsAb) and HBcAb status. Also, we evaluated the outcomes of anti-HBV treatment for de novo HBV patients. **(Results)** A total of 187 cases were included in this study. Among them, 40 (21.4%) HBsAg negative recipients received graft from HBcAb positive donor. There was no significant difference in donor age and recipient survival rate between HBcAb positive and negative donor group. Without anti HBV prophylaxis treatment, de novo HBV infection was occurred in 5 (12.5%) out of 40 HBsAg negative patients. De novo HBV infection in HBsAb negative recipient was significantly more than HBsAb positive recipient. In the same way, HBV infection in HBcAb negative recipient was more than HBcAb positive recipient. However, there was no statistically significant survival difference between two HBcAb positive and negative donor group. All patients were successfully treated with antiviral agent such as entecavir with/without hepatitis B immunoglobulin (HBIG). Among them, negative seroconversion of HBV DNA was occurred in 4 patients and serum alanine transaminase (ALT) was declined in all treated patients. There were no mortality cases which were related with HBV infection. **(Conclusion)** HBcAb positive graft can be safely used without survival difference in HBsAb and/or HBcAb positive recipient. However in HBsAb and HBcAb negative recipient, risk of de novo hepatitis B virus infection was significantly increased. All patients with de novo HBV infection were successfully treated. So in these cases, preoperative anti HBV prophylaxis should be needed.

간담췌 P-18

Effects of pretransplant locoregional treatments in HCC patients on overall survival and disease free survival after living donor liver transplantation

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(Purpose) Among the several treatment modalities for hepatocellular carcinoma (HCC), liver transplantation (LT) is represents the treatment of choice for selected patients with HCC and cirrhosis because it cures not only the tumor but also the underlying liver disease. However, not all patients with HCC and cirrhosis can undergo transplantation because of the scarcity of liver donors. HCC patients awaiting LT are received locoregional treatments for the purpose of bridging and downstaging. Therefore it is important to evaluate the response of pretransplant locoregional treatments and to predict the result of pretransplant locoregional treatments preoperatively. **(Methods)** From December 2003 to December 2012, a total of 234 patients underwent living donor liver transplantation (LDLT) for HCC at our transplant center. Among them, the medical records of 130 patients who were newly diagnosed HCC at our hospital were reviewed retrospectively. The response to pretransplant locoregional treatments was compared using the Milan criteria, modified Response Evaluation Criteria in Solid Tumors (mRECIST) criteria, the change of tumor markers, and tumor necrosis in explants. **(Results)** 20 patients experienced HCC recurrence after LDLT during follow up period. The 1, 3, and 5 year disease free survival (DFS) rates were 90.9, 84.6, and 81.4%, respectively

and the 1, 3, and 5 year overall survival rates were 89.8, 83.9, and 81.0%, respectively. Among 33 patients with HCC beyond the Milan criteria at HCC diagnosis, 12 patients (36.4%) were successfully achieved downstaging. And their 5 year DFS rate was 81.8%, comparable with that in patients initially within the Milan criteria. The Milan criteria at transplantation (p=0.030), mRECIST criteria (p=0.003), and the change of the tumor markers such as alpha-fetoprotein (AFP) (p<0.001) and vitamin K absence or angiotensin-II (PIVKA-II) (p=0.008) were statistically significant for HCC recurrence after LDLT in univariate analysis. The increased AFP level during pretransplant locoregional treatments was only significant factor for HCC recurrence after LT in multivariate analysis [odds ratio: 6.012 (1.388 - 26.035), p=0.016]. The response to pretransplant locoregional treatments can predict tumor biology such as microvascular invasion. **(Conclusion)** The increasing AFP level while waiting for LDLT is the most relevant preoperative prognostic factor for HCC recurrence after LDLT. The patients who are successfully down-staged and undergo LDLT have a good DFS rate and it is comparable with that in patients within the Milan criteria.

간담췌 P-19

Preliminary metabolome study to predict acute rejection after liver transplantation

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(Purpose) Despite improved survival rates in liver transplantation, acute rejection is still major problem which threatens the life of recipients. If we can predict the acute or chronic rejection in advance, it is possible to use adequate immunosuppressive agents and to give a timely treatment. **(Methods)** Between March and May 2012, serum samples were obtained at week 1, 2, 3, and 4 post living donor liver transplantation at Asan Medical Center. Six months later, 16 patients who showed rejection symptoms composed the rejection group. We selected a control group comprised of 17 patients, who did not show any rejection symptoms. They are selected on the basis of age, sex and ABO compatibility similar to rejection group. A variety of free fatty acids, free cholesterol, and energy metabolites were investigated and compared between two groups. **(Results)** Several fatty acids, such as myristic acid, palmitoleic acid, palmitic acid, linoleic, vaccenic, stearic acid, eicosapentaenoic acid and docosahexaenoic acid in rejection group showed higher levels at week 3, but not γ -linolenic, stearic acid, arachidonic, dihomo-γ -linolenic and free cholesterol. At week 4, fatty acids and cholesterol levels in rejection group were higher than those of week 3. Levels of energy metabolites such as glucose 6-phosphate/ fructose 6-phosphate (G6P/F6P), 3-phosphoglycerate (3PG), pyruvate (PYR), citrate/iso citrate (CIT/ISO CIT), alpha-ketoglutaric acid (AKG), succinic acid (SUC), malic acid (MAL), lactic acid (LAC) and nicotinamide adenine dinucleotide (NAD) in control group increased over time, but not glucose, fructose 6-phosphate (FBP) and nicotinamide adenine dinucleotide, reduced form (NADH). **(Conclusion)** The ratios of many free fatty acids and energy metabolites differed between two groups, suggesting that metabolites may be useful to detect acute rejection at early stages post-transplantation. However, further investigation with larger sample numbers is required to verify these results.

간담췌 P-20

Severity of fatigue after liver transplantation is associated with postoperative complication

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(Purpose) Fatigue is common in chronic hepatitis and end-stage liver disease. Almost clinical and laboratory findings usually recover after transplantation. But fatigue often remained. The aims of this cross-sectional study were to assess fatigue after liver transplantation, and to explore what factor is related to severity of fatigue. **(Methods)** From April 2013 to May 2013, we reviewed 94 patients after transplantation. Severity of fatigue was assessed with the Fatigue Severity Scale (FSS). Furthermore, age, gender, etiology, immunosuppressant and complication **(Results)** 21.3% of all patients was fatigued (FSS≥ 4.1) and 9.6% of all patients was severely fatigued (FSS≥ 5.1). Complication rate of the fatigue patients were significantly higher than non-fatigue paitents (50% vs 31.1%, P<0.05).Relative risk of fatigue with complication was 2.21. But severity of complication was not associated with fatigue. **(Conclusion)** Fatigue after liver transplantation is also troublesome. Complication is associated with severity of fatigue after liver transplantation

간담췌 P-21

Comparision of patient satisfaction according to different incision methods for donor hepatectomy in living donor liver transplantation

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(Purpose) As a donor age is becoming less and female ratio is becoming more, a large abdominal incision is a major concern of some live donors and surgeons especially in terms of cosmetic appearance. **(Methods)** A total of 336 donors who underwent donor hepatectomy for living donor liver transplantationfrom April 2010 to December 2012 were analyzed. Donors were divided into 2 groups by the type of incision as conventional group (n=214) and minimal incision group (n=122) including upper midline incision (n=110) and transverse incision using laparoscopy (n=12). Demographics, clinical outcomes of donor and recipient and patient satisfaction of cosmetic appearance using a questionnaire were compared. **(Results)** In demographics, mean age was younger (28.1 vs. 34.6, year, p=0.000), female ratio was higher (30.4%, 40.2%, p=0.068) and BMI was lower (23.3 vs. 22.5, Kg/m2, p=0.024) in conventional group than minimal incision group. Mean operation time (274.8 vs. 267.7, min, p=0.188) and hospital stay (9.4 vs. 8.5, day, p=0.000) was shorter in minimal incision group than conventional group. Peak level of aspartate transaminase (144.8 vs. 161.5, IU/L, p=0.014) and alanine transaminase (141.3 vs. 161.4, IU/L, p=0.025) were more elevated in minimal incision group than conventional group.There was no significant difference in postoperative morbidity and mortality of donor and recipient in both groups. Donor satisfaction us-

ing questionnaire showed more satisfactory of cosmetic view (p=0.001) and self-confidence (p=0.001) in minimal incision group than conventional group. Sense of dullness or numbness on scar was more prominent in conventional group than minimal incision group which upper midline incision only included. (40.0% vs. 13%, p=0.027) **(Conclusion)** Minimal incision is technically feasible and safe for donor hepatectomy and it also achieved higher patient satisfaction levels from improved cosmetic outcomes than conventional incision.

간담췌 P-22

Long-term outcome of living donor liver transplantation for patients with alcoholic liver disease

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(Purpose) Since most liver transplantation (LT) studies for alcoholic liver disease (ALD) were performed on deceased donor LT, little was still known following living donor LT (LDLT). **(Methods)** The clinical outcomes of 126 ALD patients who underwent LDLT for 11 years in a high-volume LT center were assessed retrospectively. **(Results)** ALD cases occupied 5.7% of adult LDLT indication (n=2196). ALD occupied 1.9% (4 of 207) during 2000 to 2001, whereas the proportion gradually increased up to 11.3% (34 of 301) in 2010. The model for end-stage liver disease score was 22.1±9.9, and 6-month abstinence was observed in 105 (83.3%). Related donors were 123 (97.6%). Single-graft and dual-graft were implanted to 111 and 15, respectively. Main graft type was single right liver graft (n=108, 85.7%). Graft-to-recipient weight ratio was 1.02±0.16. Perioperative mortality within 3 months occurred in 5 (4.0%). Overall 1-, 3-, 5- and 10-year patient survival rates were 92.1%, 88.0%, 85.8% and 83.7%, respectively. Three patients died from alcohol abuse. De novo hepatitis B virus infection occurred in 2 of 26 after implantation of core antibody-positive graft and no further cases happened after strict application of prophylaxis. **(Conclusion)** The results of this study revealed that the survival outcome of LDLT in ALD patients is comparable to that of deceased donor LT. To achieve favorable long-term survival, a multidisciplinary approach can be an effective strategy, including the interaction between the patient, the physician, and the family members.

간담췌 P-23

Role of external biliary drainage in living-donor liver transplantation using duct-to-duct anastomosis

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(Purpose) This study intended to compare the incidence of biliary complication (BC) in adult living-donor liver transplantation (LDLT) recipients who underwent right-lobe duct-to-duct anastomosis (DDA) with or without external biliary drainage (EBD) and intended to optimize EBD tube clamping. **(Methods)** This study consisted of a ret-

rospective assessment of EBD effect and a prospective trial for EBD tube clamping optimization. The retrospective study included EBD group (n=208) and non-EBD group (n=145). The prospective study included 60 cases with EBD. **(Results)** In the retrospective study, single DDA was performed in 83.7% of EBD group and 80.7% of non-EBD group (p=0.47). One-year overall incidence of BC was 14.4% in EBD group and 16.8% in non-EBD group (p=0.48). The incidence of early anastomotic bile leakage was 1.0% in EBD group and 4.8% in non-EBD group (p=0.036). In the prospective study, there was no difference in tube clamping success rates between low- and high-output EBD groups. There was also no statistical difference between the success and failure groups in terms of graft duct size, liver function tests, and posttransplant days at tube clamping. **(Conclusion)** The size of our EBD tube was too small for the graft duct size, therefore its main role appeared to be early biliary decompression, which helped prevent bile leakage and also simplified the route of cholangiogram in detecting early BC. Hence, EBD is worthy of performing in selected patients with a high-risk of anastomotic bile leak.

간담췌 P-24

Treatment of Hepatocellular carcinoma recurrence after liver transplantation

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(Purpose) Recurrent hepatocellular carcinoma (HCC) after liver transplantation (LT) has a poor prognosis. This study aims to access characteristics of patients and treatment strategy for HCC recurrence after LT. **(Methods)** We performed LT for HCC to 60 patients between May, 2010 and March, 2013. Among them, 7 (12%) patients recurred and we analyzed characteristics and clinical course of those cases retrospectively. **(Results)** 47 (78%) patients underwent Living donor liver transplantation (LDLT). The etiology of HCC are hepatitis B (77%), hepatitis C (11%). The cumulative 1 year survival rate of HCC patients was 94.2%. And the 1 year disease free survival (DFS) rate was 83.5%. Among recurred patients, 5 (71%) of patients were beyond Milan criteria, 6 (86%) of patients survived till now. The average of DFS of recurrent HCC patients was 6.47 months. Only 1 patient deceased within 1 month from recurrence. The treatment modalities were locoregional therapy such as radiofrequency ablation and transarterial chemoembolization, surgical procedure such as resection and re-LT, chemotherapy using sorafenib. 3 of 7 patients were treated by sorafenib and surgical resection, other patients were treated by resection or RFA. **(Conclusion)** Although the prognosis of recurrent HCC after LT is poor, long term survival can be achieved by active therapy. Among several therapeutic modality, the combination of sorafenib treatment and other therapies is safe and effective. However, prospective randomized trials should be needed to assess progression of recurrent HCC and to demonstrate a survival benefit of several therapeutic modality.

간담췌 P-25

The fate of the remnant segment 4 according to its arterial origin after living donor left lateral sectionectomy

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(Purpose) We investigated that change of the remnant segment 4 according to the different origination of segment 4 artery and its complications after living donor left lateral sectionectomy (LLS). **(Methods)** We retrospectively analyzed the outcomes of 32 living donors who underwent LLS among 169 pediatric liver transplantations from January 2004 to December 2010. **(Results)** Segment 4 Artery was originated from proper hepatic artery in 3 donors (9%) or left hepatic artery in 23 cases (72%) or right hepatic artery in 6 cases (19%). Postoperative bile duct dilatation was observed in 29 donors (90%) (p=0.775) and 22 cases of remnant segment 4 was atrophied regardless of its arterial origination (P=0.699). Postoperative bile leak was treated without any intervention in 2 cases and no bile duct related problem from saved remnant artery was observed. And liver function was normalized within postoperative 4 months in all donors and. **(Conclusion)** After living donor left lateral sectionectomy, bile duct related problem from remnant arterial supply in remained segment 4 was not significant.

간담췌 P-26

High alpha-fetoprotein level as the sole predictor of tumor recurrence and survival after liver transplantation for patients with advanced hepatocellular carcinoma

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(Purpose) The oncologic outcome of liver transplantation (LT) for hepatocellular carcinoma (HCC) has improved by using Milan criteria (MC) for selecting candidates of the procedure. However, there was a debate on the strict criteria because patients with HCC beyond MC with favorable outcome were reported. Some studies tried to expand its criteria, and others sought to find more effective prognostic factors of LT for HCC, including 18F-FDG PET (PET) uptake and preoperative biopsy for assessing tumor biology. The aim of the study was to validate some expansion criteria and to figure out accurate predictors of LT for HCC beyond MC. **(Methods)** The study included LT recipients with HCC beyond MC on preoperative radiological studies between 2005 and 2012. Candidates of predictor variables including several reported expansion criteria (UCSF, up-to-seven, and Asan), parameters of tumor biology (PET uptake, alpha-fetoprotein level), and postoperative pathologic findings were evaluated. **(Results)** A total of 31 patients with advanced HCC were treated by means of LT, 8 of whom underwent salvage LT. Excluding the 4 cases (12.9%) of in-hospital mortality, the overall survival rates at 3 and 5 years were 56.3% and 50%. During follow-up, there were 9 deaths, all because of tumor recurrence. On multivariate analysis, alpha-fetoprotein >400 ng/mL was the only in-

dependent predictor of tumor recurrence (HR: 17.287 [1.689-176.926], p=0.016) and survival (HR: 16.733 [2.136-131.075], p=0.007). **(Conclusion)** In this study, reported expansion criteria did not reliably stage patients with HCC beyond MC for LT, but high alpha-fetoprotein level solely did.

간담췌 P-27

Unexplicable outcome of early appereance of De Novo HCC in the Allograft after DDLT

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(Purpose) Although only few cases have been reported in the literature, occurrences of de novo hepatocellular carcinoma (HCC) after liver transplantation for advanced cirrhosis have been diagnosed after many years of viral infection recurrence. **(Methods)** We are presenting a unique case with the earliest appearance of de novo HCC in a patient with end stage liver disease (ESLD) without previous malignancy and with YMDD viral mutation. **(Results)** This case is a 45-year-old male with HCV, HBV and HBsAg positive previous decease donor liver transplantation (DDLT), however, after liver transplantation HCV RNA and HBsAg were not detected, but HBV DNA was still positive after liver transplantation (LT). The recipient obtained a liver from a young donor with a negative report for HCV and HBV and otherwise healthy background. Nine months after liver transplantation in a routine followup, a computerized tomography (CT) scan detected a severe mass occupying the right lobe. This unfortunate case has also shown a CT chest with lung metastatic nodules in the right basal lower lobe (BLL). There are some theories left to elucidate how de novo HCC could possibly appear in such a short period of time in a case with a low suspicion to occur after liver transplantation. **(Conclusion)** To the extent of our knowledge this is the first report of de novo HCC that has emerged in such degree of severity and in a very short period of time after LT.

간담췌 P-28

Hepatic failure due to subcapsular hematoma resulting from percutaneous transhepatic biliary drainage after liver transplantation

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(Purpose) Introduction) Parenchymal liver injury after liver transplantation is rare complication. Expanding hematoma can lead to the elevation of intrahepatic pressures that resulted in diminished hepatic perfusion and ischemia. It may cause fulminant hepatic failure requiring emergent liver transplantation. We reported 1 case of hepatic failure due to subcapsular hematoma resulting from percutaneous transhepatic biliary drainage (PTBD) after liver transplantation. **(Methods)** Case) A 46-year-old man underwent living donor liver transplantation for hepatitis B-related cirrhosis. He admitted for biliary stricture at 9 months later after liver transplantation. Endoscopic procedure was not successful, so PTBD was done. After PTBD, parenchymal liver injury occurred. Large amount of hematoma was seen at computed tomography. Liver enzyme and serum bilirubin were highly elevated. The patient's clinical course progressed to hepatic

failure. 20 days after, the patient underwent explorative laparotomy for evacuation of intra-abdominal hematoma. In operative finding, large amount of subcapsular hematoma was seen. It seemed 'hepatic compartment syndrome'. Hematoma evacuation and multiple drainage were performed. After operation, the patient's condition was improved gradually. The patient discharged 2 weeks after the operation. Liver enzyme and serum bilirubin decreased to nearly normal range at present.

간담췌 P-29

Do we need for a more standardized definition of bile leakage after hepatectomy?: A prospective observational study

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(Purpose) Bile leakage after liver resection remains a major cause of postoperative morbidity, often leading to a prolonged hospital stay, and need for additional diagnostic tests and interventions. The international study group of liver surgery (ISGLS) had proposed a uniform definition and severity grading of bile leakage after hepatobiliary and pancreatic operative therapy. The aim of this study was apply the definition proposed by the ISGLS in clinical practice and search for additional criteria for defining bile leakage after liver resection. **(Methods)** We prospectively collected clinical data from patients who underwent liver resection between May, 2012 and August, 2013. Data included drain amount, bilirubin concentration in serum and drain fluid on the first and third postoperative day. Bilirubin concentration in serum and drain fluid was also checked on the day of drain removal. **(Results)** There were 126 patients during the study period. The mean age was 57.3 years. The mean bilirubin concentration in drain fluid on the first and third postoperative day was 3.92mg/dL and 3.08 mg/dL, respectively. Liver resection procedures included minor (ex. wedge resection) to major resections (ex. trisectionectomy). The mean hospital stay was 14 days. According to the definition proposed by the ISGLS, 17 patients revealed bile leakage whereby the bilirubin concentration in drain fluid on or after the third postoperative day exceeded 3 times the concentration in serum. Of these patients, 14 had grade A bile leakage, and 3 patients required radiologic intervention (grade B, n=2) or reoperation (grade C, n=3). There were 11 patients whose bilirubin concentration in drain fluid on the first postoperative day exceeded 3 times the concentration in serum. Almost all of these patients (n=10) eventually did not develop bile leakage and were discharged within the tenth postoperative day. The mean hospital stay did not differ between patients with grade A bile leakage and patients without bile leakage ($p>0.05$). However hospital stay significantly longer in patients with grade B or C bile leakage. **(Conclusion)** The bilirubin concentration in drain fluid and serum checked on or after the third postoperative day was more reliable to predict bile leakage than on the first postoperative day. There was no difference in clinical management between patients with grade A bile leakage and patients without bile leakage. The current definition of bile leak provided by the ISGLS was useful in clinical practice.

간담췌 P-30

Small remnant liver volume case experience after major liver resection

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(Purpose) Liver resection is the first choice of treatment for primary and secondary liver malignancies. But, at a lot of reports extensive hepatic parenchymal resection is the risk factor of the post-hepatic dysfunction. And it is associated with high frequency of post operative complication, mortality and an increased leghth of hospital days. Generally, Major hepatectomy can be performed safely at RLV (Remnant Liver Volume)/TLV (Total Liver Volume) ≥30% or RLV/BWR (Body Weight Ratio) ≥0.6. Recent reports have shown that this limit can be decreased to 20%~25% without a high death rate. In this retrospective study, we investigate 42 patients under RLV/TLV <30% or RLV/BWR <0.6 about post operative hepatic dysfunction, morbidity, hopital days and so on after major hepatectomy. **(Methods)** Study Design Records were reviewed of 42 consecutive patients who falls under RLV/BWR<0.6 or RLV/TLV <30% in which underwent major hepatectomy between 2008 and 2012.RLV (cubic centimeter) was measured preoperatively with three-dimensional helical computed tomography; TLV (Total Liver Volume; cubic centimeter) was calculated from the patients BSA. The relation between RLV/TLV and RVL/BWR (Body Weight Ratio; cubic centimeter per kilogram) was examined using linear regression analysis. Post Hepatectomy Liver Failure (PHLF) was defined as both a prothrombin time<50% and total serum bilirubin level >50 mol/L after postoperative day 5 according to beaujon hospital criteria. Continuous variables were expressed as median and compared using the Mann-Whitney U test. Hepatic dysfunction and morbidity were compared using Fisher's exact test. **(Results)** PHLF patience along 50/50 criteria was seven (16.67%) people during 42 patients, and one patient expired due to PHLF. Five patients out of seven patients were recovered until normal laboratory value. There is a jaundice patience for two months during progress observation. At cirrhosis, preoperative chemotherapy, fatty change, and DM; there was no affect of occurrence as PHLF. Cholestasis and Caudate lobectomy revealed risk factor of PHLF (p-value=0.002). In morbidity, Only caudate lobectomy was significant risk factor. Hospital stay has increased significantly with cholestasis, hilar cholangiocarcinoma, caudate lobectomy, and pre-op PVE patients. **(Conclusion)** Liver resection was known as first treatment of choice for hilar cholangiocarcinoma, advanced hepatocellular carcinoma, advanced intra-hepatic cholangiocarcinoma, and multiple metastatic tumor. However, many number of patients with such this conditions has to have liver-resection for their complete recovery; in most cases, palliative operation was done due to small remnant liver volume factor. As follows from our research, acceptable rate of PHLF has been reported for small remnant liver operation with no cholestasis and even with PHLF, every patient was recovered their liver function except two cases. Correlation between caudate lobectomy and risk factor that large number of caudate lobectomy combined patience has bile duct obstruction. Though, a comparative study with non-small remnant liver group will be necesary, major hepatectomy can perform under RLV/BWR <0.6 or RLV/TLV <30% in non-cholestatic patients. And major hepatectomy can be done with enough pre-operative decompression for cholestatic patient.

간담췌 P-31

Laparoscopic anatomic mono-segmentectomy 8 using a intra-hepatic glissonian approach

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(Purpose) The application of laparoscopic liver resection has been extended farther with accumulated experience and evolved techniques. Nevertheless, lesions of poserosuperior segment is still challengeable due to lack of visualization and difficulty of bleeding control. Some of forerunners have attempted the glissonian approach to overcome these problems. Herein, we reported a HCC (S8) patient treated with laparoscopic segmentectomy 8 using the intrahepatic glissonian approach. **(Methods)** A 58 year-old male patient was diagnosed with EGC (antrum) and 3.9x4 cm sized HCC located at segment 8. Laparoscopic S8 monosegmentectomy was firstly performed with 4 ports method (umbilicus and epigastrium: 11 mm, Rt. mid-abdomen and Lt. upper abdomen: 5 mm) and LADG with D2 lymph node dissection was performed later with additional 2 ports (Rt. lower abdomen: 11mm, Lt. lower abdomen: 5mm). He was placed in Rt. semilateral postion. The operator was stood at the right side of the patient. Firstly, the main lesion was checked with intraoperative ultrasonography, the portal pedicle was divided into Rt. and Lt. pedicle. We performed parenchymal dissection to find out a superior pedicle for S8 of Rt. anterior pedicle, and ligated the glisson's pedicle with clip and 10 mm hemo-weck clip. And further parenchymal dissection was continued along the demarcation line. S8 hepatic branch of Rt. hepatic vein also skeletonized and ligated with 10 mm hemo-weck clip. All the parenchymal dissection was performed using the laparoscopic cavitron ultrasonic surgical aspirator (CUSA) and harmonic scalpel. After the segmentectomy, LADG was performed continuously. **(Results)** The total operating time was 215 minutes, and estimated blood loss was 100 ml. Diet was started at postoperative day 4 and discharged at postoperative day 8 without complications. **(Conclusion)** The laparoscopic intrahepatic glissonian approach is a feasible and safe method for en masse resection of lesions at posterosuperior segments.

간담췌 P-32

Laparoscopic Pringle maneuver with endovascular clamp and expandable trocar

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(Purpose) During liver resection, Pringle's maneuver is sometimes very usefull to control beeding. surgeons. However, laparoscopic encircling of the hepatoduodenal ligament can prove difficult because the field of view is narrow and the surgeon's blind spot may lead to unexpected bleeding or injury under laparoscopy. We introduce here a simple and safe method of laparoscopic Pringle's maneuver with endovascular clamp and extendable trocar with a video clip. **(Methods)** After insertion of trocars, 5mm sized expandable trocar (Versastep®) was inserted in right or left mid site of abdomen. Endovascular clamp was inserted through extendable trocar. Then encircling of hepatoduodenal ligament was performed and endovascular clamp was placed at encircled hepatoduodenal ligament without clamping. During liver resection, when portal bleeding was occurred, Pringle maneuver was done by clamping endovascular clamp. **(Results)** From

January 2007 and June 2013, 90 patients underwent laparoscopic liver resection for various pathology. Among these patients, laparoscopic Pringle maneuver was performed in 18 patients. In all patients, laparoscopic Pringle maneuver could be performed easily without any complication. Mean ischemic time was 27.6 minutes and mean bleeding amount was 460 ml. **(Conclusion)** Laparoscopic Pringle maneuver using endovascular clamp is safe and feasible.

간담췌 P-33

A case of liver abscess caused by a lost appendicolith, successfully treated by laparoscopic approach

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(Purpose) Introduction; The incidence of liver abscess has been decreased. We report a very unusual case of liver pyogenic abscess cuased by a lost appendicolity during previous appendectomy. And the appendicolith was removed by laparoscopic approach to avoid recurrent pyogenic liver abscess **(Case report)** A-44 year old woman was admitted emergency room for abdominal pain. She had a history of appendicitis, and underwent appendectomy seven months ago. At that time, appendix was perforative and panperitonitis was detected in the operation. At this time, on the abdomen CT scan, 3cm sized, low density lesion was detected at subcapsular area of segment 6 and 7 of the liver. The abscess cavity contained small high density lesion, which was compatible with appendicolith detected at previous abdominal CT scan. At first, she was treated by antibiotics. However, the abscess did not disappear and the patient complained recurrent abdominal pain with fever. Therefore, after treatment of subsequent antibiotics, we decided to operate to remove the appendicolith by laparoscopic approach. We used four port. At first, right triangular ligament was dissected and the pocket of abscess dissected. And we found the appendicolith and removed. The patient recovered without complication. And she did not suffer recurrent liver abscess anymore after operation. **(Conclusion)** ConclusionWondering appendicolith was the leading cause of pyogenic liver abscess at this case. And we removed the appendicolity successfully by laparoscopic approach.

간담췌 P-34

Role of preoperative left portal vein embolization for left hemihepatectomy in hepatobliary malignancy patients with high operative risk

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(Purpose) The primary indication of portal vein embolization (PVE) has been settled for emolization of the hemihepatic portal vein to induce ipsilateral atrophy and contralateral hypertrophy before major hepatectomy. With accumulation of clinical experience, indication of PVE is expanded to left liver atrophy in patients with high operative risk on left hepatectomy. **(Methods)** The clinical data for 7 patients who underwent left PVE for left hepatectomy were reviewed retrospectively. **(Results)** Primary diagnoses were perihilar cholangiocarcinoma (n=5) and intrahepatic cholangiocatcinoma (n=2). Their mean age was 64.1±5.6 years. The underlying reasons for

preoperative left PVE were excessively large left liver volume with concurrent removal of the dominant middle hepatic vein trunk (n=2), poor general condition (n=3) and delayed resolution of obstructive jaundice (n=2). The mean interval between PVE and operation was 13.6±5.1 days. The volume shrinkage of the left hemihepatic parenchyma was about 15% during the first 7 days. One patient underwent additional left hepatic vein embolization due to little shrinkage effect. No PVE procedure-related complication occurred at all. All of these patients underwent curative surgery of preplanned extents and recovered uneventfully without noticeable deterioration of liver function. All of these patients are alive for 1-5 years with or without primary tumor recurrence. **(Conclusion)** The results of this preliminary study implicate that left PVE is a useful preparative option for patients with high operative risk on left hepatectomy. Our indications for left PVE include excessively large left liver volume after consideration of age factor, concurrent removal of the dominant middle hepatic vein trunk, poor general condition and delayed resolution of obstructive jaundice.

Biliary & Pancreas

간담췌 P-35

Surgical outcome of hilar cholangiocarcinoma with Bismuth type Ⅲ or Ⅳ: the meaning of neoadjuvant concurrent chemoradiation therapy

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(Purpose) Although aggressive surgical resection with negative resection margin (R0 resection) remains standard treatment for hilar cholangiocarinoma (HCCA), systemic recurrence as well as local recurrence is frequent even after R0 resection. This study aimed to analyze the prognostic factors after surgical resection for HCCA involving over second order intrahepatic duct and evaluate the meaning of neoadjuvant concurrent chemoradiation (CCRT) therapy. **(Methods)** From January 2000 to May 2013, 129 consecutive patients with Bismuth type III or IV underwent surgical resection for treatment of HCCA. Among these patients, 120 patients underwent curative aimed surgical resection and 16 patients got neoadjuvant concurrent chemoradiation therapy. Disease-free and overall survivals after surgical resection were evaluated and prognostic factors were analyzed. Then, perioperative outcome of the patients with neoadjuvant CCRT was compared the patients without neoadjuvant CCRT. **(Results)** R0 resection was achieved in 102 patients (85.0%) and perioperative mortality was 14.2%. 5-year disease-free and overall survivals of 120 patients were 29.7 and 30.2%, respectively. Preoprative tumor markers, carinomebrionic antigen (CEA) more than 5 ng/mL, carbohydrate antigen 19-9 (CA 19-9) more than 400 U/mL, and performing chemoradiation therapy were signifincant worse prognostic factors for disease-free survival. Preoperative CA 19-9 more than 400 U/mL, preoperative serum total bilirubin more than 2 mg/dL, and presence of microscopically positive resection margin were worse prognostic factors for overall survival according to multivariate analysis. R0 resection was achieved for all patients with neoadjuvant CCRT even though there was no statistically significance. Recurrence rates, especially local recurrence rate after surgical resection were smaller in the patients with neoadjuvant CCRT (50.5% Vs 31.3% and 25.5% Vs 12.5%, respectively) even though there was no statistically significance. **(Conclusion)** Radical R0 resection might be the best treatment option for treat of HCCA with Bismuth type III or IV. Although there was no statistical significant differences due to small number of patients, neoadjuvant CCRT might be helpful to increase R0 resection rates and decrease local recurrence.

간담췌 P-36

An adenocarcinoma detected at remnant cystic duct after cholecystectomy

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(Purpose) Carcinoma of the remnant cystic duct is extremely rare, and only eight cases have been reported in worldwide. We experienced a case of incidentally detected remnant cystic duct carcinoma in a patient who had undergone cholecystectomy. **(Methods)** A 74-year-old woman visited our hospital with pain of right upper quadrant of the abdomen. Her past history included cholecystectomy for acute cholecystitis 10 years ago and common bile duct (CBD) stones that removal by endoscopic retrograde cholangiopancreatoscopy (ERCP) 2 years ago. Both computer tomography (CT) scan and magnetic resonance imaging of the abdomen suspected acute cholecystitis in remnant gallbladder (GB) or remnant cystic duct with impacted multiple stones. And there was focal enhanced wall thickening in cystic duct adjacent CBD, which was probably due to acute inflammation rather than tumorous condition. ERCP was performed, but there was no filling defect or dilatation in CBD. Resection of remnant GB and cystic duct was performed. **(Results)** The resected specimen revealed a chronic active inflammation with abscess formation, and adenocarcinoma invading into the wall (pT2). The diagnosis of carcinoma of the cystic duct was made using Ozden's new criteria. A positron emission tomography (PET)-CT scan performed after cholecystectomy showed an hypermetabolic lesion in portal mass (standard uptake value (SUV) 4.8), and residual malignancy could not be ruled out. Resection of remnant cystic duct, wedge resection of liver, and lymphadenectomy were performed. There was no residual cancer cells in cystic duct, liver, or lymph nodes. **(Conclusion)** The final diagnosis was adenocarcinoma of remnant cystic duct.

간담췌 P-37

Usefulness of bacteriological analysis of bile in patients with acute cholecystitis

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(Purpose) Acute cholecystitis (AC) is one of the high risk factors for bactibilia in patients undergoing cholecystectomy. However, there is a few study have been conducted on bacteriological analysis of bile in patients undergoing cholecystectomy for AC. In this study, we focused on the bacteriological analysis of bile in AC patients and analyzed the risk factors for bactibilia. **(Methods)** Between June 2007 and July 2013, 162 patients who underwent cholecystectomy for AC at Kyunghee university hospital with bacteriological analysis of bile were enrolled in the study. **(Results)** Definite diagnosis of AC was made in accordance with the Tokyo guidelines: Mild (Grade I), 19 patients (11.7%); Moderate (Grade II), 143 patients (88.3%). Bile specimen were sampled using various methods, including percutaneous transhepatic biliary drainage (21 cases, 13.0%), direct aspiration from the gall bladder during surgery (126 cases, 77.8%) and endoscopic naso-biliary drainage (15 cases, 9.2%). Bactibilia was detected in 104 patients (64.2%). The bacterial isolates were mainly intestinal microorganisms, including Escherichia coli (22.8%), Klebsiellar spp. (7.4%), Streptococcus spp. (5.5%), Enterococcus spp (9.9%) and Enterobacter spp. (7.4%). Pseudomonas aeruginosa (2.5%) and anae-

robes including Fusobacterium spp. (0.6%) were also isolated. Our local antibiogram revealed that several microorganisms showed higher resistance rates. Total bilirubin (>1.2 mg/dl) was identified as predictor of positive bile cultures in logistic regression analysis. Infectious complications after cholecystectomy were mild and there was no correlation between positive bile culture and the incidence of post operative infections. **(Conclusion)** Bacteriological analysis of bile in AC patients is useful to have an understanding of the type of bacteria and the antimicrobial resistance profile to select the appropriate antimicrobial therapy.

간담췌 P-38

Mass-forming xanthogranulomatous cholecystitis masquerading as invasive gallbladder cancer with a false-positive result on PET leading to extensive surgical resection

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(Purpose) Xanthogranulomatous inflammation of gallbladder wall can extend and infiltrate adjacent organs which can be mistaken for malignancy on preoperative investigations and, intraoperatively, often leads to extensive surgical resections. Only the histopathologic examination of the specimen allows correct diagnosis. **(Methods)** We hereby review clinicopathologic findings of a case which underwent extensive surgeries on clinical, radiological and intraoperative suspicion of gallbladder carcinoma which turned out to be xanthogranulomatous cholecystitis. Xanthogranulomatous inflammation extended into liver, duodenum and colon in our case. **(Results)** A 74-year-old woman was admitted to our hospital for right upper quadrant and epigastrium discomfort and diagnosed as gallbladder carcinoma by ultrasonography, computed tomography and fluorine-18 fluorodeoxyglucose positron emission tomography (FDG-PET)Serum CA19-9 (62.6 U/ml) were elevated. We diagnosed the lesion preoperatively as a gallbladder carcinoma with direct invasion to the liver bed and colon. We performed subsegmentectomy of the liver S4a + S5 and lymph node dissection of the hepatoduodenal ligament with segmental colon resection. **(Conclusion)** Several reports have demonstrated that FDG-PET is useful in differentiating between benign and malignant lesions in the gallbladder. However, there is a limitation in the ability of FDG-PET to differentiate between inflammatory and malignant lesions. We herein present a case of xanthogranulomatous cholecystitis misdiagnosed as gallbladder carcinoma by ultrasonography and computed tomography. FDG-PET also showed increased activity. In this case, FDG-PET findings resulted in a false-positive for the diagnosis of gallbladder carcinoma.

간담췌 P-39

Diffuse large B-cell malignant lymphoma which was ocurred solitary nearby celiac axis

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(Purpose) Primary malignant lymphoma in intra-abdominal cavity have rarely been reported. Here I report a rare case of primary malignant lymphoma which was occurred solitary in celiac axis. **(Methods)** A 66-year-old female patient was

referred to out department for an extrapancreatic mass which was incidentally found during medical check-up. The mass was located nearby celiac axis. Under the diagnosis of lymphangioma or GIST, laparoscopic mass excison was performed. **(Results)** The histological diagnosis was diffuse large B-cell malignant lymphoma. Postoperative 18F-fluorodeoxyglucose-positron emission tomography showed no hot spots. **(Conclusion)** Surgeon should be aware of the possibility for the primary malignant lymphoma in case of an extrapancreatic mass.

간담췌 P-40

Gallbladder carcinosarcoma: A case report

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Gallbladder carcinosarcoma is a rare gastrointestinal tract malignant tumour, which contains both epithelial cancer component and mesenchymal sarcoma component. Because of its unique anatomic location and unspecific medical presentation, preoperative diagnosis is difficult. The prognosis of gallbladder carcinoma is poor with median survival time of 5.5 months. T- and N-staging system has no role in cancer prognostic stratification. Currently, we still have limited experience in managing this form of notorious cancer. Surgical resection is the common practice in treating gallbladder carcinoma though recurrence rate is high (80%). Here, we report a 52-year-old male with new diagnosed gallbladder carcinosarcoma. He was found to have a carcinosarcoma masse at gallbladder with acute inflammation but no metastatic lesion. He underwent a radical cholecystectomy such as wedge resecion with cholecystectomy and regional lymph node dissection after diagnostic laparoscopy. Patholgy shows well differentiated adenocarcinoma and malignant fibrous histiocytoma subserosal involvement and negative involvement of nine lymph nodes. About 2 months later fater postsurgery, he developed carcinomatosis of whole abdomen. So we report a case of gallbladder carcinosarcoma with literature review.

간담췌 P-41

Review of first consecutive 500 cases of single port laparoscopic cholecystectomy in primary hospital

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(Purpose) Cholecystectomy was one of major surgery for hepatobiliopancreas surgeon and is performed mostly at tertiary hospitals. Recently, due to development of surgical technique and equipment, cholecystectomy is also performed at primary hospitals. Damsoyu hospital is primary hospital in Seoul, South Korea and has been performing single port laparoscopic cholecystectomy since 2012 and recently performed over 500 cases consecutively. The aim of this study is to review first consecutive 500 cases of single port laparoscopic cholecystectomy performed at Damsoyu Hospital and seek if primary hospital is capable of performing cholecystectomy **(Methods)** Primary hospital named "Damsoyu Hospital" was opened at September 1st 2012. From September 1st 2012 to August 15th 2013 a single surgeon at Damsoyu Hospital performed 500 cases of single port laparoscopic cholecystectomy consecutively. **(Results)** Patient's male to female ratio was 235 to 265. Mean age was 41.05 years. 69 patients were acute cholecystitis including impacted cystic duct stone and GB* empyema. 3 patients were porcelain GB. 61 patients were GB

polyp and other 367 patients were symptomatic GB stone and chronic cholecystitis. All patients were performed single port laparoscopic cholecystectomy. All patients were admitted at surgery day and discharged the day after surgery except 14 patients who had 2 hospital days and 2 patients who had 5days of hospital days. There were no complication except 7 patients needed ERCP# due to remnant CBD stone and 2 patient took re-operation due to post-op bleeding and due to operation site fluid collection. **(Conclusion)** single port laparoscopic cholecystectomy at primary hospital is possible and can provide large satisfaction to patient. But association with tertiary hospital is essential.

간담췌 P-42

An experience with cystic duct Endoloop ligation in single port laparoscopic cholecystectomy

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(Purpose) There are several techniques of cystic duct closure in laparoscopic cholecystectomy. Laparoscopic metal clip or Hem-o-lok application is most common technique. Although rare, the clips are known to slip, dislodge, ulcerate, migrate, internalize, embolize, and give rise to necrosis of the cystic duct with resultant bile leak and other complications. Ligation of cystic duct with absorbable material could evade these complications. But during the single port laparoscopic cholecystectomy (SPLC), ligation of cystic duct is known to be technically demanding and time consuming procedure. We present our experience with consecutive cystic duct Endoloop ligation in SPLC by a single surgeon. **(Methods)** Between March 2013 and August 2013, there were consecutive 21 patients with SPLC using Endoloop technique for cystic duct ligation in our hospital. The data related to the operative and postoperative measures were collected retrospectively. The operative dissection of the gallbladder was same with conventional laparoscopic cholecystectomy. Infundibular dissection was done until the cystic duct and the cystic artery was clearly identified. The proximal artery was clipped twice, and the proximal cystic duct was double ligated by Endoloop before bisection. **(Results)** Mean operation time was 104.7 minutes (range, 40-180 minutes). In none of the patients was introduction of an additional port or conversion to conventional laparoscopic cholecystectomy needed. Mean estemated blood loss was 28.6cc (minimal-100 cc) and postoperative hospital stay was 2.1 day (2-3 days). No operation needed surgical drain and no postoperative complication was found including bile leakage. **(Conclusion)** Endoloop ligation technique has the advantage of no risk of complications related clips. And this technique can provide almost same result with cystic duct ligation in open laparotomy. SPLC with Endoloop double ligation technique is technically feasible and safe in our experience.

간담췌 P-43

Cystic duct management during inevitable Partial Cholecystectomy

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(Purpose) Accidentally or inevitably performed Partial Cholecystectomy (PC) is associated with high complication rate well above 10%. Still few publications are available dealingdetailed handling around Calot triangle and cystic ductal closure. **(Methods)** We re-

viewed our 28 cases of PC about their operative procedure and outcome during follow up period from Jan. 1998 to Dec. 2010. Cystic duct closure under severe cholecystitis was tried variously by guiding probe, antemesenteric gallbladder tearing down to cystic duct by guiding instruments, or by stapling, together with mucosal cauterization and packing of collagen fiber materials around. **(Results)** Cystic duct ligations were possible in 11 cases, the other 17 cases were managed by intraluminal approach from Hartmann's pouch for closure of cystic duct. Direct stitch closure was possible in 4 cases, stapling was made in 7 cases. In 6 cases, blunt suture closure of Hartmann's pouch was carried out after mucosal cauterization and plugging of collagen fiber material. Complications were 4 bile fistula, 5 peritonitis, 4 wound infection, 2 retained stones, and 5 reoperations later with 4 mortalities. Among 6 cases of blunt suture closure of Hartmann's pouch, 3 bile fistula, 3 peritonitis, 2 wound infection, 1 retained stones, and 3 reoperations occurred, with 2 mortalities. Bile fistula was leading cause of peritonitis and fatal sepsis in 2 blunt stitched cases (2/6 33.3%). **(Conclusion)** When secure closure of cystic duct was not possible after various efforts, patients should always be informed about elevated risks of postoperative complications.

간담췌 P-44

Laparoscopic management of Cholecysto-colonic fistula: Case report

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(Purpose) Bilo-enteric fistula (BEF) is an uncommon finding of gallstone disease with a reported incidence of 0.15~4.8%. Most common cause of BEF is chronic calculous cholecystitis which accounts for 90% of all BEF and calculous cholecystitis is often diagnosed intra-operatively in patients undergoing laparoscopic cholecystectomy but rarely preoperatively. BEF was previously considered to be a relative contraindication to laparoscopic surgery due to technical difficulities. Here, we present a single case of BEF (cholecysto-colononic type) treated successfully by laparoscopic surgery. **(Methods)** The patient had a cholecysto-colonic fistula with a common bile duct stone. The fistula was repaired laparoscopically by an endoscopic linear stapling device (endo-GIA, Endosurgery, Ethicon). A tube drain placed in the sub-hepatic space. **(Results)** The patient had no major complications such as significant bile leakage or intra-abdominal sepsis. **(Conclusion)** Laparoscopic management is feasible and safe, with preference to using endoscopic linear stapling device to avoid peritoneal contamination.

간담췌 P-45

The prevalence of cystic neoplasm of the pancreas in normal healthy population

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(Purpose) The prevalence of cystic neoplasm of the pancreas is not known, but asymptomatic pancreatic are diagnosed with increasing frequency. Few reports in regard to prevalence among asymptomatic

normal healthy population are published except data from small number of subjects. Therefore, the purpose of this study is to investigate the crude prevalence of pancreatic cyst in normal healthy population and to estimate age, sex-matched nationwide prevalence of cystic tumor of the pancreas in Korea. **(Methods)** From October 2003 to June 2013, 21,745 individuals were screened using abdominal computed tomography in the Seoul National University Hospital Healthcare System Gangnam Center, Korea. Demographic data including age and sex were collected and imaging findings were reviewed for differential diagnosis by 1 specialized radiologist. Nationwide population data of 2010 were collected from National Statistical Office, Korea for calculation of expected prevalence. **(Results)** Total 21,745 subjects who were screened had mean age of 51.8±9.8 years, and 13,046 (60.0%) were male. Cystic tumor was found in 457 cases. Mean age of the patients with cystic tumor were 58.7±10.0 years, and 236 (51.6%) were male. The number of intraductal papillary mucinous neoplasm (IPMN), serous cystic tumor (SCT), and mucinous cystic neoplasm (MCN) were 376 (82.3%), 19 (4.2%), and 7 (1.5%) cases, respectively. There were 55 (12.0%) indeterminate cysts which were very small to be characterized. Among 457 incidentally found cystic tumors, total 8 (1.8%) cases were operated. Total 3 distal pancreatectomy, 3 pancreatoduodectomy, 1 enucluation, and 1 duodenum preserving resection of head of the pancreas were performed. Pathologic diagnosis proved out to be 5 cases of IPMN with intermediated grade, 2 IPMN with an associated invasive carcinoma, and 1 cases of SCN. Crude prevalence was 2.1% (2099/100,000 population) and age, sex-matched expected nationwide prevalence was 2.2% (2203/100,000 population). Prevalence of cystic tumor of the pancreas increased with age (p=0.001, R^2=0.730). **(Conclusion)** Total 457 pancreatic cysts were found on 21,745 abdominal CT scan of normal healthy population. Crude and expected prevalence rate of cystic neoplasm of the pancreas were 2.1% and 2.2%, respectively. Prevalence increased with age, therefore, surveillance for pancreatic lesions which might be precursor for pancreas cancer is strongly recommended.

간담췌 P-46

Early prediction of clinically significant post-operative pancreatic fistula following Pancreaticoduodenectomy in Pancreatic Head Cancer

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(Purpose) Pancreaticoduodenectomy is generally accepted as a safe and effective treatment modality in the treatment of pancreatic head cancer. However, postoperative pancreatic fistula (POPF) still remained important complication after pancreaticoduodenectomy. We experienced relatively early presentation of POPF symptoms and elevation of peritoneal amylase level in severe POPF patients, hence we evaluated the peritoneal amylase level and systemic inflammatory response syndrome at early postoperative periods as a predictor of clinically significant POPF (POPF ≥B) **(Methods)** All patients who underwent pancreaticoduodenectomy with pancreatic head cancer in Yonsei University Severance hospital between January 2005 to Dec -ember 2010 were studied. All patient's medical records were retrospectively reviewed. We checked peritoneal amylase level and existence of SIRS at post-operative day 1,3,5,7 and 10. We evaluated the correlation between peritoneal amylase level and SIRS with clinically significant POPF (POPF≥ B) at POD 1,3,5,7 and 10 days. **(Results)** 120 patients were finally enrolled in our study. Male were 52.6% and female were 47.4%.

The mean age of the all patients was 61.9±9.6 years old. POPF occurred in 35 patients (29.2%), Grade A was 27 patients (22.5%), Grade B were 8 patients (6.7%) and Grade C was not occurred. Sensitivity, Specificity, PPV and NPV of Peritoneal amylase level and SIRS at POD 3 as prediction for POPF≥B were (100%,100%), (90.8%,83.3), (44.4%,29.6%) and (100%,100%). Combination of peritoneal amylase level with SIRS at POD 3 showed highly sensitive and accurate prediction of POPF>B, sensitivity, specificity, PPV and NPV were 100%, 91.3%, 80.0% and 100% **(Conclusion)** In our study, combination of peritoneal amylase level with SIRS at POD 3 predicted POPF≥B showing high sensitivity and specificity. We believe early prediction of severe POPF can helpful in that early drain removal can be possible for less likely expected patients and hospital days can be shortened with faster recovery protocols.

간담췌 P-47

Impact of lymph node ratio on survival in resected periampullary malignancies

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(Purpose) As in other gastrointestinal malignancies, it has been suggested that lymph node ratio (LNR) may be associated with survival in patients with periampullary malignancies. Although LNR has been studied in pancreatic adenocarcinoma, it has been infrequently demonstrated in other periampullary malignancies. The purpose of this study was to determine the relation between LNR and survival in different types of periampullary maliganancies. **(Methods)** A retrospective review of 253 pancreaticoduodenectomies (PDs) performed between 2002 and 2012 was undertaken. Clinicopathologic data were collected, and LNR was calculated. Patients with positive lymph node (LN) status were placed into the following groups: (1) LNR=0; (2) LNR ≤ 0.2; (3) LNR ≤ 0.4; and (4) LNR >0.4. **(Results)** Of the 253 malignancies identified, there were 80 (31.6%) pancreatic adenocarcinomas, 23 (9%) duodenal adenocarcinomas, 75 (29.6%) ampullary adenocarcinomas, and 75 (29.6%) cholangiocarcinomas. Median follow up was 18 months. Tumor size, positive resection margin, and nodal involvement affected patient survival in all malignancies studied. Although the absolute number of positive LNs obtained during resection did not significantly change prognosis, increasing LNR was associated with decreased survival ($p<0.05$) in all types of periampullary tumors except duodenal adenocarcinomas. **(Conclusion)** Positive LN status in all patients with periampullary malignancies is associated with worse survival rates than in those with no evidence of disease. LNR is inversely associated with survival rates in almost all types of periampullary malignancies.

간담췌 P-48

Predictors of the presence of concomitant carcinoma in intraductal papillary mucinous neoplasm of the pancreas

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(Purpose) Concomitant carcinoma is common in intraductal papillary mucinous neoplasm (IPMN). It is not well known that the risk factors for high grade dysplasia, non-invasive and invasive intra-

ductal papillary mucinous carcinoma (IPMC). The aim of this study is to determine the predictors of concomitant carcinoma in IPMN. **(Methods)** From September 1994 to April 2013, we retrospectively reviewed the data of 277 patients who underwent pancreatic resection for IPMN. We evaluated personal characteristics, morphologic and pathologic features of IPMN and analyzed predictors of concomitant carcinoma. **(Results)** Of the 277 patients, 67 patients (24%) were diagnosed with IPMC, 21 patients (7.5%) were high grade dysplasia or non-invasive carcinoma and 189 patients (68.5%) were low or moderate grade dysplasia. Among 88 patients with concomitant cancer, 35 cases (40%) were main duct type, 28 (32%) cases were branch duct type and 25 (28%) cases were combined type. The tumor size more than 3.0cm (P=0.041, 95% CI 1.022 - 2.863) and main pancreatic duct size more than 0.5 cm (P=0.016, 95% CI 1.145 - 3.702) were significant predictors of concomitant carcinoma in pancreatic IPMN. **(Conclusion)** If the size of IPMN is more than 3.0 cm or main pancreatic duct size is more than 0.5 cm, concomitant carcinoma is highly suggestive. Therefore before surgical resection we should consider about these findings.

간담췌 P-49

Survival benefit through intraperitoneal gemcitabine chemotherapy in a patient with pancreatic ductal adenocarcinoma and peritoneal carcinomatosis: Case report

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(Introduction) Pancreatic ductal adenocarcinoma (PDAC) shows a very poor prognosis partly due to advanced stages at diagnosis. Recently, adjuvant intraperitoneal chemotherapy (IPCTx) after curative resection of PDAC has been reported. We applied this IPCTx to a case of PDAC with peritoneal carcinomatosis as palliative setting and report early results. **(Case)** A 54-year male was referred for pancreatic tumor. He had taken medicine for DM but had no surgical history. Laboratory results including tumor markers were normal. CT scans showed a 4cm-sized mass with cystic portion in the pancreas tail, encasing splenic artery and vein. EUS revealed an irregular echogenic 3cm-sized mass, extending to surrounding tissue and obliterating splenic vessels. EUS-guided FNA demonstrated malignant cells, consistent with well-differentiated ductal adenocarcinoma. As no distant metastases were detected in PET-CT, the patient was transferred for surgery. On intraabdominal exploration, the pancreatic tumor directly invaded the stomach and transverse colon but was expected to be resected. However, multiple small metastatic nodules were encountered on mesentery and parietal peritoneum. In consideration of patient's age, pancreatic resection (RAMPS), wedge resection of the stomach and segmental resection of the transverse colon were performed and CAPD catheter was installed for palliative IPCTx. Histopathological examination of the surgical specimen demonstrated an about 3.5x2.2x3cm-sized moderately differentiated ductal adenocarcinoma, extending to outermost muscle layers of the transverse colon and stomach (pT3)with clear resection margins. There were two metastatic lymph nodes among 20 regional nodes. The patient recovered without significant complications and underwent palliative IPCTx with gemcitabine (1,000mg/m^2) on days 1, 8 and 15 of the 4-week cycle for a half year. No demonstrable evidence of disease progression has been detected until 10 months after surgery. **(Conclusion)** IPCTx could have a place in contributions to survival benefit in selected patients with PDAC, however, more clinical results based on substantial cases are warranted.

간담췌 P-50

Inflammatory Pseudotumor of the Spleen

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(Purpose) We report a rare case of inflammatory pseudotumor (IPT) of the spleen. **(Methods)** We report a rare case of inflammatory pseudotumor (IPT) of the spleen occurred in a 32-year-old woman admitted to our hospital for left upper quadrant and epigastrium discomfort. **(Results)** There were no constitutional signs and laboratory findings were unremarkable. Serum oncologic markers were within ranges. A computed tomography of the abdomen showed a solitary hypoechoic nodule within the spleen. A colonoscopy and a chest X-ray were performed to rule out the presence of a primary malignancy located at other sites, but nothing relevant was found. Histological characterization with fine needle aspiration of the nodule was not performed to avoid the risk of uncontrollable bleeding and potential tumor seeding. In the suspect of a malignancy the patient underwent splenectomy. Subsequent pathologic examination of the resected organ revealed an IPT. Splenectomy resulted diagnostic and curative. **(Conclusion)** We report a rare case of inflammatory pseudotumor (IPT) of the spleen occurred in a 32-year-old woman

간담췌 P-51

Single port laparoscopic distal pancreatectomy

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(Purpose) Laparoscopic distal pancreatectomy has become the treatment of choice for pancreatic tail cystic tumors, and single port laparoscopic distal pancreatectomy might be another procedure that could be safely performed due to technical advance. **(Methods)** All 24 patients who were diagnosed with pancreatic cystic tail mass were divided into the single port group or conventional group. We compared data from a review of the medical records and clinical outcomes retrospectively. **(Results)** The mean operation time in the conventional group was significantly shorter than in the single port group. Splenectomy was performed more often in the single port group. There was no significant difference in intraoperative blood loss, pancreatic fistula, and postoperative hospital stay between two groups. **(Conclusion)** Clinical outcomes of single port laparoscopic distal pancreatectomy are similar to conventional laparoscopic distal pancreatectomy, except in operation time and spleen preservation.

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Laparoscopic pancreatectomy in severe inflammatory pseudocyst and chronic pancreatitis with complication

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(배경 및 목적) 만성 췌장염의 수술적 처치의 적응증은 많지 않다. 그러나, 합병증을 동반하여 급성병변이 발생하였을 때에는 급성 췌장염과 다르게 이전 만성화된 췌장의 변형, 주변의 유착, 췌장의 변형 등으로 수술적 처치가 까다로울 수 있고, 특히 복강경 수술은 선택하기 쉽지 않은 방법이다. 최근 사회의 변화로 만성 췌장염은 고령이나 남성에게만 국한되어 나타나는 질환이 아니고 젊은 여성에게도 나타날 수 있다. 이런 경우에 개복 수술은 환자와 보호자에게 큰 부담으로 작용할 수 있다. 최근 만성췌장염 환자로서 급성 염증을 동반한 가성낭종과 비장 고름집, 좌측 흉수 발생 등이 합병된 젊은 여성에서 복강경 원위부 췌장 및 비장 절제수술을 성공적으로 시행한 예가 있어 보고하고자 한다. **(대상 및 방법)** 32세 여자 미혼이며, 약 1년 전 원인을 알 수 없이 췌장염이 발생하였고, 최근까지 지속적인 복통과 췌장염 반복되면서 만성 췌장염으로 진단받고 치료 중이던 분이었다. 최근들어 췌장의 미부에 발생한 합병증 동반 가성 낭종이 발생하여 입퇴원을 반복하면서 통증 조절과 치료를 지속하던 중 얼마 전부터는 지속적인 강력한 주사 진통제를 24시간 투여받아야 겨우 견딜 수 있고, 좌측 흉수가 심해지면서 호흡이 나빠지고, 발열과 가성 낭종의 염증 악화, 비장의 고름집 형성이 있어 외과적 처치가 필요하다고 판단되어 의뢰되었다. 환자 보호자 상담 후 미혼인 젊은 여성이라 복강경 수술 원하였으며, 개복 수술로의 전환 가능성 설명 후 수술을 시행하였다. **(결과)** 환자는 전신마취하에 우측을 아래쪽을 한 절반정도의 45도 앙와위를 유지하면서 제대부위에 11mm 카메라 투관침을 넣고, 상복부와 좌측 옆구리 부위에 각각 5mm 투관침, 좌측 복부 중앙 상부에 12mm 투관침을 넣고 수술을 진행하였다. 만성 췌장염과 급성 염증이 혼재되어 있어, 앞쪽으로 위장과, 뒷쪽 후복강쪽으로 심한 유착으로 인해서 해부학적 구조를 확인하기 어렵고, 비장은 팽대, 염증, 유착 등으로 주변부와 횡격막의 박리가 어려운 상황이었다. 조심스럽게 박리하여 원위부 췌장 절제를 시행하고 췌장단면은 췌장관의 노출과 췌장액의 누출을 방지하기 위해서 이중 봉합 시행하고 절제된 장기는 혹시 암의 가능성 배제하지 못하여 완전한 상태로 제거하기 위해서 bag에 넣고 아래쪽 Pfannenstiel incision을 이용해서 제거하였다. 환자는 수술 후 통증 및 합병증 없이 수술 후 7일째 퇴원하였으며, 이후 외래에서 문제없이 정상 생활 확인하고 있다. **(결론)** 단순한 만성 췌장염이나 급성 췌장염인 경우 복강경 수술이 적용되는 경우들이 있으나 심한 염증성 병변을 동반한 급만성 췌장염의 경우에는 환자의 상태가 불안정하고 수술 시 돌발 상황과 합병증 발생, 주변 유착의 박리 어려움 등으로 쉽게 복강경 수술을 적용하기 어렵다. 그러나, 급성과 만성이 혼재된 심한 경우라 할지라도 외과적 경험과 복강경 술기의 끈기를 가진다면 환자에게 만족할 만한 결과를 가져다 줄 수 있을 것으로 판단된다.

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En bloc resection right hemiliver, caudate lobe of liver and IVC for locally advanced malignant adrenal tumor

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(Purpose) Locally adevanced tumor such as adrenal and renal malignant tumors invaded to IVC and liver was regarded as unresectable state or recommended palliative treatment till now. But advance of surgical technique and intensive treatment make the surgeon perform more radical surgery.

(Methods) We report a case of en bloc resection of right hemiliver, caudate lobe and intrahepatic IVC and prosthetic graft reconstruction in adrenal tumor with liver, diaphragm crux and IVC invasion **(Results)** Forty six years old man visit for right frank pain began 2month ago. Initial physical examination and laboratory findings were within normal ranges. Vital signs were within normal range, too. Screening abdomen CT scan reveal 8.5cm sized adrenal mass with IVC and liver invasion. In 24hr urine test, metanephrine was 1.8mg/day, epinephrine, VMA, costisol, norepinephrine were within normal range. There was no metastatic foci and lymph node involvement in preoperative MRI and PET CT scan. In preoperative CT scan left side liver volume was about 30% of total liver volume but ICG R15 was 37.6%, so preoperative right portal vein embolization was done. After 3 weeks later, left lateral section and S4 were slightly increased (about 10%). Right lobectomy, caudate lobectomy, intrahepatic IVC resection and prosthetic graft anastomosis was done. After midline incision with right lateral extended incision was done in abdomen, liver mobilization was performed except around tumor. Right colon and duodenum was mobilized for encircling infrahepatic IVC and both renal veins. Suprahepatic IVC was encircled and hanging maneuver was done. Right hepatectomy and caudate lobectomy and IVC resection was performed by en bloc resection. During IVC resection and graft reconstruction, extracorporeal circulation was performed. Dacrone prostetic graft was used for IVC graft. 3pint PRC were transfused during surgery. AT POD #5 total bilirubin was peak to 8mg/dL and INR was 1.0, albumin 3.0 g/dL, platelet was 111K/uL. Total bilirubin was normalized at POD #14. Adrenal gland tumor was revealed malignant pheochromocytoma with direct invasion to IVC and liver by pathologic examination. **(Conclusion)** Combined liver and IVC resection is difficult but feasible in selected patients and can be adopted to locally advanced adrenal gland tumor.