01-1 Preoperative simulation with 3D printed solid model for one-step reconstruction of multiple hepatic veins during living donor liver transplantation

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Meticulous preoperative volumetry of the partial liver graft is essential for both assessing the postoperative graft function and to ensure the donor safety in the field of living donor liver transplantation (LDLT).

We herein report the case of a 53-year-old patient who underwent LDLT for hepatitis C virus-infected liver cirrhosis complicated with hepatocellular carcinoma. Preoperative 3D images were obtained using a 3D image analysis system to evaluate the graft volume and possible congested volume after implantation in LDLT, which revealed that a large middle hepatic vein drained a vast area in the right lobe. The estimated volume of the donor’s whole liver was 1,948 ml. The extended left graft was considered to be small for the size of the recipient, corresponding to 30% of the recipient’s standard liver volume, and also with an estimated congested area of 407 ml, which was equivalent to 39% of the donor’s liver volume in the remnant right lobe. Therefore, the left lobe was considered inappropriate not only because of the small-for-size graft for the recipient, but also because of the safety concerns for the donor.

We decided to use a right lobe graft with the middle hepatic vein, because the volume was considered to be sufficient. A preoperative contrast-enhanced CT scan revealed a distance of 2 cm between the donor’s right hepatic vein and middle hepatic vein at the estimated Cantlie line. Because of the location, we planned to use autologous portal vein Y-graft interposition for the hepatic venous anastomosis. Three-dimensional printed solid models of the donor’s right lobe graft made from plastic and the gum-like material made Y-graft from the recipient’s portal vein were also obtained for preoperative simulation using the Vincent program.

Based on the estimation, we were able to evaluate whether to reconstruct the middle hepatic vein tributaries or anomalous hepatic veins in LDLT. The 3D solid model was effective for preoperative simulation and planning, which made it easy to imagine the reconstructed shape of the anastomosis with appropriate spatial perception.

01-2 Comparison of reduced anatomical liver resection with Couinaud segmentectomy for hepatocellular carcinoma

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Background
The superiority of anatomical liver resection (AR) of Couinaud segment for hepatocellular carcinoma (HCC) compared to non-anatomical resection has been reported in several studies, but the significance of reduced AR other than Couinaud segmentectomy is still remain unclear.

Patients and Methods
Between January 1990 and March 2013, 135 consecutive patients underwent Couinaud segmentectomy or reduced AR for a solitary HCC 5cm or smaller in diameter as initial liver resection were retrospectively enrolled in this study. Patients were divided in three groups, who received anatomical Couinaud segmentectomy (Group A, n=58), reduced AR defined as resection of a small anatomical area within Couinaud mono-segment (_group B, n=56), and reduced AR defined as total resection of each small anatomical areas in adjacent Couinaud segments (Group C, n=21). Clinico-pathological findings and surgical outcomes were compared between these three groups. AR was defined as resection of the neoplasm together with the portal vein branches related to the tumor and the corresponding hepatic territory. The extent of liver resection in each patient was decided by the territory of the portal vein branches related to the tumor in the preoperative imaging studies, and confirmed by ligation of the corresponding glisson’s pedicle or injection of indigocarmine dye into the corresponding portal vein branch intraoperatively.

Results
(1) Comparison between the Group A and B
Patients’ characteristics were comparable between the two groups. T.bil value in the Group B was better than that in the Group A (0.86 mg/dL (Group A) vs 0.76 mg/dL (Group B), P=0.05). Other liver function tests were comparable between the two groups. Tumor size in the Group A was larger than that in the Group B (2.8cm vs 2.4cm, P=0.02). In the Group A, operative time was longer (364 min vs 323 min, P=0.02), and the total amount of blood loss was larger (603ml vs 352ml, P<0.01) than those in the Group B. No significant differences were detected in the cumulative recurrence rates (2-year: 28% vs 33%, P=0.83) or overall survival rates (5-year: 75% vs 78%, P=0.28) between the two groups.

(2) Comparison between the Group A and C
Ratio of patients with HBs-Ag-positive HCC was lower in the Group A (12% (Group A) vs 38% (Group C), P=0.01). In the Group A, operative time was longer (364 min vs 304 min, P=0.02), and total amount of blood loss was larger (603 ml vs 337 ml, P<0.01) than those in the Group C. No significant differences were detected in the cumulative recurrence rates (2-year: 28% vs 25%, P=0.63) or overall survival rates (5-year: 75% vs 80%, P=0.21) between the two groups.

Conclusion
Reduced AR could provide comparable benefit with Couinaud segmentectomy in patients with HCC of a solitary and 5cm or smaller in diameter.
01-3 Investigation of key molecules in regeneration of cholestatic liver

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Background
Biliary anastomotic stricture is one of the common complications following living donor liver transplantation (LDLT). Although regeneration of the partial graft is essential for LDLT, influences of biliary stricture on regeneration of a partial graft remains unclear. The objective of the study was to clarify key molecules of cytokines, chemokines and cell-extracellular matrix (ECM) which regulate regeneration of cholestatic liver.

Materials and methods
Forty-eight mice (C57/BL6) were categorized into three groups randomly: sham, 70% partial hepatectomy (PH), 70% partial hepatectomy + bile duct ligation (PH + BDL). n = 16 in each group. Mice were sacrificed on postoperative day 1, 3, 7, and 14 under general inhalation anesthesia. For assessment, we measured liver weight, body weight and calculated the liver and body weight ratio (LW/BW). The liver tissues were histologically evaluated with Hematoxylin-eosin (HE) stain and Masson trichrome stain which were used to assess liver cholestasis and fibrosis in the PH + BDL group. Total RNA was extracted from all groups’ liver tissues at four time points, and reverse transcription to cDNA, then, we executed RT2 Profiler PCR Array to measure the relative expression of cytokines, chemokines and ECM levels. Immunohistochemical staining with Ki67, integrin alpha 2. Western blotting was also performed to evaluate an expression of integrin alpha 2.

Results
LW/BW in the PH group was higher than that of PH+BDL group on postoperative day 1, 3, 7 and 14. Specimen with HE and Masson trichrome stain on day 7 and 14 showed chronologically progressive liver fibrosis. Cell proliferation in the PH group was higher than that of PH+BDL group on day1, 3, 7, 14. Quantitative analysis of Ki67 showed more increased cell proliferation on day 3 and 7 in the PH group than in the PH+BDL group. PCR Array for screening cytokines, chemokines, and ECM molecules showed up-regulation of integrin alpha 2 in the PH+BDL group compared with those in the PH group at four time points. On the contrary, Laminin alpha 3 was down-regulated in the PH+BDL group compared with those in the PH group at four time points. Western blotting showed higher expression of integrin alpha 2 in the PH+BDL group than in the PH and the Sham group.

Conclusion
Integrin alpha 2 and Laminin alpha 3 may be key molecules in liver regeneration of cholestatic liver, with regulating fibrosis and regeneration.

01-4 Portal vein modulation in auxiliary partial orthotopic liver transplantation

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Introduction: APOLT is a technique of segmental liver trans-plantation, involving the placement of a partial liver graft in the orthotopic position after a hepa-rectectomy in the recipient. APOLT has two main indications. The first is Acute liver failure where there is a reasonable chance of native liver recovery. Here, APOLT acts as a bridge providing vital liver support until the native liver regenerates. This provides the future potential for an immunsuppression-free life for the recipient. The second indication for APOLT is Metabolic liver disease usually caused by single enzyme defects localized primarily to the liver such as Crigler-Najjar syndrome, urea cycle defects, and organic acidurias. Portal steal leading to early graft failure has been described in APOLT for ALF and MLD. This complication can be minimized by a good understanding of the portal flow dynamics between the native liver and the graft and its impact on liver function and regeneration.

Materials & Methods: Between Jan 2009 - Dec 2014, about 440 patients underwent liver transplantation. Of these 11 was Auxiliary liver transplantation. Six patients underwent APOLT for metabolic liver disease & five were done for acute & sub-acute liver failure.

Results: There were six females & five males, age group varied from 6 months - 42 years. The indications were Acute viral hepatitis (B & E Virus) in 3, Sub acute liver failure in 2 cases, Propionic academia in 3, Criggler - Najjar Syndrome in 2 Citrullinemia in 1. All patients with metabolic liver disease underwent graded hemi-portal banding for prevention of portal steal phenomenon. None of the patient with acute liver failure required portal banding. The mean pressure gradient was 4mmHg & portal flow velocity difference was about 15cm/sec. Morbidity was seen in two patients (HAT & ACR). No mortality was noted. The mean follow-up was 18 months. None of the child with MLD, had metabolic decompensation.

Conclusion: Adequate portal flow to the native remnant and the graft is essential for the success of APOLT in both ALF and MLD. Portal steal phenomenon can occur in both settings though it is more common in MLD. Good understanding of portal hemodynamics, careful intra-operative portal pressure measurements and graded hemi-portal banding, when indicated, can improve the success of this operation.
01-5 Significance of portal venous flow control in living-donor liver transplantation

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Background. We investigate the optimal portal venous circulation of small-for-size graft (SFSG) in large animal experiment and validate our portal venous pressure control (PVP≤15mmHg) strategy in clinical LDLT.

Methods. I. Animal experiment: Nineteen swine transplanted SFSG (30%SLV) were divided in 3 groups: a high-flow shunt group (HS: n=7), in which PVF was reduced with a 10-mm diameter portocaval shunt (PCS); a low-flow shunt group (LS: n=6), in which PVF was reduced with a 5-mm diameter PCS, and a no-shunt group (NS: n=6), in which no PCS was placed. II. Clinical LDLT: In 221 adult recipients who underwent an LDLT at Kyoto University from 2006 to 2013, we analyzed prognostic factors including PVP at operation.

Results. I. Animal experiment: Seven-day survivals were 83.3% in NS, 100% in LS and 0% in HS (p = 0.0088). NS showed the highest portal venous pressure and portal venous flow. LS showed lower ALT levels. Graft damage was more severe in NS. Intestinal mucosal injury was also most severe in NS. Liver graft at autopsy in HS showed massive hepatocyte necrosis. II. Clinical LDLT: The independent prognostic factors after LDLT were donor-age>33y/o (HR13.8, CI 3.3-92.9;p=0.002), final PVP>15mmHg (HR2.1, CI 1.1-4.0;p=0.03), and final PVP-CVP gradient>5mmHg (HR2.3, CI 1.2-4.0;p=0.008) at the operation.

Conclusion. Final PVP>15mmHg and PVP-CVP gradient>5mmHg at the operation were both prognostic factors after LDLT. While reducing PVP may be effective, one should avoid placing large shunts because they greatly reduce PVF and may therefore result in graft failure.

01-6 The expression of Ki-67 is a useful prognostic factor in patients with colorectal liver metastasis

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[Background] Ki-67 is a nuclear protein that is associated with cellular proliferation. Ki-67 protein is present during G1, S, G2 phase in cell cycle and mitosis, but is absent from G0 phase. The population of Ki-67-positive tumor cells (Ki-67 labeling index) is well known as a prognostic factor in prostate, brain, breast carcinomas. In this study, we investigated the Ki-67 labeling index in patients with colorectal liver metastasis and identified that Ki-67 labeling index is associated with poorer prognosis.

[Methods] Between 1994 and 2013, 92 patients underwent curative hepatic resection of colorectal metastasis with curative intent in our department were enrolled. The Ki-67 labeling index (Ki-67 LI) of the tumor was evaluated by immunohistochemistry (anti-human Ki-67 antigen clone MIB-1 (M7240), DAKO) and divided into the two groups as follows; Ki-67 LI high group and low group (cut-off value: median 42%). We evaluated the relationships between Ki-67 LI and clinicopathological factors including prognosis. Of these 66 cases, we further investigated Ki-67 LI of primary colorectal cancer tissue.

[Results] In clinicopathological factors, there was no significant difference between the Ki-67 LI high and low groups. However, in both overall survival and recurrence-free survival, Ki-67 LI high group had significantly poor prognosis. Ki-67 LI of metastatic live tumor was tend to be lower compared to those of primary colorectal cancer (metastatic liver tumor vs. primary tumor: 43.7 ± 2.00 vs. 48.9 ± 2.40, p=0.09). In overall survival, Ki-67 LI high was identified as a significant poor prognostic factor in univariate analysis. In multivariate analysis, Ki-67 LI was also identified as independent poor prognostic factor (HR=2.36, 95%CI 1.13-5.25, p=0.02). In recurrence-free survival, synchronous metastasis, Ki-67 LI high were identified in univariate analysis. In multivariate analysis, Ki-67 LI was also identified as independent recurrence-free prognostic factor (HR=2.31, 95%CI 1.38-3.95, p=0.001).

[Conclusion] Ki-67 labeling index is a useful prognostic marker after hepatectomy in patients with colorectal liver metastasis.
02-1 Comparison of short- and long-term clinical outcomes between laparoscopic assisted and open total gastrectomy for patients with gastric cancer

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Background and Purpose: Validation of laparoscopic assisted total gastrectomy (LATG) for patients with gastric cancer has not been fully confirmed. In particular, the way how to conduct reconstruction of esophagojejunostomy has been still controversial and there has not been golden standard procedure up to now. We experienced 103 cases of LATG for patients with gastric cancer since 2007 to 2013 and all esophagojejunostomy reconstruction was performed with intracorporeal circular stapling esophagojejunostomy using the OrVil™ system except for the first 3 cases. The purpose of this study is to clarify the clinical usefulness of LATG with intracorporeal circular stapling esophagojejunostomy using the OrVil™ system and oncological feasibility of LATG comparing the outcomes of open total gastrectomy (OTG). Patients and method: We retrospectively analyzed clinical course of consecutive 100 operation with LATG and also consecutive 53 operation with OTG for patients with gastric cancer. As an estimation of short-term outcome, operative time, blood loss, postoperative hospital stay and post-operative data of blood and drain examination were included. Moreover, relapse-free survival time and overall survival time depending on each stages were calculated by log-rank test as an estimation of prognostic relevance. Results: Blood loss, postoperative hospital stay of LATG were significantly less than that of OTG. Postoperative complications were equivalent between the two groups and there was no patient who died within one month post LATG. Surprisingly, all 100 patients experienced LATG has been surviving without recurrence (median follow up period: 44 months). Conclusion: Our experience revealed that LATG with intracorporeal circular stapling esophagojejunostomy using the OrVil™ system could be performed safely and seems enough acceptable procedure as an oncological feasibility for patients with gastric cancer. However, we need to practice a large numbered randomized controlled study comparing short- and long-term outcomes between LATG and OTG for patients with gastric cancer.

02-2 Efficacy of S-1 plus cisplatin combination chemotherapy in patients with esophageal squamous cell carcinoma and concomitant gastric adenocarcinoma

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[Background] S-1 has a wide variety of indications since its release in 1999, in Japan and is used for the treatment of gastric cancer, colorectal cancer, head and neck cancer, but not for esophageal cancer. From the results of JCOG9907 trial, standard treatment for clinical stage II and III esophageal cancer is surgery with preoperative chemotherapy with 5-FU and cisplatin, in Japan. On the other hand that for advanced gastric cancer is surgery and postoperative chemotherapy with S-1. As these two strategy is quite different, nobody know how to treat patients who have esophageal squamous cell carcinoma and concomitant gastric adenocarcinoma. From the results of SPIRITS trial, S-1 plus cisplatin combination chemotherapy (SP) became the first line treatment for unresectable or recurrent gastric cancer. We focused on this regimen and decided to give this chemotherapy for the patients who have esophageal squamous cell carcinoma and concomitant gastric cancer, as preoperative chemotherapy.

[Patients and Method] From 2009 to 2013 SP was given to 11 patients and we reviewed their clinical courses. Two cycles of chemotherapy was given before radical surgery. S-1 was administrated orally for 21 days and cisplatin was administered at 60 mg/m2 at day 8. Clinical staging of tumor was performed according to the TNM classification 7th edition. Clinical and histopathological response were evaluated according to endoscopy, computed tomography and microscopic findings.

[Results] Median age of this 11 patients was 65, all of 11 patients were male, one patient had cervical esophageal cancer, and five cases had early gastric cancer. One patient quitted his second course because of adverse event and some patients had more than 3 cycles of chemotherapy because of waiting period and so on. Focus on esophageal cancer, according to histopathological finding 5 cases had grade 2 effect (more than 2 third of cancer cell disappeared) and response rate was 45%. Histopathological response rate was 27% and 2 cases had grade 3 effect, so that no cancer cell was seen in the specimen, for gastric cancer. We had 2 anastomotic leakage but did not have any in hospital death. The number of the patients is limited in this retrospective study, however, SP seemed to be safe and effective regimen not only for gastric cancer but also for esophageal squamous cell carcinoma. Standard preoperative chemotherapy for esophageal cancer is 5-FU plus cisplatin, however, SP could be an alternative. Hence we conducted a clinical trial to assess the efficacy and safety of SP for thoracic esophageal squamous cell carcinoma patients.
02-3 Significance of subcarinal lymph node dissection in esophageal cancer

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Background: The objective of this study was to evaluate the prognostic relevance of subcarinal lymph node dissection and to identify a subset of patients with esophageal cancer in whom subcarinal lymph node dissection can be omitted.

Study Design: We retrospectively analyzed 370 consecutive patients with thoracic esophageal cancer who underwent R0 subtotal esophagectomy with lymph node dissection. The efficacy indices (frequency of metastasis to a particular lymph node station multiplied by 5-year disease-specific survival rate of patients with metastasis to the station) was calculated for each lymph node station and prognostic impact of dissecting each station was analyzed with reference to the main tumor location. Moreover independent predictive factors for subcarinal lymph node metastasis were analyzed using the Cox proportional hazards regression model.

Results: The overall frequency of metastasis to the subcarinal lymph nodes was 6.8% (2.3%, 9.1%, and 5.0% in patients with upper, middle, and lower thoracic esophageal cancer, respectively). The efficacy index for the middle thoracic esophagus was 2.9, and that for the upper and lower thoracic esophagus was 0.0. Clinical T stage (T2-T4) was the independent predictive factor for pathological subcarinal lymph node metastasis (P = 0.018).

Conclusions: Subcarinal lymph node dissection has little value in patients with upper and lower thoracic esophageal cancer, and could be omitted, especially for superficial cancer.

02-4 Significance of blood flow evaluation by indocyanine green fluorescent system in laparoscopic anterior resection

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[Aim] One of the most important causes for anastomotic leakage in anterior resection is an insufficient blood flow at the stump. The aim of this study is to evaluate the blood flow of colon for avoiding anastomotic leakage using indocyanine green (ICG) fluorescent system.

[Methods] ① Basic research: Five segmental resection of mesentery and colon preserving one feeding artery was performed using one male pig. Evaluation of blood flow using ICG fluorescent imaging system after 7.5 mg of ICG administration intravenously.

② Clinical research: Rectal cancer patients (n=24) who underwent laparoscopic anterior resection were examined blood flow of stump of the colon using ICG fluorescent system. After resection of rectum, 7.5mg of ICG was administered, and the blood flow of oral stump was evaluated by measuring fluorescent time. Relationship between the time until recognition of blood flow at the stump and anastomotic leakage was investigated. And to evaluate the both stump in laparoscopic anterior resection, laparoscopic ICG fluorescent system was used. Fluorescent time of both stumps were measured and the blood flow of both stumps were evaluated.

[Result] ① Ischemic region was included in remnant colon by vertical resection. So cutting line should be extended to proximal side. Recommended cutting line(distance from edge of mesentery) was 5mm for proximal side at opposite side of mesentery.

② Two of twenty four patients (8.3%) suffered anastomotic leakage whose fluorescent time were over sixty seconds. Under sixty seconds cases, patients suffered no anastomotic leakage. In eighty seconds case, we could avoid anastomotic leakage by additional resection of the colon with low blood flow. And in laparoscopic ICG fluorescent system evaluation, fluorescent time of both stumps were all under sixty seconds and there was no leakage.

[Conclusion] To secure sufficient blood supply, we must cut colon not by vertical stapling but by tilting the cutting line of opposite side of mesentery towards proximal side. ICG fluorescent system may be very useful for evaluating blood flow of stump, and avoiding anastomotic leakage.
02-5  Clipless laparoscopic total proctocolectomy

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Background: Laparoscopic surgery has been applied to various kinds of disease now. However, there are few reports on total proctocolectomy by clipless laparoscopic surgery. We have been performing total proctocolectomy by a clipless fashion by using LigaSure.

Surgical Procedure: Firstly, the great omentum was divided by an approach with five ports. After the division was extended to both splenic and hepatic sides, both splenic and hepatic side of the flexure of the colon were taken down. A mesocolon window was created from the descending to horizontal portion of the duodenum. The mesocolon including vessels from left side of the window to the sigmoid colon was incised by LigaSure without clips. After total mesorectal excision, rectal transection was performed at the upper edge of the anal canal with a stapler, and ileo-anal canal anastomosis was performed by the double stapling technique.

Results: Two patients diagnosed ulcerative colitis with cancer underwent this procedure during the last year. The mean operative time was 325 (315-330) min, the mean operative blood loss was 65 (30-100) ml, the mean hospitalization after surgery was 12 days, and postoperative complications were not encountered.

Conclusion: Clipless laparoscopic total colectomy was feasible and safe.

02-6  Robotic surgery for rectal cancer in our institute

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BACKGROUND/PURPOSE:
Minimally invasive approaches such as laparoscopic surgery have been becoming a standard procedure of colon cancer treatment. However, regarding rectal cancer, laparoscopic approach is known to have several limitations and the robotic surgery (RS) has several potential advantages to overcome those limitations. From 2012, we had started robotic surgery for rectal cancer. This study aimed to clarify the feasibility and the advantage of RS focusing on rectal cancer.

MATERIALS/METHODS:
A total of 106 colorectal cancer patients undergoing robotic surgery of curative sphincter saving operation in our institute were enrolled. We analyzed the clinical characteristics, types of operation, operation time, conversion rate, amount of bleeding and perioperative complications.

RESULTS:
We had performed robotic surgery including 74 low anterior resection (LAR) and 23 intersphincteric resection (ISR). All patients received total mesorectal excision or tumor specific mesorectal excision (TMSE). Preoperative neoadjuvant chemoradiotherapy had been added to 28 patients and extended lateral lymphnode dissection completely through robotic assisted were performed in 34 patients. The median amount of blood loss was 25 ml. There was no open conversion and no leakage after operation. Other complications were as follows; subcutaneous emphysema 2 cases, dysuria 5 cases and peripheral neuropathy 2 cases drain hernia 1 case, respectively.

CONCLUSIONS:
Surgical treatment for rectal cancer includes some difficult procedures such as ISR and latelal lymphnode dissection. RS for rectal cancer can be performed safely in such difficult situations and it may be one of the most suitable targets to achieve minimally invasive surgery by robot.
**O3-1 255 laparoscopic pancreatic resections: single centre experience**

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But: Laparoscopic pancreatic resections (LPR) become a routine but larges uni-centric series are still lacking. Our aim was to evaluate our large single centre experience

Methods: Between January 2008 and December 2014, 255 LPR were performed in our department and included in a prospective maintained database. LPR included 145 (59%) distal pancreatectomies (DP), 55 (20%) pancreatoduodenectomies (PD), 27 (10%) enucleations (En), 26 (10%) middle pancreatectomy (MP) and 2 (1%) total pancreatectomy (TP). Demographics, operative and postoperative outcome were studied according to each procedure

Results: The mean age (55y, 17-87), BMI (24.6, 16-39) kg/m² with female preponderance (59%). Lower BMI, male gender and malignancy characterized PD. Malignancy (49%) was treated mainly by PD and DP (82%), LPMD (41%) and BD (10%) treated mainly by DP and En (84%). The mean operative time was 207mn (30-540), 345(240/540) for PD but decrease with the learning curve for all procedures. The mean blood loss was 228ml (0-1500) and 364(50 /1200) for PD, transfusion (5%) and conversion (3.5%). DP were spleen preserving (n=94, 65%) with (n=50, 53%) splenic vessels preservation. The mean length of the resected pancreas with or without spleen preservation was significant (11.6 vs 8.5cm p<0.001).  Two mortalities (0,8%) after PD. The most common complication was PF (overall= 43%, MP=53%, PD=49% and DP=44%), mainly of grade B (19%) and grade C was mainly after PD (26%). Bleeding (12%) and re-intervention (10%) mainly after PD and MP. The mean hospital stay was 18 (2-104) but more prolonged in procedures with reconstruction phase (26 vs 16, p<0.001). Histology for adenocarcinoma showed a mean of 17 (8-59) harvested LN and R0 resection (77%).

Conclusion: This large study show that laparoscopic pancreatic surgery can be achieved safely with low mortality and acceptable morbidity, which was mainly increased in procedures with reconstruction phase.

**O3-2 The significance of lymph node metastasis in pancreatic neuroendocrine tumor**

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Background and Aims: Pancreatic neuroendocrine tumor (PNET) is a relatively rare disease, and it is said that the prognosis of PNET is generally good compared with that of pancreatic cancer. However, the prognosis of the patients with lymph node metastasis is not known well, so lymph node dissection for PNET is still controversial. The aim of our study is to prove the significance of lymph node metastasis in PNET.

Methods: We retrospectively examined 84 PNET patients who underwent pancreatic resection with lymph node dissection at Kumamoto University Hospital, Saiseikai Kumamoto Hospital and Kumamoto Regional Medical Center from April 2001 to October 2014. Clinicopathological parameters were analyzed according to the absence or presence of lymph node metastasis. And clinicopathological parameters affecting disease-free survival (DFS) and overall survival (OS) were also analyzed.

Results: Among 84 PNET patients, lymph node metastasis was confirmed in 17 cases. Median age was 57 years old and median tumor size was 1.8cm. 5-year disease-free survival was 48.1% in lymph node positive, 86.8% in lymph node negative patients (P = 0.003). On the other hand, 5-year overall survival was 74.8% in lymph node positive, 96.3% in lymph node negative patients (P < 0.001). Multivariate analysis revealed that older than 57 years old patients and larger than 1.8cm tumor size were independent risk factor for disease-free survival (P = 0.034 and P = 0.025) and revealed that larger than 1.8cm tumor size and higher WHO Classification 2010 (NET G3) were independent risk factor for overall survival (P = 0.047 and P = 0.015).

Conclusions: The presence of lymph node metastasis was not independent prognostic factor. However, preventive lymph node dissection is recommended to be performed in patients whose tumor size larger than 1.8cm and in patients with apparent lymph node metastasis.
03-3 A new prognostic scoring system using preoperatively available factors to predict survival after surgical resection of hilar cholangiocarcinoma

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Objective: To establish a new preoperative staging system using preoperatively available factors to predict survival after surgical resection of hilar cholangiocarcinoma.

Summary Background Data: Most previously reported staging systems for hilar cholangiocarcinoma require histopathological factors that are proven postoperatively.

Methods: Between July 1999 and October 2009, 115 patients underwent major hepatectomy and bile duct resection of hilar cholangiocarcinoma with curative intent. Several clinicopathologic factors were investigated to identify independent prognostic factors that were identifiable preoperatively. We established a preoperative scoring system incorporating these factors and studied whether it could predict outcome.

Results: Multivariate analysis demonstrated that five factors such as preoperative platelet-lymphocyte ratio (PLR), preoperative serum carcinoembryonic antigen (CEA) levels, and preoperative serum C-reactive protein (CRP) levels were independent prognostic factors of survival. Using these three independent prognostic factors, which can be determined before surgery, preoperative prognostic scoring criteria were thereby established. Patients were stratified by a score from 0 to 3; Patients with a total score 0, 1 and 2 had a 5-year survival of 75.9%, 42.3%, and 27.0% respectively. There were also significant differences of 5-year survival among total score (score 0 vs. score 1, P=0.039; score 1 vs. score 2, P=0.033; score 2 vs. score 3, P=0.001). Patients with a total score of 3 had a dismal prognosis; none of these patients remained alive at 5 years after resection, having a median survival of 3.9 months.

Conclusions: A new preoperative scoring system using PLR, serum CEA level, and serum CRP level can preoperatively predict survival of patients following surgical resection for hilar cholangiocarcinoma.

03-4 Preoperatively elevated C-reactive protein (CRP) indicates a poor prognosis in pancreatic cancer

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[Objectives]
In advanced cancer, progressed systemic inflammatory response (SIRS) is known to lead a poorer outcome. Preoperative anti-inflammatory treatments are being applied and improved prognosis has been reported. To elucidate the effect of progressed preoperative SIRS, we analyzed preoperative nutrition status and long term prognosis in patients with resected pancreatic cancer.

[Methods]
Total of 187 patients from 2003 to 2013 who underwent surgery for pancreatic cancer at our institute were examined. 162 patients were classified as preoperative normal CRP group (NORMAL <1.0 mg/dL) and 25 patients were classified as preoperative elevated CRP group. (ELEVATED >= 1.0 mg/dL) Background, various nutrition status, postoperative complication, adjuvant therapy appliance, overall survival rate and disease free survival rate differences were retrospectively compared between the two groups.

[Results]
Between two groups, age, sex, bile drainage, tumor location, preoperative CA19-9 value, operative procedure and stage were not significantly different. As for preoperative nutrition value, serum albumin (3.9 vs 3.4 g/dL, p<0.01), lymphocyte (1530 vs 1288 /µL, p=0.02), pre-albumin (24.5 vs 16.1 mg/dL, p<0.01), transferrin (221 vs 184 mg/dL, p=0.02) were significantly higher in NORMAL. CONUT score was higher in NORMAL (p=0.0001). Postoperative complication (≥Clavien-Dindo Classification 3b) was lower (7.5 vs 24.0%, p=0.039) and adjuvant therapy application was higher (83.0% vs 58.3%, p=0.009) in NORMAL. Overall survival (OS) and relapse free survival (RFS) were better in NORMAL (MST: 37.7 vs 28.6, p=0.009; median RFS: 26.6 vs 9.1, p=0.08; month). Considering operative parameters, subgroup analysis indicated N factor, R factor, NCCN resectability and adjuvant therapy application as poor OS factors in ELEVATED.

[Conclusion]
In resected pancreatic cancer, preoperatively elevated CRP leads to an unfavorable prognosis. Patients with preoperative progressed SIRS show malnutrition, a higher complication rate and failure in adjuvant therapy. Preoperative anti-inflammatory treatment might improve prognosis in pancreatic cancer undergoing operation.
O4-1 Detection of invisible liver tumors using real-time virtual sonography

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Introduction: In spite of the routine use of intraoperative ultrasonography (IOUS), we sometimes have trouble in finding tumors when they are small or deeply located. Recently we introduced real-time virtual sonography, an innovative navigation technology that synchronizes an intraoperative ultrasonography with preoperative computed tomography (CT) or magnetic resonance imaging (MRI). We experienced two cases in which this navigation system was effective in detecting small liver tumors, which had been found in preoperative images and were difficult to detect using conventional intraoperative inspection including IOUS.

Patient 1: A 65-year-old man had a metastatic liver tumor from renal cell carcinoma. Preoperative CT revealed that the tumor was 6 mm in size, located deeply in segment 6. The tumor was not detected either using conventional IOUS or contrast-enhanced IOUS. Real-time virtual sonography was performed synchronizing IOUS with preoperative CT. The result indicated the necessity of adding mobilization of the right liver. After mobilizing the liver around the virtual tumor, the tumor was successfully identified using contrast-enhanced IOUS and was resected and confirmed in histological examination.

Patient 2: A 58-year-old man had a recurrent 6 mm-hepatocellular carcinoma located in segment 4. He had a previous history of left lateral sectionectomy for hepatocellular carcinoma. The recurrent tumor was located in the previous cut surface of the liver and could not be found by conventional IOUS because of the severe adhesion. Real-time virtual sonography was performed synchronizing IOUS with preoperative MRI. With the guide of real-time virtual sonography, the adhesion just around the supposed tumor was dissected. After the minimal adhesionectomy, the tumor was successfully identified by manual palpation and was resected and confirmed in histological examination.

Conclusions: Real-time virtual sonography is a novel navigation system and helpful to detect small tumors that are difficult to find using conventional intraoperative inspection.

O4-2 Prospective evaluation of GEMOX based neo-adjuvant radio-chemotherapy for borderline and locally advanced pancreatic adenocarcinoma. Analysis on 66 patients

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But: To evaluate the results of induction treatment by gemcitabine + oxaliplatine (GEMOX) based chemotherapy and radiotherapy for borderline (BPA) and locally advanced pancreatic adenocarcinoma (LAPA).

Methods: From 2007 to 2012, 66 pts were prospectively evaluated. Histology was obtained (100%) and patients received a mean of 5 (4-8) cycles of chemotherapy and 54 Grays of radiotherapy. Radiological evaluation was mainly done by CT scan. Surgery was proposed except in case of local progression (LP) or distant metastases (DM). Delay between radiotherapy and surgery was 65 (33-146) days. No patients were lost of PO follow up (3-75 months).

Results: 37 pts were excluded for DM or LP, 29 underwent surgery and 27 (41%) had resection for BPA (20=74%) or LAPA (7=26%). Mean age was 62 (42-72) years. Resections included pancreaticoduodenectomy (67%) or distal resection (33%), including 44% with venous resection. The mean operative and blood loss were 280 min (110-630) and 400 (100-1000), respectively. No patients died and overall morbidity was 52% (mainly chylous ascites=26%). Hospital stay was 14 days (8-48). Long-term functional results included intractable diarrhea (33%), weight loss >10% (100%) and readmission (18%) for parenteral nutrition. Adjuvant chemotherapy (93%) was delayed > 3months in 52%. Mean tumour size was 25 (10-110), with necrosis>50% in 33%; lymph node were present in 48% and R0 resection in 82%. Median (months) and 5 year of OS and DFS were 16(7-75), 41%, 14(4-61), and 22%, respectively for the entire population; survival was better in resected compared to non resected patients: median=23 vs 13 mo., p=0.004) and 5-y = 41 vs 0 %, log rank =12.869

Conclusion: This strategy was associated with favourable rates of resecability, tumor necrosis, and R0 resection. However, PO morbidity is high and delayed adjuvant treatment. After resection, survival seems similar to that obtained for resectable disease at diagnosis.
04-3  Repeated liver resection up to three times may have little effect on postoperative liver volume and indocyanin green retention rate

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Aim: Repeated resection is known to prolong survival with acceptable morbidity rate in patients with hepatocellular carcinoma. However, little is known about the effect of repeated liver resection on postoperative liver regeneration and indocyanin green retention rate at 15 minutes (ICG-R15).

Methods: Patients who underwent four times of liver resection for hepatocellular carcinoma between May 2001 and December 2011 in a tertiary care Japanese hospital were included in the analysis. We analyzed the changes of postoperative liver volumes and ICG-R15, comparing after first liver resection with second and third liver resection, 10 and deferred 20 cases respectively.

Results: The 10 cases underwent initial liver resection had a mean of -86ml±100.6ml total liver volume change, but when compared with the other deferred 20 cases, underwent repeat resection had a mean -21ml±134.5ml total liver volume change, no significant difference was detected (P=0.13). There are also no significant difference in ICG-R15 (0.55±6.67 and 0.16±5.68, P=0.68).

Conclusions: The postoperative regenerated liver volume and liver function may not be affected by frequency of liver resection up to three times.

04-4  Predictors for the benign liver lesions which maximum tumor sizes were 3 cm or less misdiagnosed as hepatocellular carcinoma

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Background: The clinical features of benign liver lesions misdiagnosed as hepatocellular carcinoma (HCC) have not been fully described.

Methods: A total of 187 patients who underwent hepatectomy diagnosed as solitary HCC of which the maximum tumor sizes were 3 cm or less (≤3 cm) at Kyushu University Hospital from April 2005 to March 2014 were included in this study. We defined the predictors of benign liver lesions misdiagnosed as HCC compared to those of genuine HCCs.

Results: Eighteen patients (9.6%) were pathologically diagnosed as benign liver lesions after hepatectomy. The breakdowns of the benign lesions were as follows: liver tissue (n = 4), focal nodular hyperplasia (n = 3), fatty change (n = 3), angiomyolipoma (n = 2), and others (n = 6). The patient’s age ≤ 67 years (P < 0.001), hepatitis C virus antigen negative (P = 0.016), lesion size ≤ 1.5 cm (P = 0.008), normal level of AFP (P = 0.037), normal level of AFP L3 (P = 0.056), normal level of DCP (P = 0.028), normal level of tumor markers (P = 0.034), and absence of tumor size increase (≥ 5 mm) (P = 0.010) were features for benign lesions using univariate analysis. The patient’s age ≤ 67 years (Odds ratio 12.3, P = 0.011), and absence of tumor size increase (Odds ratio 8.5, P = 0.035) were independent predictors of benign lesions using multivariate analysis. These two factor’s positive predictive value for benign liver lesions in the lesions diagnosed as HCCs was 35.7%.

Conclusions: Benign liver lesions (≤3 cm) misdiagnosed as HCC were not infrequency cases, and reached approximately 10% of resected cases. The patient’s age ≤ 67 years and absence of tumor size increase were independent predictors for benign liver lesions. These predictors would contribute the refinement of correct diagnosis of HCCs.
Preoperative neutrophil-to-lymphocyte ratio for prognostication of patients with distal bile duct carcinomas undergoing surgery

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<Background> The current standard treatment for distal bile duct carcinoma (DBC) remains surgical resection, as no effective alternative treatment exists. However, even after resection, the long-term prognosis is poor. Simple biomarkers that can predict response or toxicity, and which are applicable to all community oncology settings worldwide, have not been identified. Differential white-cell counts, such as the neutrophil-to-lymphocyte ratio (NLR), as markers of inflammation, may be simple and readily available biomarkers. This study aimed to determine whether the NLR can be used as a predictor of surgical outcome in patients with DBC.

<Materials and Methods> We enrolled 91 DBC patients who had undergone pancreateoduodenectomy (PD) at a single institution between April 2000 and December 2013. Blood was sampled on admission for determination of NLR. A NLR of ≥5 was selected as the cut-off value for validation.

<Results> There were 17 patients with a NLR of ≥5 (Group 1; 18.7%), while 74 had a NLR of <5 (Group 2; 81.3%). The 1-, 3- and 5-year survival rates for Group 1 patients were 75.9%, 34.5% and 34.5%, respectively, while those for Group 2 patients were 94.8%, 55.2% and 46.6%, respectively (P= 0.02).

There were no significant inter-group differences in clinico-laboratory background factors such as the mean operation time, bleeding volume, tumor size, CRP, neutrophil count and lactate dehydrogenase (LDH) level. On the other hand, there were significant inter-group differences for albumin level (P=0.011), lymphocyte count (P=0.001) and NLR (P<0.001). Multivariate analyses were performed for factors such as gender, age, maximum tumor diameter, drainage method, operation time, bleeding volume, pathology, albumin, CRP, neutrophil count, lymphocyte count, LDH and NLR. The results revealed that NLR (odds ratio, 2.032; 95% CI, 0.999-4.134; P= 0.040) was associated with postoperative overall survival.

<Conclusions> A NLR of ≥5 predicts a poor outcome in patients undergoing PD for DBC. NLR is an independent indicator of overall survival for such patients.

Analysis of optimal timing of laparoscopic cholecystectomy for acute cholecystitis after percutaneous transhepatic gallbladder drainage

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Background: Percutaneous transhepatic gallbladder drainage (PTGBD) is considered as a safe treatment for patients with acute cholecystitis. However, optimal timing of operation for cholecystitis after PTGBD is controversial, which is not determined in the Tokyo Guidelines 2013.

Objectives: The objective of this study is to investigate the optimal timing for laparoscopic cholecystectomy (LC) in patients with PTGBD for acute cholecystitis.

Methods: The subjects were 49 patients who underwent LC at our hospital between January 2006 and January 2015. The following clinical variables in relation to conversion to laparotomy, complications, operation time as well as intraoperative blood loss were evaluated: age, gender, body mass index, past history of operation, interval (cholecystitis to PTGBD), interval (PTGBD to LC), preoperative WBC, preoperative C-reactive protein (CRP), days until the normalization of WBC and CRP after PTGBD.

Results: In univariate analysis, patients over 70 years of age, LC within 14 days after PTGBD, BMI more than 22, preoperative CRP more than 15 mg/dl, normalization of CRP more than 15 days after PTGBD tended to have high rate of conversion to laparotomy (p=0.1094, 0.1000, 0.1168, 0.1168, and 0.0505, respectively). Operation time was significantly longer in patients with preoperative CRP more than 15mg/dl (P=0.0286). In multivariate analysis, all clinical variables were not statistical significant.

Conclusion: In terms of conversion to laparotomy and complications, optimal timing of LC remains unclear. Further investigation is needed.
05-3 **Treatment strategy and surgical outcomes of intrahepatic cholangiocarcinoma**

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Hepatectomy is the standard treatment for intrahepatic cholangiocarcinoma (ICC). But any guidelines have not shown clearly the survival benefit of lymphonode dissection (LND), extrahepatic bile duct resection (BDR), or adjuvant chemotherapy (AC). We have performed hepatectomy without LND for ICC limited to the peripheral region of the liver, and hepatectomy with BDR and regional LND for ICC extending to the hepatic hilum. After cumulative resection, patients are offered to receive adjuvant chemotherapy with gemcitabine and cisplatin.

In the present study, we evaluated the surgical outcome in ICC patients. Between 1989 and 2013, 80 patients underwent surgical resection for ICC at Shinshu University Hospital. The patient population consisted of 45 men and 35 women with a median age of 67 years (48-85 years). Fifty patients underwent LND, 36 patients underwent BDR, and 30 patients had adjuvant chemotherapy (AC). Overall and recurrence free survival rates at 5 years were 40.6% and 30.6%. The multivariate analysis revealed that male gender \( p=0.02 \) and LN metastases \( p=0.03 \) were independent negative prognostic factors. None of the patients with lymph node metastasis survived over 5 years. Neither BDR nor LND had significant effect on patient's survival. AC proceeded survival prolongation on stratified patients with peripheral type ICC with lymph node metastasis. (2-year overall survival 44.4% vs 0%, MST 27months vs 7 months). Thirty-eight patients had experienced cancer recurrence: 21 (55%) patients had intrahepatic recurrence, 12 (32%) LN metastasis, 8 (21%) lung metastasis, 7 (18%) peritoneal dissemination, 7 (18%) local recurrence, 1 (3%) bone metastasis, 1 (3%) spleen metastasis. Intrahepatic metastasis was the most frequent primary recurrent site. Of the four patients submitted to a second liver resection, 2 are alive at 5 years without disease.

This study could not show survival benefit of LND with or without BDR for ICC patients. LND or BDR does not seem to be able to control ICC. AC is beneficial only in patients with peripheral type ICC with lymph node metastasis. Repeat hepatectomies appear worthwhile when potentially curative.

05-4 **Factors for early recurrence of pancreatic neuroendocrine tumor**

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Objective: The outcomes after surgical resection with pancreatic neuroendocrine tumors (pNETs) are diverse. The aim of this retrospective study was to elucidate risk factors for early recurrence after resection of pNETs.

Methods: Thirty-four pNET patients who underwent curative resection from July 2002 to December 2012 were enrolled in this study. The clinicopathological variables were compared between patients with \( n=4 \) and without \( n=34 \) recurrence within two years after resection. Statistical analyses were performed using Student's t-test and chi-square test for comparing two groups. Kaplan-Meier plots were used for calculating disease-free survival probabilities, and the log-rank test was used for testing statistical significance. Significance was set at \( P<0.05 \).

Results: Two-year overall survival rate was 100% in both groups. Recurrent site of 4 patients was the liver. Male to female ratio and median ages were 0% and 43 years in the recurrence group, and 35% and 53 years in the non-recurrence group with no significant differences \( p=0.35 \) and \( p=0.15 \). Tumor location, multiplicity and the ratio of functional pNETs were similar between the two groups. Two patients in the recurrence group had synchronous liver metastasis \( p=0.01 \). Tumor size more than 18mm and border irregularity of tumor in pre-operative CT scan findings were significant predictors of early recurrence \( p<0.01 \) and \( p<0.01 \), although calcifications and heterogeneously enhancements in the tumor were not significant predictors \( p=0.33 \) and \( p=0.11 \). Sixteen (47%) and no patients were performed enucleation or central pancreatectomy in the non-recurrence and the recurrence group, respectively. Lymph node dissection was performed in all patients in the recurrence group and fourteen patients (41%) in the non-recurrence group. Hepatomecy for the synchronous liver metastasis was performed in 2 patients, which were similar disease free survival rate compared with the other two intrahepatic recurrence patients \( p=0.09 \). Pathological examination showed that the rate of higher G grade, microscopic lymphatic involvement, vascular involvement and perineural invasion vessel invasions were significantly higher in the recurrence group \( p<0.02, <0.01, <0.01 \) and \( <0.01 \), and higher TNM classification stage was also more prevalent in the recurrence group \( p=0.01 \).

Conclusions: In patients with pNETs, risk factors of associated with recurrence were large size, tumor border irregularity in CT scan, synchronous liver metastasis, G2 grading and vascular invasion. Careful follow-up is recommended in pNET patients with such risk factors.