
KAHBPS-O-1-1

Validation of risk assessment scales and predictors associated with complicated cholecystitis: An analysis of 983 consecutive patients

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(Purpose) Patients with complicated cholecystitis have worse clinical outcomes than do those with simple cholecystitis. However, the predictors of complicated cholecystitis have not been determined yet. We were here investigated to find the predictors which can better differentiate simple and complicated cholecystitis

(Methods) Patients undergoing laparoscopic cholecystectomy for acute or chronic cholecystitis in 7-year span at a single institution were stratified into two groups according to the pathologies: simple cholecystitis and complicated cholecystitis. Complicated cholecystitis was defined when the cholecystitis was complicated by secondary changes, including hemorrhage, gangrene, emphysema, xanthogranuloma and perforation. Predictable models for complicated cholecystitis were induced based on the multivariate analysis of preoperative clinical and radiologic variables and their validation by receiver operating characteristic (ROC) curve. **(Results)** We detected independent factors that could predict complicated cholecystitis using preoperative variables: age ≥ 65 years, male gender, body-mass index ≥ 25 , serum leukocyte count $\geq 10,000/\text{mm}^3$, serum neutrophil fraction $\geq 80\%$, serum platelet count $\geq 20,000/\text{mm}^3$, serum alanine transaminase level ≥ 40 IU/L, admission via emergency department, and radiologic features (CT or ultrasound) of gallbladder wall thickening $\geq 4\text{mm}$ on and presence of pericholecystic fluid collection ($P < 0.05$). A model of risk assessment scale (range: 0-77) for complicated

cholecystitis was developed based on the individual hazard rate. In this model, higher risk patients showed an 8.630 higher odds of complicated cholecystitis than the low risk patients ($P < 0.01$). **(Conclusion)** We have constructed a valid and reliable model for prediction of complicated cholecystitis, which is expected to help improve surgical outcome of patients with cholecystitis.

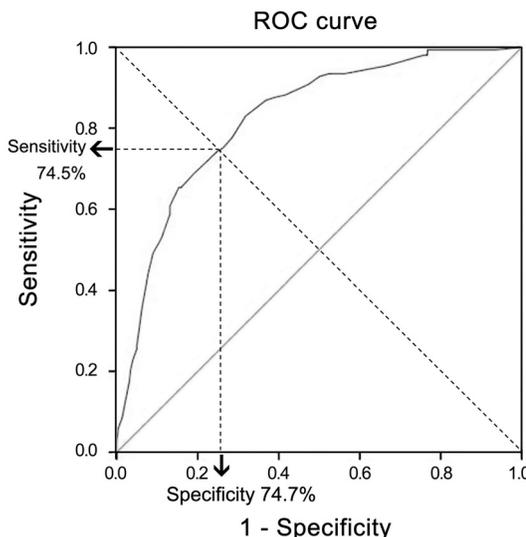


Fig. 1. Receiver operating characteristic (ROC) curve for uncomplicated and complicated cholecystitis. The area under ROC curve: 0.826. 95% CI 0.792-0.860; P -value < 0.001

KAHBPS-O-1-2

Vibrational spectroscopy for diagnosis of gallbladder diseases

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(Purpose) Primary gallbladder cancer is the most common cancer in the biliary tract and its prog-

nosis is very poor. Even with substantial scientific efforts, very few limited biomarkers enabling of diagnosis for gallbladder cancers have been found perioperatively. Alternatively, gallbladder bile juice, a digestive fluid helping absorption of fat, could be a potential matrix that can provide valuable information on gallbladder pathology. Especially, the composition of different types of bile acids could be closely related with gallbladder pathology. **(Methods)** In this study, prospective data and bile juice collection with IRB permission was done for the patients who underwent cholecystectomy from Oct 2013 to Sep 2014 at Hanyang University Hospital. 28 cases of gallbladder stones with cholecystitis and 9 cases of gall bladder polyps were used for this study. We have investigated infrared (IR) and Raman spectroscopy as a simple and fast analytical tool for diagnosis of different gallbladder diseases using bile juices. **(Results)** As shown in Fig. 1 (a), IR spectral features of gallbladder polyp (red) and gallbladder stone (blue) are slightly different with each other. The origin of the difference needs to probe in detail. Raman spectroscopy could be advantageous for analysis of biological samples, since influence of water on spectral feature is minimal. Also, to enhance the sensitivity, bile juice sample simply mixed with gold nanorods solution was dropped on bare silicon substrate and the surface enhanced Raman scattering (SERS) spectrum of drop-dried sample was obtained as shown in Fig. 1 (b). **(Conclusion)** In conclusion, preliminary infrared and Raman spectroscopic studies showed typical peaks in both gall bladder polyps and stones suggesting these tools can be applied to differentiate gall bladder pathology. The further study with gallbladder cancer and normal bile juice samples will be analyzed using both IR and Raman spectroscopy, and the results will be compared for verification of gall bladder cancer specific markers in bile juice.

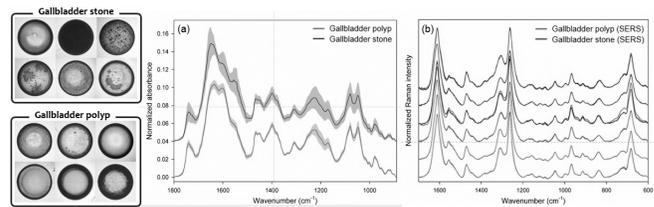


Fig. 1. (a) Averaged transmission-IR spectra of bile juice samples (red: gallbladder polyp, blue: gallbladder stone); (b) SERS spectra of bile juice samples (red: gallbladder polyp, blue: gallbladder stone)

KAHBPS-O-1-3

Comparison of laparoscopic versus open left side hepatectomy for intrahepatic duct stones

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(Purpose) Laparoscopic hepatectomy for intrahepatic duct (IHD) stone is rarely applied due to technical difficulties caused by adhesion with adjacent tissue or distorted anatomy resulting from recurrent inflammation unlike liver tumor. This study was sought to evaluate and compare the perioperative and clinical outcomes between laparoscopic and open hepatectomy for left IHD stones. **(Methods)** From January 2002 to December 2013, 40 patients underwent laparoscopic hepatectomy (left hemihepatectomy [n=7] or left lateral sectionectomy [n=33]) and 201 patients underwent open hepatectomy: among them, 54 patients underwent left side hepatectomy without co-operation and previous operation histories were included (left hemihepatectomy [n=24] or left lateral sectionectomy [n=30]). We analyzed the perioperative and clinical outcomes including the stone clearance rate, stone

recurrence rate, and median follow-up duration. **(Results)** There was no difference in age (56.8±8.2 vs 55.6±9.6 years, $p=0.531$), sex (1.0:4.0 vs 1.0:1.8, $p=0.108$), or BMI (22.8±2.8 vs 22.9±3.0, $p=0.802$) between laparoscopic and open hepatectomy group. Laparoscopic group had higher proportion of lateral sectionectomy (33/40 vs. 30/54, $p=0.010$), shorter operation time (174.2±56.6 vs 210.4±51.6 minutes, $P=0.002$), shorter postoperative hospital stay (7.9±2.6 vs 14.3±5.5 days, $p<0.001$), and lower complication rate (17.5 vs 40.7%, $p=0.016$), especially surgical site infection (5.0% vs. 18.5%, $p=0.052$) compared with open hepatectomy group. It also showed similar results in comparisons of the subgroup according to the operation. There was no operation related mortality. There were no significant differences in initial stone clearance rate (85% vs 75.9%, $p=0.279$), final clearance rate (95.0% vs. 96.3%, $p=0.758$), stone recurrence rate (2.5% vs 5.6%, $p=0.468$) within comparable follow-up periods (48±33.6 vs 59.2±41.7 months, $p=0.235$). **(Conclusion)** Laparoscopic hepatectomy can be a safe and effective option for well-selected left IHD stones when performed by experienced surgeons: it resulted in a shorter operation time, a shorter postoperative hospital stay, and a lower postoperative morbidity.

KAHBPS-O-1-4

Risk factors for conversion to conventional Laparoscopic cholecystectomy in single - Incision laparoscopic cholecystectomy (SILC)

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cholecystectomy (SILC) is able to apply to the most of cases diagnosed as cholecystitis. However, any definitive indications and contraindications are not established. Here we report a single-institute experiences of 697 cases treated by SILC and we aimed to investigate risk factors for conversion to conventional laparoscopic cholecystectomy (conventional LC) in SILC. **(Methods)** A total of 697 cases were performed SILC at the Department of Surgery of Konyang University Hospital, Korea, between April 2010 and July 2014. Nineteen cases (2.7%) were undergone conversion to conventional LC. We compared these 2 groups (SILC group vs. conversion group) and analyzed risk factor for conversion to conventional LC. **(Results)** Our study includes 697 cases performed SILC and 19 cases (2.7%) were converted conventional LC. In univariate analysis, age over 80, ASA score >3, preoperative PTGBD status and pathological diagnosis as acute cholecystitis and GB empyema were significant risk factors for conversion ($p=0.011$, $p=0.003$, $p=0.002$ and $p<0.001$). Conversion rate was relatively higher in young surgeon than expert surgeon (21.1% vs. 7.5%, $p=0.055$) and in BMI over 30 (21.1% vs. 7.5%, $p=0.055$). Conversion group significantly had more prolonged operation time (102.9±37.4 min vs. 52.5±17.6 min, $p<0.001$). Also bleeding loss (114.7±209.8 ml vs. 17.9±20.0 ml, $p<0.001$), hospital stay days (4.3±3.3 days vs. 2.7±2.3 days, $p=0.047$) and complication rate (21.1% vs. 2.8%, $p=0.001$) was higher in conversion group. In multivariate analysis, BMI over 30 and pathologically diagnosis as acute cholecystitis or GB empyema were significant risk factors for conversion (HR: 4.481, $p=0.021$, HR: 4.859 $p=0.007$). **(Conclusion)** Although most of patient with cholecystitis can be applied to SILC, patient with BMI over 30 and diagnosed as acute cholecystitis or GB empyema should be considered performing conventional LC rather than SILC.

(Purpose) Currently Single - incision laparoscopic

KAHBPS-O-1-5

Large scale analysis for treatment strategy according to genetic alterations of K-ras and DPC4 (SMAD4) genes in pancreatic ductal adenocarcinoma

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(Purpose) To investigate correlation of genetic alterations of pancreatic ductal adenocarcinoma (PDAC) with patients' survival, recurrence patterns, and treatment for recurrent disease. **(Methods)** We reviewed genetic alterations of major 4 genes (K-ras, DPC4, p53, and c-erbB-2) in 699 patients who underwent surgical resection, and correlated with clinical outcomes. **(Results)** Median survival of all patients was 21.7 months, and 5-year survival rate was 20.4%. Alterational rates of each gene were as follows: K-ras, 48.3%; DPC4, 68.1%; p53, 40.8%; c-erbB-2, 14.0%. Mutation of K-ras and inactivation of DPC4 genes were associated with shorter patients' survival in univariate analysis. In multivariate analysis, mutation of K-ras gene was independently correlated with patients' survival (especially, GAT and TGT subtypes). Inactivated DPC4 gene had no independent correlation with overall survival, but it was strongly associated with distant metastasis following pancreatectomy. Survival after recurrence (SAR) was evaluated in subdivided groups according to DPC4 gene function (intact or loss)/recurrence patterns (locoregional or distant)/treatment options (local control or systemic therapy). In these 8 groups, pa-

tients in intact/locoregional/local control group showed the longest survival (24.2 months of median SAR), and intact/locoregional/systemic therapy and loss/distant/systemic therapy groups were associated with much shorter survival (9.5 and 9.2 months of median SAR, respectively). **(Conclusion)** Assessment of genetic features of PDAC may assist in deciding targeted surveillance or treatment for primary as well as recurrent PDAC, and further studies for therapeutic strategies according to genetic analyses should be devised.

KAHBPS-O-1-6

Preoperative volume-based PET parameter MTV2.5 as a potential surrogate marker for tumor biology and recurrence in resected pancreatic cancer

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(Purpose) This study aims to evaluate the role of volume-based PET parameters as potential surrogate markers for tumor recurrence in resected pancreatic cancer. **(Methods)** Between January 2008 and October 2012, the medical records of patients who underwent surgical resection for pancreatic ductal adenocarcinoma and completed 18F-FDG PET/CT as part of a preoperative staging work-up were retrospectively reviewed. Not only clinicopathologic variables, but also PET parameters, such as SUVmax, MTV2.5 (METABOLIC TUMOR VOLUME), and TLG (TOTAL LESION GLYCOLYSIS) were obtained. **(Results)** Twenty-six patients were female and 31 were male with a mean age of 62.9±9.1 years. All patients were pre-

operatively determined to have resectable pancreatic cancer except one, who was found to have borderline resectable pancreatic cancer. R0 resection was achieved in all patients. Forty-five patients (78.9%) received postoperative adjuvant chemotherapy with or without radiation therapy. Median overall disease-free survival was 12.8 months with a median overall disease-specific survival of 25.1 months. SUVmax did not correlate with radiologic tumor size ($p=0.501$); however, MTV2.5 ($p=0.001$) and TLG ($p=0.009$) were significantly associated with radiologic tumor size. In addition, MTV2.5 ($p<0.001$) and TLG ($p<0.001$) were significantly correlated with tumor differentiation. There were no significant differences in TLG and SUVmax according to LNR (lymph node ratio); only MTV2.5 was related to LNR with marginal significance ($p=0.055$). In multivariate analysis, LNR (Exp (β)=2.425, $p=0.025$) and MTV2.5 (Exp (β)=2.273, $p=0.034$) were identified as independent predictors of tumor recurrence following margin-negative resection. **(Conclusion)** Most clinically available parameters for the prediction of tumor biology and oncologic outcome are based on pathologic examination. However, a preoperatively determined volume-based PET parameter, MTV2.5, can potentially be used as a surrogate marker to estimate tumor biology. Thus, more effective treatment strategies for pancreatic cancer can be determined based on the results of preoperative MTV2.5.

KAHBPS-O-2-1

Tumor size-dependent long-term prognosis after resection of solitary hepatocellular carcinoma: Single-institution experience with 2558 patients

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(Purpose) According to 7th AJCC staging system, solitary hepatocellular carcinoma (HCC) is classified as T1 or T2 according to microvascular invasion (MVI) regardless of tumor size. This study intended to evaluate the prognostic value of tumor size on long-term patient survival after curative resection of solitary HCCs. **(Methods)** A cohort of 2558 patients who underwent R0 resection of solitary HCC (<10 cm) were selected for the study population, with all patient follow-up period ≥ 24 months or until death with no patient censored during survival analysis. **(Results)** HCC lesion was incidentally detected in 2054 (80.3%) during regular health screening or routine follow-up and hepatitis B virus infection was associated in 2127 (83.2%). Mean patient age was 47.8 ± 10.8 years. Preoperative locoregional treatments were performed in 513 (20.1%). Anatomical resection was performed in 1686 (65.9%). MVI was identified in 408 (16.0%), thus became stage T2 and other 2150 patients became stage T1. Overall 5-year patient survival rates were 85.0% in tumor size <2 cm ($n=490$; 86.1% and 61.1% without and with MVI), 78.3% in tumor size 2.0~3.9 cm ($n=1092$; 80.4% and 67.6% without and with MVI), 68.9% in tumor size 4.1~5.9 cm ($n=573$; 74.0% and 52.6% without and with MVI), 60.0% in tumor size 6.1~7.9 cm ($n=267$; 64.9% and 49.2% without and with MVI), and 62.6% in tumor size