SE 01 AB-01
Abdominal complications detected on MDCT after liver transplantation in early and late periods
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1. To review imaging findings of abdominal complications detected on MDCT after liver transplantation in early (within the first 90 days) and late periods (after 90 days).
2. To emphasize the importance of reviewing radiologic features in the abdominal complications after liver transplantation compared between early and late period.
3. To review pitfalls in CT interpretations to assess abdominal complications after liver transplantation.

1) Radiologic features of abdominal complication on MDCT after liver transplantation in early phase
   (1) Vascular complications: HA stenosis or thrombus, PV stenosis, active bleeding
   (2) Biliary complications: anastomosis site leakage, anastomosis site stricture, T-tube site leakage, T-tube site stricture
   (3) Liver parenchymal complications
   (4) Adrenal hematoma

2) Radiologic features of abdominal complication on MDCT after liver transplantation in late phase
   (1) Vascular complications: HA or PV stenosis
   (2) Biliary complications: anastomosis site leakage, anastomosis site stricture, CBD stone, biliary cast
   (3) Liver parenchymal complications: recurrent HCC, hepatic abscess
   (4) Bowel disease: small bowel obstruction
   (5) Others: Lymphoma, incisional hernia

3) Benefits and pitfalls of abdominal CT imaging interpretations after liver transplantation

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SE 01 AB-02
Role of MDCT in the detection of abdominal complications after liver transplantation compared with early and late periods
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PURPOSE: To assess the role of multidetector computed tomography (MDCT) for detecting abdominal complications after liver transplantation in comparison with early and late periods.

MATERIALS AND METHODS: We retrospectively enrolled 75 patients underwent MDCT after liver transplantation. The 75 patients were divided into two groups according to the postoperative days: MDCT within the first 90 days (early period) and after 90 days (late period) by two radiologists. The readers judged vascular, biliary, liver parenchyma, bowel, and other organ complications. Angiography and endoscopic retrograde cholangiography interpreted by an expert panel were reference standards.

RESULTS: We analyzed 992 CT (342 within the first 90 days and 650 after 90 days). MDCT within the first 90 days demonstrated vascular complications (HA stenosis, n = 2; portal vein stenosis, n = 6; IVC stenosis, n = 1; IVC thrombus, n = 1; portal vein thrombus, n = 2; active bleeding, n = 9), biliary complications (anastomosis site leakage, n = 3; anastomosis site stricture, n = 2; T-tube site leakage, n = 1; T-tube site stricture, n = 1), liver parenchymal complications (recurrent HCC, n = 3; hepatic abscess, n = 1), small bowel obstruction (n = 11), and other complications (incisional hernia, n = 1; lymphoma, n = 1; RCC, n = 1). The sensitivity, specificity, and diagnostic accuracy of MDCT in various complications were 96.2%, 95.9%, and 96.0% within the first 90 days and 82.1%, 97.9%, and 92.0% after 90 days. The main cause of lower sensitivity after 90 days was biliary complication (sensitivity, 78.6%; specificity, 97.9%; and diagnostic accuracy, 90.7%).

CONCLUSION: Although biliary complication is weak point of MDCT, MDCT is a reliable diagnostic technique in the identification of early and late abdominal complications after liver transplantation.

CLINICAL RELEVANCE/APPLICATION: MDCT is a reliable diagnostic technique to evaluate early and late abdominal complications after liver transplantation.
SE 01 AB-03
Role of US in early diagnosis of gallbladder carcinoma: a boon for low resource settings
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PURPOSE: To evaluate the usefulness of ultrasonography (US) in early diagnosis of gall bladder carcinoma for low resource settings.

MATERIALS AND METHODS: A total of 264 clinically suspicious cases were enrolled in the study. All the patients underwent US evaluation followed by computed tomographic (CT) evaluation on a 384 slice multidetector CT. Histopathological specimens were obtained from 208 cases. Final diagnosis was confirmed histopathologically/CT. Sensitivity, specificity, positive predictive and negative predictive values of US were calculated.

RESULTS: A total of 29 cases were confirmed as gall bladder carcinoma, 17/29 (58.6%) were diagnosed at advanced stage (stage III/IV). US diagnosed 42 cases as gall bladder carcinoma, however, only 24 of these were true positive while remaining 18 were false positive. US was thus found to be 82.8% sensitive and 92.5% specific. The positive and negative predictive values of US were 57.1% and 97.8% respectively, thus diagnostic efficacy of US was 91.5%. A total of 16 out of 17 (94.1%) advanced stage gall bladder cancers were diagnosed correctly by US. Although false positivity rate was higher for early stages (13/21; 61.9%) as compared to advanced stage (5/21; 23.8%), yet the sensitivity rate for early stages was also promising (66.7%). Cost of US was nearly five times lesser as compared to that of CT.

CONCLUSION: The findings of the study showed that US was a useful economical imaging modality for screening of gall bladder cancer in low resource setting, especially for advanced stage gall bladder carcinoma. However, for early stages too, it seemed to be useful. Attempts to increase the sensitivity of US in early stages of gall bladder carcinoma with routine use and identification of newer diagnostic features is recommended to encourage the use in socially and economically challenged settings.

SE 01 AB-04
Double-contrast upper gastrointestinal barium examination findings corresponding to the ABC classification for gastric cancer risk
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PURPOSE: To investigate double-contrast upper gastrointestinal barium examination findings corresponding to the ABC classification for gastric cancer risk.

MATERIALS AND METHODS: The study included 135 participants (M:F = 90:45; mean age, 51.7 years; age range, 30-86 years) who underwent serum H. pylori antibody titers, serum pepsinogen, and double-contrast upper gastrointestinal barium examinations on the same day in the health examination center of our hospital. Subjects were classified into four groups according to serological status. Group A patients had...
normal pepsinogen values and were negative for H. pylori antibodies; group B had normal pepsinogen and were positive for H. pylori antibodies; group C had atrophic pepsinogen and were positive for H. pylori antibodies; and group D had atrophic pepsinogen and were negative for H. pylori antibodies. Group A patients were subclassified into group A-1 (H. pylori antibody titer < 10.0 U/ml) and group A-2 (3.0 U/ml ≤ H. pylori antibody titer < 10.0 U/ml) according to H. pylori antibody titer findings. There were 83 participants in group A-1, 9 in group A-2, 17 in group B, 23 in group C, and 3 in group D. Radiography was performed in accordance with the imaging guidelines of the Japanese Society of Gastrointestinal Cancer Screening. Gastric fold thickness was measured on a frontal or right anterior oblique view using double-contrast radiography in a supine position, and the surface gastric mucosa was classified as smooth, granular, or reticular depending on its characteristics.

**RESULTS:** Gastric fold thickness in groups A-2 (3.5 ± 0.9 mm), B (4.9 ± 0.7 mm), C (5.0 ± 1.2 mm), and D (3.9 ± 0.8 mm) was significantly increased compared with that in group A-1 (2.8 ± 0.6 mm) (p < 0.05). The surface gastric mucosa in group A-1 was smooth in 82 (98.8%) participants and granular in 1 (1.2%), but in group A-2, it was smooth in 6 (66.7%) participants and granular in 3 (33.3%); in the non-A groups, it was smooth in 1 (2.3%) participant, granular in 31 (72.1%), and reticular in 11 (25.6%). Both the gastric fold thickness and surface gastric mucosa differed significantly between groups A-1 and A-2.

**CONCLUSION:** Double-contrast upper gastrointestinal barium examination is a useful tool for the diagnosis of chronic gastritis with H. pylori infection.

**SE 01 AB-05**

Results of research on diagnosis of chronic pyelonephritis with radioisotopic X-ray of kidneys

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**PURPOSE:** To reveal attributes of the radioisotopic X-ray during chronic pyelonephritis and definition of criteria of chronic pyelonephritis diagnosis.

**MATERIALS AND METHODS:** We have developed research cards and analysis on 103 patients diagnosed chronic pyelonephritis diagnosis by radioisotopic X-ray of kidneys during 2012-2016 in the X-ray Sectors of the Medical Imaging and Informational Center named after Mongolian State Prize Winner, National Doctor, Honorious Professor R. Purev of the P.N. Shastin's Central Hospital and Medical Imaging Center of National Clinical Central Hospital.

**RESULTS:** There were following radiological attributes such as slowing of the emission process of nephritic radioisotopes on 87 (84.5% ± 3.8), loss of the parallel position of the axis along to kidney to M. psoas axis on 84 (81.6% ± 3.8), complete nephritic radioisotope highlighting capacity decrease on 79 (76.7% ± 4.2), intrarenal reflux deformation on 77 (74.8% ± 4.3), lower intrarenal reflux’ concave is flattering or bulging on 61 (59.2% ± 4.8), intrarenal reflux widening on 84 (81.6% ± 3.2), kidney’s borders becoming unclear and not proportional on 34 (33.0% ± 4.6), M. psoas’ borders becoming unclear, undefinable on 64 (62.1% ± 4.8), lumbodorsal vertebras’ axis version to the opposite side of the ill kidney on 41 (39.0% ± 4.8), wriggling of ureter on 40 (38.8% ± 4.8), angle sharpening of reflux’ and ureter on 32 (31.1% ± 4.6), reflux’ bottom line being parallel to ureter on 24 (23.3% ± 4.2).

**CONCLUSION:** During one side’s chronic pyelonephritis there observed special attributes like lumbodorsal vertebral axis version to the opposite side of the ill kidney, in plastically movable kidney cases ureter wriggling and folding, reflux and ureter angle becoming sharp and reflux’ lower line parallel to ureter. We have defined that main radiological criterias for the diagnosis of chronic pyelonephritis were kidney form, position, borders, lumbodorsal vertebral axis, relation between the axis along the kidney and M. psoas axis, position and form of ureter, process of kidney’s radioisotopic emission and form of reflux’.

**SE 01 AB-06**

Predictive performance of US-determined non-alcoholic fatty liver disease severity for coronary heart disease risk

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**PURPOSE:** To evaluate the relationship between ultrasound (US)-determined non-alcoholic fatty liver disease (NAFLD) severity and coronary heart disease (CHD) risk and the predictive performance of US-determined NAFLD for determining intermediate/high CHD risk compared with and in combination on with NAFLD fibrosis score (NFS).

**MATERIALS AND METHODS:** This retrospective study included 1276 patients between November 2015 and August 2016. FL was categorized as absent, mild, moderate, or severe based on liver-to-kidney echogenicity, intrahepatic vessel walls, and the diaphragm. The Framingham risk score (FRS) and NFS were used to predict CHD risk and hepatic...
Fibrosis severity. Statistically, Spearman correlation test, multivariate-adjusted logistic regression analysis, and receiver operating characteristic (ROC) curves were used.

**RESULTS:** FRS increased as US-determined NAFLD severity increased, and US-determined NAFLD severity and FRS were highly positively correlated ($r = 0.683$, $p < 0.001$). The odds ratios for intermediate/high CHD risk increased with increasing NAFLD severity. The predictive performance of US-determined NAFLD severity for determining intermediate/high CHD risk in NAFLD patients was 0.738; this area under the ROC curve was not significantly different between US-determined NAFLD severity and NFS ($p = 0.88$). However, this area under the ROC curve significantly improved to 0.833 when US-determined NAFLD severity and NFS were combined ($p < 0.001$).

**CONCLUSION:** US-determined NAFLD severity was well correlated with FRS and associated with the prevalence of intermediate/high CHD risk. The combination of US-determined NAFLD severity and NFS may be useful for predicting CHD risk.

**SE 01 AB-07**

Prospective comparison of diagnostic performance in patients with abdominal pain of full-dose standard and half-dose FBP and SAFIRE with dual-source abdominal CT

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**PURPOSE:** To prospectively compare diagnostic accuracy and image quality of abdominal CT images obtained at half-dose filtered back projection (FBP) and sinogram-affirmed iterative reconstruction (SAFIRE) with that of full-dose FBP in patients with abdominal pain.

**MATERIALS AND METHODS:** One hundred one patients who had abdominal pain, underwent dual-source abdominal CT. Three sets of CT images were obtained: full-dose FBP, half-dose FBP, and half-dose SAFIRE3. The 101 patients were randomly divided into three groups; using a crossover design, interpretations were made in three separate reading sessions by three readers. Probability of inflammatory, and neoplastic disease was graded on a 5 point scale to investigate diagnostic performance compared by noninferiority test between full-dose images and half-dose scans. The overall image quality of abdominal CT was subjectively compared with the quality graded on a 4 point scale. Ileocolonoscopy, surgery and clinical follow-up interpreted by an expert panel were reference standards.

**RESULTS:** The diagnostic accuracy for inflammatory disease with half-dose scans (FBP, 81.1%; SAFIRE3, 81.2%) was not different from that of full-dose FBP images (87.4%). The diagnostic performance of half-dose scans was also noninferior to that of full-dose FBP images (95% confidence interval [CI] lower limit difference [FBP, -6.26%; SAFIRE3, -6.17%] excluding the -10% clinical noninferiority limit). The diagnostic accuracy for neoplastic disease with half-dose scans (FBP, 84.8%; SAFIRE3, 85.2%) was not different from that of full-dose FBP images (89.6%). The diagnostic performance of the half-dose scans was also noninferior to that of full-dose FBP images (95% CI [-4.86%, -4.44%]). The mean (SD) volume CT dose index (CTDvol) at full-dose was 10.36 (3.31) mGy and those at half dose were 5.18 (1.66) mGy. The image quality was poorer with the half-dose scans [FBP, 2.02 ± 0.20; SAFIRE3, 2.17 ± 0.45] than FD-FBP (2.95 ± 0.22, $p < 0.01$).

**CONCLUSION:** Diagnostic accuracy of half-dose CT with FBP and SAFIRE is statistically noninferior to that of full-dose FBP for evaluation of inflammatory and neoplastic disease in patients with abdominal pain, despite an inferior image quality.

**CLINICAL RELEVANCE/APPLICATION:** By applying half-dose scans, the radiation dose could be reduced by up to 50% compared with full-dose standard without deteriorating diagnostic performance for detection of inflammatory and neoplastic disease.

**SE 01 AB-08**

Getting the abdominal hernia: CT approach to correct diagnosis

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**LEARNING OBJECTIVES:**

1. Learn about different types of abdominal hernias.
2. Learn about important anatomical structures in each abdominal hernia.
3. Learn about key image findings in CT of each abdominal hernia and complication.

**BACKGROUND:** Abdominal hernias have various types and different incidence depending on the types. They can also be accompanied by complications such as incarceration or strangulation. CT is a useful modality to evaluate abdominal hernias. In particular, CT can identify location, anatomical structures, contents, and complications, and can assist in narrowing the differential diagnosis. These findings are helpful for clinicians to make an accurate diagnosis and treatment planning. This exhibition shows key CT findings of
common and uncommon abdominal hernias.

**IMAGING FINDINGS:**
1. Various types of abdominal hernias.
2. Important anatomical structures in each abdominal hernia.
3. Key image findings in CT of each abdominal hernia.

**CONCLUSION:** Abdominal hernias are diverse, and occasionally can be missed without careful attention. Accurate diagnosis is essential for proper treatment to be performed at the right time, which is important for both cure of the disease and patient's quality of life. CT is a useful modality to evaluate and diagnose abdominal hernias. Therefore, radiologists should be familiar with key CT findings of abdominal hernias for accurate diagnosis and appropriate treatment.

**SE 01 AB-09**

Acute appendicitis: "what to see on US?"
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Appendicitis essentially means inflammation of the appendix.

**Epidemiology:** Acute appendicitis is typically a disease of children and young adults with peak incidence in the 2nd to 3rd decades of life.

**Pathology:** Appendicitis is typically caused by obstruction of the appendiceal lumen, with resultant buildup of fluid, secondary infection, venous congestion, ischemia and necrosis.

**US:** US with its lack of ionizing radiation should be the investigation of choice in young patients, and is effective in competent hands in identifying abnormal appendixes, especially in thin patients.

**Graded compression,** and uses the linear probe over the site of maximal thickness, with gradual increasing pressure exerted to displace normal overlying bowel gas is used.

Findings supportive of the diagnosis of appendicitis include:
- aperistaltic, noncompressible, dilated appendix (> 6 mm outer diameter) distinct appendiceal wall layers
- target appearance (axial section)
- appendicolith
- periappendiceal fluid collection
- echogenic prominent pericecal fat
- confirming that the structure visualized is the appendix is clearly essential and requires demonstration of it being blind ending and arising from the base of the caecum

**Complications:**
- perforation occurs in up to 13-30% of cases
- appendiceal abscess
- generalized peritonitis

Mortality from simple appendicitis is approximately 0.1%, but is as high as 5% in perforation with generalized peritonitis

**Differential includes:**
- inflammatory bowel disease, especially Crohn's disease
- pelvic inflammatory disease (PID)
- right sided diverticulitis
- Meckel's diverticulitis
SE 01 AB-10
Getting the cystic lesions in the abdomen: CT approach to correct diagnosis
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Learning Objectives: 1. To differentiate various cystic tumor or tumor-like lesions from developmental, inflammatory, neoplastic lesion in the abdomen. 2. To introduce key radiologic differential points of various cystic lesions approach to correct diagnosis.

Background: In practice, we daily meet various cystic lesions in the abdomen from simple cyst to cystic neoplasm. The therapeutic strategy and clinical courses are very different between each disease that presents as cyst in the abdomen. So it is important to differentiate with noninvasive diagnostic methods. In this exhibit, each disease entity is introduced with key radiologic findings with case-based analysis.

Imaging Findings: The contents of cystic lesions are arising from pancreas (pancreatic pseudocyst, abscess, cystic neoplasm), bowels (enteric duplication cyst, appendiceal mucocele, GIST, Brunner gland hamartoma, diverticulum) and retroperitoneum (cystic schwannoma, cystic lymphangioma), kidney (cystic RCC, MEST, abscess, carcinoid, neuroendocrine neoplasm, parapelvic cyst), and peritoneum (peritoneal inclusion cyst, cystic mesothelioma). All CT images were reviewed the shape, morphology, abutting organs, presence of septum and enhancing solid portion, and correlated with pathologic characteristics.

Conclusion: We tried to show and differential diagnosis of cystic lesions which occur in the abdomen. We hope that this exhibit helps you differentiate focal cystic lesions that are faced frequently in daily practice to correct diagnosis.

SE 01 AB-11
Necklace sign in hepatic abscesses secondary to melioidosis
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A 45-year-old man with uncontrolled diabetes, hypertension and ischemic heart disease presented with fever and lethargy for 2 weeks and abdominal pain for 2 days. On admission, his GCS was full but he appeared drowsy. Blood pressure was 85/52 and pulse...
rate 77 bpm. After fluid resuscitation, his blood pressure normalized. Clinically, there was hepatomegaly up to 5 fingers below the costal cartilage. Blood investigations revealed mild leukocytosis (12 x 10^9/L), hyponatremia (114 mmol/L) and hypoalbuminemia (29.5 g/L). There were raised alkaline phosphatase (492 U/L), AST (281 U/L), ALT (190 U/L) and LDH (488 U/L). Ultrasound showed multiple multiloculated hypoechoic lesions throughout the liver and normal biliary tree. Contrast enhanced CT abdomen further characterized the lesions as multiseptated with multiple small intralesional peripheral locules in radial fashion. Blood culture eventually revealed Burkholderia pseudomallei. He was subsequently treated with IV Ceftazidime for 6 weeks followed by oral trimethoprim/sulfamethoxazole for 6 months. Hyponatremia was attributed to poor oral intake and was managed accordingly. He was transferred well to another district hospital for continuation of care after 2 weeks of antibiotic treatment. Upon transfer, all electrolytes and liver enzymes have normalized.

Hepatic abscesses have up to 5 descriptive characteristics on CT and are not strictly representative of underlying causative organisms. Based on a study on 49 Thai participants, the necklace sign is found to be highly associated with melioidosis. The more commonly encountered double target sign or cluster sign are not seen in melioid hepatic abscesses. Hydatid lesions may have similar appearance as the necklace sign. However, there are often peripheral calcifications and internal floating, undulating membrane. Daughter cysts are usually focal and of varying sizes. In conclusion, early identification of the necklace sign in intrahepatic abscesses will expedite early treatment and prevent unnecessary workup or intervention.

SE 01 AB-12
The result of the study of angiography findings of chronic pancreatitis
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PURPOSE: To study and evaluate angiography findings of chronic pancreatitis.

MATERIALS AND METHODS: We developed study chart for the angiography findings of the 12 patients who are diagnosed with chronic pancreatitis at Department of Radiology of Third Central Hospital named after P.N. Shastin, Mongolia between years of 2015 to 2016.

RESULTS: When evaluating the angiography findings of 12 patients it reveals that, on arterial phase small artery obliteration in 11 (91.7%) cases, artery was not clearly visualized in 9 (75.0%) cases, distal artery dilatation in 6 (50.0%), artery was tortuous in 8 (66.7%) cases, narrowing of artery in 10 (83.3%) cases, transition of artery in 7 (58.3%) cases, constriction of artery in 6 (50.0%) cases were detected. In parenchymal phase, findings of regular increase in pancreatic vessel enhancement of 3 (25.0%) cases, irregular regular increase in pancreatic vessel enhancement 9 (75.0%) cases, regular decrease in pancreatic vessel enhancement in 4 (33.3%) cases, irregular decrease in pancreatic vessel enhancement in 8 (66.7%) cases, pancreatic enlargement in 8 (66.7%) cases, reduced pancreatic size in 4 (33.3%) cases, irregular enhancement of pancreas with contrast in 12 (100.0%) cases, prolonged parenchymal phase in 6 (50.0%) cases, splenic vein not visualized in venous phase occurs in 4 (33.3%) cases, late enhancement of portal and splenic vein with contrast in 10 (83.3%) cases, case of narrowing of extrapancreatic arteries including hepatic artery in 3 (25.0%) cases, gastroduodenal artery in 5 (41.7%) cases, splenic artery in 2 (16.7%) cases were detected.

CONCLUSION: In chronic pancreatitis, the angiography findings of obliteration of small arteries in 91.7 ± 8.3 cases, narrowing of artery 83.3% ± 12.3, artery was not clearly visualized in 75.0 ± 13.1 cases, irregular enhancement of pancreas with contrast in parenchymal phase in 100%, irregular enhancement of pancreatic vessel in 75.0 ± 13.1 cases were statistically significant (p < 0.05-0.001).
SE 01 AB-13
Clinical challenges and images of incidental splenic masses: how much do you know regarding splenic tumors and mimickers?
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LEARNING OBJECTIVES:
1. Classify neoplastic and non-neoplastic splenic lesions into three pathologic categories: hematopoietic, non-hematopoietic, and other tumor-like non-neoplastic lesions.
2. Identify radiologic-pathologic correlations for various splenic tumors and mimickers.
3. Offer a narrowed differential diagnosis for various splenic lesions based on the pattern of composition and contrast-enhancement using the suggested pattern-based approach.
4. Recognize key imaging findings and specific clinical features of various splenic lesions to correctly distinguish between benign and malignant lesions.

OUTLINES:
1. Classification of splenic neoplastic and non-neoplastic lesions
2. Clinical challenges and comprehensive review of with radiologic-pathologic correlation
   1) Case 1: Lymphoma
   2) Case 2: Malignant fibrous histiocytoma
   3) Case 3: Extramedullary hematopoiesis
   4) Case 4: Epithelial cyst (true cyst)
   5) Case 5: Hamartoma
   6) Case 6: Inflammatory myofibroblastic tumor
   7) Case 7: Sclerosing angiomatoid nodular transformation
   8) Case 8: Hemangioma
   9) Case 9: Lymphangioma
   10) Case 10: Angiosarcoma
   11) Case 11: Metastasis
   12) Case 12: Pseudocyst (false cyst)
   13) Case 13: Trauma
   14) Case 14: Abscess
   15) Case 15: Tuberculosis
   16) Case 16: Invasive aspergillosis
3. Suggested a pattern based approach for narrowing differential diagnosis of various splenic tumors and mimickers
4. Summary of clinical features and imaging findings to help discriminate among various splenic tumors and mimickers

SE 01 AB-14
Clinical challenges and images of various incidental pancreatic cystic lesions and mimickers
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BACKGROUND: Cystic lesions in the pancreas are relatively common findings at cross-sectional imaging, and these lesions range from benign to malignant. Differential diagnosis between various pancreatic cystic lesions is crucial in determining the proper treatment. Thus, knowledge of the various spectrums of pancreatic cystic lesions and familiarity with the imaging features can be essential.

PURPOSE: In this exhibit, we overview imaging findings of various pancreatic cystic lesions and mimickers with radiologic-pathologic correlation. Also, we discuss differential points to help discriminate among various pancreatic cystic lesions and mimickers.

CONTENTS ORGANIZATION:
1. Classification of nonneoplastic and neoplastic pancreatic cystic lesions
2. Clinical challenges and images (cases 1-15)
   1) Case 1: Pseudocyst
   2) Case 2: Retention cyst
   3) Case 3: Epidermoid cyst
   4) Case 4: Colloid carcinoma
   5) Case 5: Pancreatic hamartoma
   6) Case 6: Lymphoepithelial cyst
   7) Case 7: Duodenal diverticulum
   8) Case 8: Acinar cell cystadenoma
   9) Case 9: Serous cystadenoma (I, II)
   10) Case 10: Pancreatic bronchogenic cyst
   11) Case 11: Mucinous cystic neoplasm (I, II)
   12) Case 12: Solid pseudopapillary neoplasm
   13) Case 13: Infarcted intrapancreatic accessory spleen
   14) Case 14: Cystic pancreatic neuroendocrine neoplasm
   15) Case 15: Intraductal papillary mucinous neoplasm (I, II)
3. Review of cases 1~15 with radiologic-pathologic correlation
   1) Non-neoplastic cysts
   2) Neoplastic cysts
   3) Mimickers
4. Summary of useful radiologic findings to help discriminate among various pancreatic cystic lesions and mimickers
5. Suggested algorithms for the management of various pancreatic cystic lesions and mimickers

CONCLUSION: The radiologists should understand useful imaging findings of various spectrums of incidental pancreatic cystic lesions and mimickers to
narrow differential diagnoses. Furthermore, with the suggested algorithm, appropriate work-up and treatment could be implemented, avoiding unnecessary imaging evaluation or procedures.

**SE 01 AB-15**

**Follow-up and characterization of indeterminate spleen lesions in primary CT after blunt abdominal trauma: potential of MR imaging**

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**PURPOSE:** To determine the value of MR imaging for follow-up and characterization of indeterminate spleen lesions in primary CT of patients with blunt abdominal trauma.

**MATERIALS AND METHODS:** Twenty-five patients (10 female, mean age, 51.6 ± 22.4 years) with an indeterminate spleen lesion diagnosed at CT after blunt abdominal trauma underwent MR imaging with T2- and T1-weighted images pre- and post-contrast material administration. MR images were reviewed by two radiologists. Age, gender, injury mechanism, injury severity score (ISS), management of patients, time interval between CT and MR imaging, and length of hospital stay were included into the analysis. Patient history, clinical history, imaging and two-month clinical outcome including review of medical records and telephone interviews served as reference standard.

**RESULTS:** From the 30 indeterminate spleen lesions in CT, 14 (44%) were traumatic and 16 (56%) non-traumatic. The ISS (p < 0.001) and length of hospital-stay (p = 0.03) were significantly higher in patients with traumatic spleen lesions as compared to those without. All other parameters were similar among groups (all, ps > 0.05). The MR imaging features ill-defined lesion borders, variable signal on T1 and T2-weighted images, focal contrast enhancement indicating traumatic pseudoaneurysm, perilesional contrast enhancement and edema were indicative for traumatic spleen lesions. As compared to CT (4/30), MR images (7/30) better depicted thin subcapsular hematomas as indicator of traumatic spleen injury.

**CONCLUSION:** MR imaging shows value for follow-up and characterization of indeterminate spleen lesions in primary CT after blunt abdominal trauma and is helpful for discriminating traumatic from non-traumatic spleen lesions.

**SE 01 AB-16**

**More than just peritoneal carcinomatosis: what the radiologist needs to know**

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**PURPOSE:**
1. To demonstrate normal peritoneal anatomy for understanding imaging findings
2. To illustrate the CT imaging findings of peritoneal carcinomatosis
3. To illustrate common mimics of peritoneal carcinomatosis and differential findings
4. To review the wide spectrum of other diseases involving the peritoneum.

**CONTENTS:**
1. Anatomy of peritoneum and peritoneal reflection
2. Main CT findings of peritoneal carcinomatosis
3. Common mimics of peritoneal carcinomatosis and some suggested findings of them
   1) Malignant peritoneal mesothelioma
   2) Peritoneal lymphomatosis
   3) Pseudomyxoma peritonei
   4) Peritoneal tuberculosis
   5) Sclerosing mesenteritis
4. Other diseases involving the peritoneum
   1) Desmoid tumor
   2) Diffuse peritoneal leiomyosarcomatosis
   3) Primary peritoneal serous carcinoma
   4) Neuroendocrine tumor
   5) Actinomycosis
   6) Encapsulating fat necrosis
   7) Omental infarction

**CONCLUSION:** Familiarity with the CT imaging features of diseases affecting the peritoneum allows the radiologist to provide a proper differential diagnosis and an appropriate management for a patient.

**SE 01 AB-17**

**Imaging features of unusual diseases to cause narrowing and obstruction of extrahepatic bile duct**

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**PURPOSE:** Jaundice secondary to extrahepatic bile duct obstruction is most commonly attributed to malignancy except cholelithiasis. We will illustrate imaging features of unusual diseases to cause narrowing and obstruction of extrahepatic bile duct mimicking cholangiocarcinoma.
SE 01 AB-18

Targeted therapies as first-line chemotherapy for patients with unresectable liver metastases from colorectal cancer: comparison of RECIST with volumetric measurement for prediction of outcome

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PURPOSE: To compare the association between radiologic measurements of diameter, and volume of hepatic metastases, on computed tomography (CT) images with overall survival and tumor response in patients with unresectable liver metastases from colorectal cancer treated with targeted therapies plus FOLFIRI.

MATERIALS AND METHODS: We recruited 35 colorectal cancer patients with unresectable liver metastases who underwent Bevacizumab or Cetuximab with FOLFIRI as first-line chemotherapy. Patients performed longitudinal CT scans before and after chemotherapy. Three-dimensional quantification of the overall volume of hepatic metastases was performed in each patient. An independent survival analysis using RECIST criteria was performed, and the results were compared with volumetric measurement. Overall survival was evaluated by using Kaplan-Meier analysis and was compared by using Cox proportional hazard ratios (HRs) after univariate and multivariate analysis.

RESULTS: The stratification according to overall volume of liver metastases achieved significance between progression group and non-progression group (HR, 4.3; 95% CI: 1.2, 16.5; p = 0.024). There was no statistical significant separation of survival curves between two groups according to tumor diameters (p = 0.285).

CONCLUSION: Volumetric assessment of hepatic metastases could be an alternative predictor of overall survival for patients with liver metastases from colorectal cancer treated with targeted agent.

SE 01 AB-19

Diagnosing necrotic type of acute pancreatitis

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PURPOSE: To determine main and additional signs of necrotic type of acute pancreatitis in regard to ultrasound diagnosis.

MATERIALS AND METHODS: We made analysis and conclusion of ultrasound diagnosis and test results of 15 patients who were diagnosed in Ultra Sound Department of Radiological Imaging Department of the State Third Central Hospital of Mongolia named after P.N. Shastin in 2016 and 2017.

RESULTS: In case of necrotic type of acute pancreatitis, hypermegaly of pancreas is occurred in 66.7% of all cases (p < 0.05), unclear outline of pancreas is occurred in 86.7% (p < 0.001), change of regular contrast of pancreas is occurred in 80.0% (p < 0.001), increase of density of pancreas in 60% (p < 0.05) and the restricted liquid in 60% (p < 0.05). On the basis of our research, we divided signs of necrotic type of acute pancreatitis in two types as main signs and additional signs in regard to diagnostic significance. Herein: main signs: a. unclear outline of pancreas, b. irregular contrast of pancreas, c. increase and decrease of ultrasound reflection and unreflected zone of ultrasound. Additional signs: a. hypermegaly of pancreas, b. the restricted liquid around pancreas, c. the restricted liquid in body of pancreas.

CONCLUSION: We divided signs of necrotic type of acute pancreatitis in two types as main signs and additional signs in regard to diagnostic significance on the basis of diagnostic significance.

SE 01 AB-20

Strategy for the management of incidental pancreatic cystic lesions: radiologist’s perspective

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TEACHING POINTS:
1. To overview reasons why asymptomatic pancreatic cystic lesions (PCLs) have become an important public health issue
2. To compare strengths and limitations of various consensus guidelines for the management of incidental PCLs
3. To discuss unsolved issues concerning incidental
PCLs

TABLE OF CONTENTS/OUTLINE:

1. Nature and scope of the problem related with incidental PCLs
   1) Natural history of incidental PCLs
   2) Relationship between incidental PCLs and the development of pancreatic cancer

2. Various consensus guidelines for the management of incidental PCLs
   1) 2006 Sendai guideline
   2) 2010 American College of Radiology guideline
   3) 2012 International consensus guideline by International Association of Pancreatology
   4) 2013 European guideline
   5) 2013 Flowchart by Sahani et al.
   6) 2014 Italian consensus guideline
   7) 2015 American Gastroenterological Association guideline

3. Unsolved issues concerning incidental PCLs
   1) Selection of cases with a malignant potential for imaging surveillance
   2) Optimal follow-up interval
   3) Total duration of follow-up
   4) Choice of follow-up imaging modality
   5) Imaging biomarkers for accurate prediction of biologic behavior of incidental PCLs
   6) How to manage high-risk patients with incidental PCLs for pancreatic cancer

4. Suggested stepwise approach for the management of incidental PCLs

SE 01 AB-21

CT findings of variants of gastric carcinoma and its mimicking diseases

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PURPOSE:
1. To review the clinical and radiologic characteristics of gastric carcinoma classified by its variants, and to discuss the differences between these gastric carcinomas
2. To distinguish between these gastric carcinomas and some diseases which mimic them

CONTENTS ORGANIZATION:
The typical findings of gastric adenocarcinoma
The variants of gastric carcinoma
  • Mucin producing adenocarcinoma
  • Squamous carcinoma
  • Hepatoid adenocarcinoma
  • Lympho-epithelial carcinoma
Carcinoid tumor

The mimicking diseases of gastric carcinoma
  • Lymphoma
  • Stromal tumor
  • Gastric metastasis
  • Metastasis adjacent to stomach
  • Severe gastritis
  • Tbc. gastritis

SUMMARY: It is possible to know the clinical and radiologic key points that explain each variant. It is also possible to discriminate other diseases from gastric carcinomas and to make a right treatment plan.

SE 01 AB-22

Study of cause and types of acute aortic dissection (AAD) with using CT aortography

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PURPOSE: To study age and gender differences in acute aortic dissection (AAD) and identify the cause with using computed tomography aortography (CTA).

MATERIALS AND METHODS: We involved 6 subjects who diagnosed as aortic dissection and approved by CT and carried our study out between 6th of April 2016 and 4th of March 2017 in Department of Radiology under the Reference and Information Center of Radiology named after Purew. R (State honored Doctor, Physician of Mongolian People, Honored Professor) in State Third Central Hospital’ which named after P.N. Shastin (honored with red flag medal of labor) with using 64 slice multidetector CT/64MD-CT (Philips Ingenuity).

RESULTS: 6 of the subjects were male (100%). According to age, there were 2 (33.3%) of 31-40 aged, 1 (16.7%) of 51-60 aged, 1 (16.7%) of 61-70 aged and 2 (33.3%) of 71-80 aged subjects respectively. The youngest subject’s age was 39 and oldest one was 76. By DeBakey classification, type I-4 (66.7%) and type III-2 (33.3%) and Stanford classification A type-3 (50.0%), B type-3 (50.0%) respectively. According to the cause of AAD, myocardial infarction (MI)-2 (33.3%), arterial hypertension-2 (33.3%), sudden stress-1 (16.65%) and idiopathic-1 (16.65%).

CONCLUSION: 1. We found AAD occurs among males in age range of 39-76. 2. According to DeBakey classification, there were incidence of type I-66.7% and type III-33.3% respectively and by Stanford classification both of Type A and Type B had 50% incidence. 3. We found chronic heart disease or MI, arterial hypertension, sudden stresses are becoming main cause of AAD.
SE 01 AB-23

Ascending colon tumor: a case report
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INTRODUCTION: Colorectal cancer is the third most common cancer in both men and women. Abdominal computed tomography (CT) is valuable in planning surgery for colon cancer because it can demonstrate regional extension of tumor as well as adenopathy and distant metastases.

CASE REPORT: We report a case of a 59-year-old, female who presented with right lower quadrant pain for 1 month. Laboratory investigations revealed the following: CEA 1.45 ng/ml, creatinine 73.5 mkmol/L.

IMAGING STUDIES:
The colonoscopy: Huge ulcerative mass on the AC

CECT abdomen with gastrographin: Contrast-enhanced CT scan shows marked circumferential thickening with luminal narrowing of the ascending colon. The wall has a low-attenuation component
Fig. 1. Arterial and portal phase, axial view.

Fig. 2. Portal phase, coronal and sagittal view.

Fig. 3. 3D image.

Pathology: Adenocarcinoma moderately differentiated.

**DISCUSSION:** Colorectal cancer can also manifest as focal colonic wall thickening and luminal narrowing. Complications of primary colonic malignancies such
as obstruction, perforation, and fistula can be readily visualized with CT. At CT, local extension of tumor appears as an extracolic mass or simply as thickening and infiltration of pericolic fat. Preoperative CT is typically performed for the following indications: (a) suspected hematogenous or distal nodal metastases, (b) suspected invasion into adjacent organs or abscess formation, (c) unexplained or atypical symptoms, and (d) unusual histologic results. The major goal of CT is to determine if there is direct invasion of adjacent organs, enlargement of local nodes, or evidence of distant metastases. In a study of 158 patients with colorectal cancer, the primary tumor could be identified with CT in only 75% of cases.

CONCLUSION: The sensitivity of CT in detection of primary colon cancer is variable and depends on the size of the tumor. We reported a case of large bowel adenocarcinoma with distinct imaging features.

SE 01 AB-24

Body composition imaging heralds "new era" for cancer treatment: focusing on sarcopenia
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TEACHING POINTS:
1. To understand the concept of body composition imaging focusing on sarcopenia
2. To explain the updated knowledge about sarcopenia
3. To review the current evidence for impact of sarcopenia on cancer treatment and the future directions

TABLE OF CONTENTS/OUTLINE:
1. Body composition imaging
   - Goal: evaluation of sarcopenia, obesity, and osteoporosis
   - Modality: dual-energy X-ray absorptiometry, CT, and MRI
   - Development of sarcopenia imaging techniques: from 2D segmentation to artificial intelligence (A.I) imaging
2. Updated knowledge about sarcopenia
   - Basic physiologic and pathologic process
   - International consensus guidelines: definition, terminology, criteria
   - Huge impact of sarcopenia in various diseases
3. Current evidence for impact of sarcopenia on cancer treatment
   - Impact on major surgery: pancreaticoduodenectomy, gastrectomy, hepatectomy, etc.
   - Impact on chemotherapy and immunotherapy
4. Future direction
   - New drug development to prevent sarcopenia and cachexia in cancer patients
   - Effective exercise program to prevent sarcopenia

Fig. 1. Body composition imaging

Fig. 2. Sarcopenia measurement on CT/MRI

Fig. 3. Clinical impact of sarcopenia

Fig. 4. Evidence for impact of sarcopenia on cancer treatment

Fig. 5. Future direction
Various benign and malignant tumors of the rectum and perirectal region
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Rectal cancer is the most common cause of rectal masses. However, a variety of benign or malignant tumors may develop in the rectum, including the perirectal area. Rectal mass and perirectal mass differ in their characteristics. Rectal mass induces most of the symptoms and is associated with malignant tumor. In contrast, perirectal mass is mostly asymptomatic and benign lesions.

Rectal masses can be divided into mucosal origin and submucosal origin tumors. Mucosal origin tumors include adenocarcinoma, melanoma, and neuroendocrine tumors. Submucosal origin tumors include GIST, duplication cyst, and hemangioma. Perirectal masses can be classified into congenital, neurogenic, osseous, and miscellaneous conditions. Congenital tumors include dermoid cysts, epidermoid cysts, teratomas, tailgut cysts, lymphangiomas. Neurogenic tumors include Schwannoma and neurofibroma. Osseous tumors include chordoma, giant cell tumor. Other miscellaneous conditions include abscess and endometriosis. When rectal or perirectal tumor is present, it may cause symptoms such as hematochezia, pain and bowel habit change similar to rectal cancer. However, management depends on the type of tumor. For example, surgical resection is necessary for malignant tumors, and only occasionally observation is needed for some benign lesions. Therefore, accurate diagnosis through imaging is important.

Cross-sectional images such as transrectal ultrasound, magnetic resonance image, and computed tomography have the advantage of showing the precise depth of lesion, involvement of surrounding tissues, and lymph node metastasis. In particular, soft-tissue contrast differentiation is excellent in MRI, which can maximize the advantages of this cross-sectional image.

In this exhibition, we will look at key imaging features and differential diagnosis points in various cases for various tumors occurring in rectal and perirectal areas.
Case presentation of Fitz-Hugh-Curtis syndrome

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INTRODUCTION: Fitz-Hugh Curtis syndrome (FHC) is a rare complication of pelvic inflammatory disease (PID) involving liver capsule inflammation leading to the creation of adhesions. It is mostly occurred in females but rare in male. The symptom and signs include an acute onset of right upper quadrant (RUQ) abdominal pain. FHCS is thought to result from the peritoneal spread of infection from the pelvic cavity. In some research FHC has been reported to be up to 12% in patients with PID using only the clinical criteria and a similar rate (13.8%) was reported in another study using laparoscopic criteria. Almost all the published studies involved adult women, and studies documenting adolescents or young adults are rare.

CASE REPORT: We describe a 22 years old woman who had painful right upper abdomen like gallbladder pain, fever, nausea, some smells white fluid. These signs started three days ago. She diagnosed with pelvic inflammatory disease in UB Songdo hospital in 2017.05.02. Upon physical examination, her body temperature was 38.3°C, respiratory rate 26/min, heart rate 88/min, blood pressure 108/70 mmHg. The patient didn't have any history of abdominal or pelvic surgery. The white blood cell count was 9.9*10^9/L, neutrophil cell 76.9%, C-reactive protein 27.5 g/ml, coagulation test result a PT 41.5 second and PT 14.5 second changes. Normal electrolytes and liver function test results were noted. The urinalysis showed the presence of urobilinogen (++). The chest X-ray is unremarkable. The gastroduodenoscopy noted esophagus GERD grade M. candida infection. Abdominal CT with contrast showed hepatic capsular enhancement, diffuse increased pelvic mesenteric attenuation, thickening of lower peritoneum and enhancement of collapsed pelvic bowel loops and polycystic ovarian disease. She had diagnostic laparoscopy with drainage operation, including specific treatment in May 3rd, 2017. The patient remains well without complications in May 10th, 2017.

DISCUSSION: When FHCS was first described by Curtis in the 1930s, it was characterized by “violin-string” adhesion between the anterior surface of the liver and the parietal peritoneum in patients with coexistent gonococcal pelvic disease. This syndrome has been described as perihepatitis accompanied by pelvic inflammatory disease (PID).
while 17 (23.3%) lesions showed a size increase. Potential malignant change occurred in 8 (11.0%) CPLs. Based on multivariate logistic regression analysis, ADC value was not an independent predictor of later increase in cyst size as well as potential malignant change ($p = 0.404$ and $p = 0.727$, respectively). Among various factors, an initial cyst size was a significant factor to predict an interval increase in size of CPLs ($p = 0.030$). There was no significant predictor for the occurrence of potential malignant change at the last follow-up.

**CONCLUSION:** An initial cyst size was a significant factor to predict an interval increase in cyst size. However, ADC value had no predictive power with regard to lesion progression during imaging follow-up.

**SE 01 AB-30**

Evaluation of hepatic fibrosis by using monoexponential, biexponential, and stretched exponential diffusion-weighted MR imaging

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**PURPOSE:** To compare the ability of diffusion-weighted imaging (DWI) parameters acquired from monoexponential, biexponential, and stretched exponential models for the diagnosis of hepatic fibrosis (HF).

**MATERIALS AND METHODS:** Ninety five patients who underwent DWI using 9 b-values at 3T magnetic resonance and had a pathologic reference standard of HF were included in this study. Liver apparent diffusion coefficient (ADC); true diffusion coefficient ($D_1$), pseudo-diffusion coefficient ($D_2$), and perfusion fraction ($f$) from a biexponential model; distributed diffusion coefficient ($DDC$) and diffusion heterogeneity index ($\alpha$) from a stretched exponential model were compared with the pathologic HF stage. For the stretched exponential model, parameters ($DDC$, $\alpha^2$) were also obtained using a 6 b-value dataset with omitted lower b values. The diagnostic performance of the parameters for determining HF stage was evaluated with Obuchowski measures and receiver operating characteristic (ROC) analysis.

**RESULTS:** The diagnostic accuracy for HF staging was highest for $D_1$ (Obuchowski measures, 0.770), and it was significant better than that of ADC ($p < 0.001$) and $D_2$ ($p < 0.001$). The areas under the ROC curves (AUCs) for determining significant fibrosis ($\geq F2$) and cirrhosis ($F = 4$) were high for the parameters from stretched DWI model and $D_3$ without significant difference ($p > 0.05$). The Obuchowski measure of $\alpha^2$ for HF staging was significantly greater than $\alpha$ ($p < 0.001$), and there was no significant difference between DDC and $D_2$ ($p = 0.245$).

**CONCLUSION:** Stretched exponential DWI is a promising method in the HF staging and can be better than other DWI models, as stretched exponential DWI is potentially feasible with a fewer b-value acquisition, therefore with shorter acquisition time.

**SE 01 AB-31**

Comparison of the guidelines for the diagnosis of hepatocellular carcinoma using multidetector CT in patients undergoing liver transplantation

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**PURPOSE:** To compare the diagnostic performance of multidetector CT (MDCT) among the guidelines based on the American Association for the Study of Liver Diseases (AALSD), the Liver Imaging Reporting and Data System (LI-RADS) 2014v, the Organ Procurement and Transplant Network (OPTN) system, and the Korean Liver Cancer Study Group-National Cancer Center (KLCSG-NCC) for the diagnosis of hepatocellular carcinoma (HCC) and allocation of liver transplantation (LT) candidates.

**MATERIALS AND METHODS:** From 2007 to 2014, 78 patients who underwent preoperative MDCT and subsequent LT for suspected HCC were included in this retrospective study. Two radiologists independently reviewed the CT images and evaluated focal hepatic lesions according to each guideline. Patients were allocated into one of three groups: beyond Milan criteria (MC), within MC with priority, or within MC without priority. The sensitivity and specificity of each guideline for detecting HCC, and accuracy of patient allocation were compared using logistic regression with the generalized estimating equation.

**RESULTS:** Fifty two of 78 patients had 87 HCCs. For the detection of HCCs smaller than 1 cm ($n = 24$) and HCCs equal to or greater than 2 cm ($n = 24$), per-lesion sensitivity was not significantly different among four guidelines ($p > 0.05$). However, the sensitivity for detecting 1-2-cm HCCs ($n = 39$) was significantly higher when using the AASLD or the KLCSG-NCC guidelines (30.8-41.0%) than that using the LI-RADS or the OPTN system (15.4-18.0%) ($p = 0.030$ for reader 1 and $p = 0.005$ for reader 2). Per-patient specificity was 92.3-96.2% using the AASLD or the KLCSG-NCC guidelines, and 92.3% using the LI-RADS or the OPTN system without significant differences among four guidelines ($p > 0.05$). The accuracy for patient allocation was 74.4% in reader 1, and 71.8% in reader 2 without any
difference among four guidelines in both readers. **CONCLUSION:** The AASLD and the KLCSG-NCC guidelines can provide higher sensitivity than LIRADS and the OPTN system for the detection of 1-2-cm HCCs with MDCT. The accuracy for patient allocation was comparable among four guidelines.

**SE 01 AB-32**

**Nontraumatic perforation in the gastrointestinal tract: CT diagnosis and its differentiation**

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**PURPOSE:**
1. To understand various pathologic conditions causing gastrointestinal tract perforation beyond trauma.
2. To describe characteristic CT features to differentiate causes of nontraumatic perforation in the gastrointestinal tract.
3. To diagnose gastrointestinal perforation requiring emergency surgery.

** CONTENTS:**
1. Neoplastic conditions causing gastrointestinal perforation: adenocarcinoma, GIST, metastasis, lymphoma, appendiceal mucinous neoplasm.
2. Nonneoplastic conditions causing gastrointestinal perforation: peptic ulcer, appendicitis, inflammatory bowel disease, ischemia, diverticulosis, stercoral colitis.
3. Miscellaneous

**CONCLUSION:** CT helps the identification of pathology associated with gastrointestinal perforation, and complications.

**SE 01 AB-33**

**Lessons from LOCAT (Low-dOse CT for Appendicitis Trial), a pragmatic multicenter non-inferiority randomized controlled trial**

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From December 2013 through August 2016, 3074 adolescents and young adults with suspected acute appendicitis were randomly assigned to either low-
(LD, 2 mSv) or standard-dose (SD, 8 mSv or less) CT group in 20 Korean teaching hospitals having predominantly limited LDCT experience. The two groups involved virtually the same care providers, including 161 radiologists, two-thirds of whom had limited LDCT experience. The primary endpoint was negative (unnecessary) appendectomy rate among all appendectomies, with a non-inferior margin of 4.5 percentage points. A key secondary endpoint was appendiceal perforation rate among all confirmed appendicitis, with a non-inferiority margin of 10.0 percentage points. The median dose-length product in each group (LDCT group versus SDCT group) was 132 mGy·cm (IQR 119-151) versus 486 mGy·cm (390-561). The negative appendectomy rate was 3.9% (22 of 559 patients) versus 2.7% (16 of 601) (difference 1.3%, 95% CI -0.8-3.3). The appendiceal perforation rate was 34.7% (182 of 524 patients) versus 31.2% (176 of 564) (difference 3.5%, 95% CI -2.1-9.1). These results clearly suggest that radiation dose of appendiceal CT for adolescents and young adults can be reduced to 2 mSv without impairing clinical outcomes. Through this presentation, we will share with the audience the LOCAT results as well as our lessons from the collaborative efforts in the course of LOCAT: study conception, protocol development, funding, organization, protocol rehearsal and implementation, site and patient recruitment, data collection, central image archive, operation of the independent Data and Safety Monitoring Board and Adjudication Committees, and public data sharing. We wish LOCAT can serve as an exemplar for future clinical trials of the Korean Society of Radiology and other Asian Oceanian radiology communities.

**SE 01 AB-34**

**Hepatocellular carcinoma with biliary ductal invasion: a case report**

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Obstructive jaundice in patients with hepatocellular carcinoma (HCC) unusually presents in 1-12% as the initial symptom at the time of diagnosis. Biliary invasion by HCC is one cause of obstructive jaundice and much less common. We report a case of 55-years old, female who presented with jaundice, weight loss, abdominal pain and chronic hepatitis B. Abnormality laboratory data: a serum level of total bilirubin was shown with 185.5 umol/L with a normal range 0.0-17.1 umol/L, alkaline phosphatase 301 U/L (normal range 40-129), AST 132.8 U/L, ALT 72.7 U/L, fibrinogen 5.7 g/L. The serum level of AFP was 500 ng/mL, HBsAg was positive.

**IMAGING STUDIES:** On nonenhanced CT scan, the tumor appeared ill defined, isodense-hypodense pattern with no calcification (Fig. 1). During the arterial
phase of dynamic enhanced CT the tumor depicted heterogeneous enhancement with well-defined mass about 4.1 × 4.0 cm in SVIII/V with a continuous extension into the right hepatic duct of liver (Fig. 2). The portal and delayed phase revealed definite washout of the contrast enhancement from the mass and an invasion of the HCC into the right hepatic duct. Also noted dilatation of intrahepatic bile ducts in right lobe of liver (Figs. 3-5).

**PATHOLOGY:** Pathological analysis of liver mass led to a diagnosis of hepatocellular carcinoma.

**DISCUSSION:** Jaundice is present in 19-40% of patients with HCC at the time of diagnosis. The common causes of jaundice are the underlying liver cirrhosis and/or extensive hepatic parenchymal destruction of tumor. Obstructive jaundice as the main presenting clinical feature is uncommon. The bile ducts can be obstructed by tumor thrombi, hemobilia, tumor compression, or tumor infiltration. The type of HCC with obstructive jaundice due to the migration of tumor thrombi is also known as “icteric type HCC. Specific treatment in such circumstance is difficult and the prognosis is poor. Tumor invasion into a branch of the intrahepatic duct system can also cause mechanical obstruction of the main ducts by one of three means: 1) the tumor may grow continuously in a distal fashion, filling the entire extrahepatic biliary system with a solid cast of tumor; 2) a fragment of necrotic tumor may separate from the proximal intraductal growth, migrating to the distal common bile duct and causing obstruction; or 3) hemorrhage from the tumor may partially or completely fill the biliary tree with blood clots.
for patients with acute abdominal pain. However, there was no study conducted to compare accuracy of US and CT diagnosis.

**GOAL:** We aimed to compare and evaluate accuracy of US and CT in patients with acute abdominal pain.

**MATERIALS AND METHODS:** In this study, we retrospectively reviewed 151 cases conducted both US and CT at the Ulaanbaatar Songdo Hospital between May 2016 till the April 2017. Another common point with these patients was no abnormality in US, but medical condition was found by CT. For the Statistical analysis, used SPSS-23 program to calculate those results into Chi square.

**RESULTS:** From 151 patients the most common medical conditions were:
1. Appendicitis 29 patients which is 19.2%
2. Urethra Stone 25 patients which is 16.5%
3. Common Bile Duct Stone 24 patients which is 15.8%
The sensitivity of CT in detecting appendicitis is significantly higher than that of US (p < 0.012), but for mild appendicitis with infiltration of loculated fluid collection cases, both methods had similar sensitivity. The sensitivity of CT in detecting both urethral and common bile duct stone cases, were significantly higher than that of US (p < 0.038), (p < 0.008), respectively.

**CONCLUSION:** From these results we can conclude that using CT for patients that were admitted with acute abdominal pain is crucial, since only using US we could miss serious conditions. CT is more sensitive method of diagnosis for the patients with acute abdominal pain.

**SE 01 AB-35**

Comparison of the accuracy of US and CT in patients with acute abdominal pain at the Songdo Hospital, Ulaanbaatar, Mongolia

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**BACKGROUND:** Ultrasound (US), as an accessible, cheap method of diagnosis, commonly used in Mongolia

**SE 01 AB-36**

Noninvasive evaluation of liver fibrosis in patients with chronic hepatitis B and C using ElastPQ

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**PURPOSE:** To compare technical success rate of the ElastPQ and transient elastography (TE), and to evaluate the diagnostic performance of the ElastPQ in patients with chronic hepatitis using pathologic fibrosis as the reference method.

**MATERIALS AND METHODS:** This study included 95 consecutive patients with chronic hepatitis B and C. All patients were examined liver stiffness (LS) measurements by TE as well as ElastPQ and biochemical investigations before liver parenchymal biopsy or surgery within 7days. The technical success rate of the ElastPQ and TE were compared. The diagnostic performance of the ElastPQ was evaluated using the area under the receiver operating characteristic curve (AUC) with pathologic fibrosis as a
RESULTS: The technical success rate showed 95.8% (91/95) in ElastPQ and 94.7% in TE (90/95). After exclusion of unreliable results of TE according to a previously recommended definition, 86 patients were included in the final analysis. LS measurements obtained by ElastPQ and TE showed a storing correlation ($r = 0.64$, $p < 0.001$). LS measurements obtained by ElastPQ ($r = 0.511$) and TE ($r = 0.550$) showed a significant positive correlation with pathologic fibrosis stage, but APRI ($r = 0.306$) showed a weak correlation. For the diagnosis of significant fibrosis ($\geq$ F2) and cirrhosis (F4), the optimal cutoff values of LS were 4.18 kPa and 5.51 kPa, respectively, and AUC values were 0.881 and 0.762, respectively.

CONCLUSION: ElastPQ is a valid noninvasive imaging technique for evaluation of liver fibrosis in patients with chronic hepatitis B and C. ElastPQ showed high technical success rate.

SE 01 AB-37
Multimodality imaging of abdominal lymph node and lymphoproliferative disease
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The lymph nodes and lymphoid tissue related diseases can be easily detected in cross-sectional imaging as the imaging technique has evolved continuously. A variety of diseases can involve them in abdomen. Malignant cancer is the representative of them which spread commonly to the lymph nodes and change their imaging morphology. The accurate identification and characterization of positive lymph nodes is the major role of imaging studies to establish the treatment strategy.

In this exhibition, the imaging features of the normal and abnormal lymph nodes, a variety of diseases related with lymph nodes, and lymphoproliferative diseases involving abdomen will be shown and discussed with multimodality imaging such as US, CT, and MRI. In a benign disease entity, inflammatory, infectious, and neoplastic conditions will be discussed. They are tuberculosis, Kikuchi, Kimura, Castleman’s disease, and post transplantation lymphoproliferative disease (PTLD). In a malignant disease entity, lymphoma in various abdominal organs including GI tract and other solid organs, and metastasis from other primary malignancy will be discussed.

SE 01 AB-38
Omental cakes: CT appearance and differential considerations
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PURPOSE: Omental cakes are relatively common in tumors of the abdomen and usually imply a poor prognosis. However there are numerous other neoplasms, as well as infectious and benign processes that can produce omental cakes. In this educational exhibit, we review the anatomy of the peritoneal cavity and present a pictorial review of the different neoplastic and non-neoplastic conditions that can produce omental caking.

MATERIALS AND METHODS: A broader knowledge of the various causes of omental cakes is valuable diagnostically and to direct appropriate clinical management.

RESULTS: We present a spectrum of both common and unusual etiologies that demonstrate the variable computed tomographic appearances of omental cakes.

CONCLUSION: Peritoneal diseases may be difficult to diagnose due to overlap in their imaging appearance. The main goal of radiologic imaging evaluation is to distinguish between benign and malignant conditions, therefore knowledge of the different diseases affecting the peritoneum allows the radiologist to provide differential diagnosis and suggest pertinent patient management.

SE 01 AB-39
Imaging of pancreatic adenocarcinoma with emphasis on prediction of resectability how radiologists guide the GI surgeons: a pictorial representation
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LEARNING OBJECTIVES:
1. Anatomy of the retroperitoneum and pancreas.
2. Learning how to evaluate pancreatic mass pertaining to busy oncologic setup.
3. MDCT classification of resectable and borderline resectable pancreatic tumor.
4. Venous involvement and reconstruction (Ishikawa classification system).

BACKGROUND: Pancreatic cancer is the 4th most common cause of cancer in the world with a very
Abdominal nerve sheath malignant tumor: a case report

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BACKGROUND: Malignant peripheral nerve sheath tumor (MPNST) is an aggressive and uncommon neoplasm that develops within a peripheral nerve. Metastasis of MPNST usually occurs in the lung. In this report, we describe a rare case of MPNST that metastasized to the abdomen.

MATERIALS AND METHODS: A 39-year-old man had an abdominal pain and abdominal ultrasound examination revealed about 8.5 x 3.5 cm sized heterogeneous hypoechoic cystic mass with irregular inner wall thickened in the from RLQ to RML direction enlarged in size. The CT scan confirmed the presence of conglomerated mixed structured/solid and cystic component and calcific portion/ mass lesion sized 12.2 x 6.2 cm seen at RLQ with surrounding fat stranding and small bowel gas bubbles. Laboratory test shows alkaline phosphates 397 U/L, creatinine 1.3 mg/dl, r-GTP 144 mg/dl, total bilirubin-1.7 mg/dl. The US and CT findings were suspicious for a small bowel mass lesion with adjacent abscess formation and complicated by perforation.

RESULTS: The patient underwent abdominal laparotomy and pathology of tissue confirmed the diagnosis of malignant peripheral nerve sheath tumor,
schwannoma with penetration to the bowel mucosa. **CONCLUSION:** The MPNST is uncommon among the small bowel tumor, however, it should be suspected when conglomerated mixed structure is in the abdomen.

### SE 01 AB-42
**Mucinous-containing rectal cancer: implications for MR imaging in staging, restaging and follow-up**
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**PURPOSE:**
1. To understand clinical significance of preoperative diagnosis of mucinous rectal cancer.
2. To evaluate of mucin-component and its amount by imaging.
3. To demonstrate various changes of mucinous rectal cancer after chemoradiotherapy.
4. To discuss easily overlooked recurrent/metastatic mucinous rectal cancers at imaging.

**TEACHING POINTS:**
1. Mucinous Rectal cancer is associated with poor response after preoperative chemoradiotherapy. It is also difficult to assess the tumor response after preoperative chemoradiotherapy because of mucin pools and unpredictability of changes.
2. Furthermore, recurrent or metastatic mucinous tumors are easily missed at CT and PET.
3. This exhibit demonstrates imaging features and clinical significance of mucin-containing rectal cancer during staging, restaging and follow-up.

### SE 01 AB-43
**An application study of low-dose CT perfusion imaging for evaluation of the efficacy of neoadjuvant chemotherapy for advanced gastric adenocarcinoma**
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**PURPOSE:** This study used low-dose computed tomography (CT) perfusion imaging technology to evaluate the efficacy of neoadjuvant chemotherapy in patients with advanced gastric adenocarcinoma and to determine whether any of the perfusion parameters would predict tumor response to chemotherapy.

**MATERIALS AND METHODS:** 40 patients with gastric adenocarcinoma (T3-4NxM0) were prospectively enrolled in this study. All patients received 3 cycles of neoadjuvant chemotherapy and tumor surgical resection was performed within 3 week after chemotherapy. The patients were evaluated with a low-dose spiral CT perfusion imaging prior to, after the first series of, and after three series of chemotherapy. The data were analyzed by using commercial software to calculate tissue blood flow (BF), blood volume (BV). One-way analysis of variance (ANOVA) was used to detect any significant variation of the tested parameters between the different times of scanning. Percentage of reduction rates of BF, BV after three series of chemotherapy were correlated with the pathological efficacy grade using the spearman test. Similarly, Spearman test was used to evaluate the correlation between BF and BV values after first and three series of chemotherapy and clinical response, respectively. A receiver operating characteristic (ROC) analysis to determine the optimal diagnostic cut-off value for changes in perfusion parameters.

**RESULTS:** The BF and BV reduction rate after three series of chemotherapy were significantly correlated with pathological efficacy grade (r = 0.536, p = 0.002 and r = 0.568, p = 0.001, respectively). BF as well as BV values after first and three series of chemotherapy were significantly correlated with clinical response (p < 0.01, respectively). A cut-off value of 34.5% BV reduction rate yielded a sensitivity of 73% and a specificity of 87% for predicting response after the first series of chemotherapy. One way ANOVA showed significant differences in BF and BV values between before chemotherapy and those after first series of chemotherapy and between before chemotherapy and those after three series of chemotherapy (p < 0.01).

**CONCLUSION:** Low-dose CT perfusion imaging is a valuable tool that permits the microcirculation evaluation and therefore can evaluate the efficacy of neoadjuvant chemotherapy in patients with advanced gastric adenocarcinoma.

### SE 01 AB-44
**Can low-dose CT perfusion imaging predict response of advanced gastric cancer with neoadjuvant chemotherapy?**
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**PURPOSE:** To explore the value of low-dose CT perfusion imaging (LDCTPI) technology and its perfusion parameters in predicting response of neoadjuvant chemotherapy (NAC) in patients with advanced gastric cancer (AGC).

**MATERIALS AND METHODS:** Thirty patients with AGC were studied prospectively using low-dose spiral
CT perfusion imaging examinations to measure 2 parameters: blood flow (BF), blood volume (BV) of tumor area before chemotherapy and after chemotherapy, respectively; All of the patients received 2 courses of NAC (ECF chemotherapy regimen) and surgical resection of a tumor within 1 week after chemotherapy, and then obtained the result of postoperative pathology response grade for chemotherapy of AGC. The differences of BF, BV values of AGC between before chemotherapy and after chemotherapy, respectively; All of the patients received 2 courses of NAC (ECF chemotherapy regimen) and surgical resection of a tumor within 1 week after chemotherapy, and then obtained the result of postoperative pathology response grade for chemotherapy of AGC. The differences of BF, BV values of AGC between before chemotherapy and after chemotherapy, respectively; All of the patients received 2 courses of NAC (ECF chemotherapy regimen) and surgical resection of a tumor within 1 week after chemotherapy, and then obtained the result of postoperative pathology response grade for chemotherapy of AGC.

RESULTS: There were significant differences in BF and BV values of AGC between before NAC and after NAC (p = 0.000, p = 0.000, respectively), and there were obvious correlations between BF, BV value decrease rate after NAC and pathology response grade were analyzed by Spearman statistical test; Thirty patients were divided into effective and ineffective groups according to different pathology response grade, the differences of BF, BV value decrease rate between effective group and ineffective group were compared by independent-samples t test, respectively; then, a receiver operating characteristic (ROC) curve was used to find the cutoff value of BF, BV value decrease rate as evaluation indicators of AGC after NAC and calculate area under the curve (AUC). RESULTS: There were significant differences in BF and BV values of AGC between before NAC and after NAC (p = 0.000, p = 0.000, respectively), and there were obvious correlations between BF, BV value decrease rate after NAC and pathology response grade were analyzed by Spearman statistical test; Thirty patients were divided into effective and ineffective groups according to different pathology response grade, the differences of BF, BV value decrease rate between effective group and ineffective group were compared by independent-samples t test, respectively; then, a receiver operating characteristic (ROC) curve was used to find the cutoff value of BF, BV value decrease rate as evaluation indicators of AGC after NAC and calculate area under the curve (AUC).

CONCLUSION: The BF, BV value decrease rates may be evaluation indicators predicting chemotherapy efficacy of AGC from the function about hemodynamics.

SE 01 AB-45
Correlation of liver stiffness values measured by transient elastography with histopathologic grading of hepatic fibrosis by quantitative morphometric measurement and semi-quantitative analyses
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PURPOSE: To correlate liver stiffness values measured by transient elastography with two different histopathologic fibrosis grading systems, i.e. quantitative morphometric measurement of the fibrosis area and semi-quantitative analyses using the METAVIR score.

MATERIALS AND METHODS: This prospective study was approved by the Institutional Review Board and informed consent was obtained. We finally enrolled 74 subjects who were examined by transient elastography and underwent liver resection for focal hepatic lesions (60 subjects) or donor lobectomy (14 subjects) from March 2015 to January 2016. The time interval between transient elastography and liver resection was less than one month. Histopathologic hepatic fibrosis was graded quantitatively by using morphometry of the fibrosis area and semi-quantitatively by using the METAVIR score. The Spearman correlation coefficient (ρ) was used to examine the correlation between liver stiffness values measured by transient elastography and the two histopathologic fibrosis grading systems. The correlation between the two histopathologic fibrosis grading systems was also analyzed.

RESULTS: Liver stiffness values measured by transient elastography were poorly correlated with quantitative morphologic analysis of the fibrosis area (ρ = 0.305, p = 0.008), while they were much better correlated with the METAVIR score (ρ = 0.729, p < 0.001). The correlation between the two histopathologic fibrosis grading systems was also poor and not significant (r = 0.265, p = 0.265).

CONCLUSION: Liver stiffness values measured by transient elastography were correlated better with semi-quantitative histopathologic grading than with qualitative morphometric analyses.

CLINICAL RELEVANCE: This study enhances our understanding of physical properties measured by US elastography on the basis of histopathologic backgrounds.
SE 01 AB-46
The diagnostic usefulness of US-guided peritoneal biopsy for solitary peritoneal thickening of unknown cause visualized as only infiltrated fat tissue on CT scan
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PURPOSE: To assess the diagnostic usefulness of ultrasound (US)-guided peritoneal biopsy for solitary peritoneal thickening of unknown cause visualized as only infiltrated fat on the computed tomography (CT) scan.

MATERIALS AND METHODS: This retrospective study included 37 patients (M:F = 17:20; mean age, 51.5 years) who underwent US-guided biopsy for solitary peritoneal thickening of unknown cause visualized as only infiltrated fat tissue without apparent mass formation on CT scan. The rate of specific histopathological diagnosis and accuracy for diagnosis of malignant disease were assessed.

RESULTS: The procedure was technically successful with acquisition of adequate amount of specimen for microscopic examination in all patients. A specific histopathological diagnosis was made in 33/37 patients (89.2%). A non-specific histopathological diagnosis was made in 4/37 (10.8%). The procedure showed sensitivity of 84.2%, specificity of 100%, positive predictive value of 100%, negative predictive value of 85.7%, and accuracy of 83.8% for the diagnosis of malignant diseases.

CONCLUSION: The US-guided peritoneal biopsy is a fairly accurate diagnostic procedure for peritoneal thickening of unknown cause even in minimally thickened peritoneum visualized as only infiltrated fat on CT scan and can be used for an initial method of biopsy before performing laparoscopic or open biopsy.

SE 01 AB-47
How much do we know rectal submucosal lesions?: approach based on cases and MRI features
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TEACHING POINTS:
1. To overview MRI findings of a variety of rectal submucosal lesions including benign and malignant submucosal tumors and extramural or perirectal lesions that can mimic the rectal submucosal lesions.
2. To illustrate radiologic-pathologic correlation and to discuss differential points to help discriminate the various rectal submucosal lesions.

TABLE OF CONTENTS/OUTLINE:
1. Classification of rectal submucosal lesions
   Submucosal tumor
   Extramural or perirectal lesions mimicking submucosal lesions
   Mesenchymal tumors
   Lipoma
   Hemangioma
   Leiomyoma / leiomyosarcoma
   GIST
   Neurofibroma / Schwannoma
   Solitary fibrous tumor
   Myofibroblastic tumor
   Neuroendocrine tumors
   Malignant melanoma
   Malignant lymphoma
   Primary rectal adenocarcinoma (rarely)
   Submucosal metastases
   Endometriosis
   Perirectal or retrorectal developmental cysts
   Direct invasion by extramural tumor
   Metastases
2. Cases and review
   1) Rectal Submucosal tumors: Hemangioma / Leiomyoma / Myofibroblastic tumor / Neuroendocrine tumors / Melanoma / Lymphoma / Primary rectal cancer / Submucosal metastases
   2) Extramural or perirectal lesions mimicking submucosal lesions: Endometriosis / Tailgut cyst / Direct invasion by extramural tumor
3. Summary of useful radiologic findings of the various rectal submucosal lesions
4. Conclusion or clinical relevance
   Colonoscopy with biopsy is the most important method for the diagnosis of rectal tumors, but this procedure cannot determine the precise intramural extension of a rectal tumor and cannot accurately distinguish submucosal and intramural tumors from extramural tumors. Cross-sectional imaging, especially MRI allows the presence, location and characterization of the rectal lesions. Therefore, their key imaging features is crucial for clinicians to accurately diagnose, guide the depth of biopsy and to plan the treatment strategy.
SE 01 AB-48
Hypervascular pancreas lesion and key clue of differential diagnosis in image finding
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PURPOSE: Hypervascular pancreas lesion usually meet CT/MR imagings. Disease entity is variable that include neoplastic, vascular, inflammatory, and congenital conditions. Knowledge of disease spectrum is important to distinguish differential diagnosis. Several entities can mimic pancreatic neoplasm, so It is crucial to prevent unnecessary intervention. The aim of this educational exhibition is to review disease entity of hypervascular pancreas lesion and diagnostic key of CT/MR imaging findings for differential diagnosis.

CONTENTS ORGANIZATION:
1. Disease spectrum of hypervascular pancreas lesion.
   - Neoplasm (neuroendocrine tumor, hypervascular metastasis)
   - Vascular (pseudoaneurym, AVM)
   - Congenital conditions (intrapancreatic spleen)
   - Pitfall (duodenal diverticulum)
2. Review of the radiologic key imaging findings of differential diagnosis.
3. Case-based diagnostic approach in patient with hypervascular lesion in pancreas.
4. Summary

SE 01 AB-49
Radiologic manifestations at abdominal imaging and approach to diagnosis of amyloidosis as a systemic disease
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TEACHING POINTS: Amyloidosis is defined as an extracellular deposition of protein fibrils with a β-sheet fibrillar structures and characteristic properties after staining with Congo Red stain and classified several subgroup according to pathology and underlying disease. However, imaging findings at abdomen CT have been relatively nonspecific and unknown associated with various types and clinical settings. Therefore, we present here all about abdominal involvement of amyloidosis focused on various underlying disease or plasma cell disorder with 73 amyloidosis patients at our institution during the past 5 years.

CONTENTS ORGANIZATION:
1. Clinical characteristics of amyloidosis
   1) Frequency
   2) Pathology
   3) Classification
2. Diagnostic approach of amyloidosis
   1) Imaging findings of amyloidosis at abdomen CT
   2) Correlation with endoscopic, laboratory, and pathologic findings
   3) Various concomitant systemic disease and imaging findings
   4) Post-treatment changes and prognosis
3. Mimickers of amyloidosis and differential diagnosis
4. Importance of abdominal involvement in diagnosing amyloidosis in various clinical setting

SUMMARY: Abdominal involvement of amyloidosis has a variety of clinical and radiologic manifestations. It would be important that radiologists be aware of these imaging findings and diagnostic approach of amyloidosis to better diagnose and treat this disease.
fatal to the patient, the radiologist should become aware of imaging findings of these tumors for applying proper management.

SE 01 AB-51
Hepatic echinococcus granulosus: a case report
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INTRODUCTION: Echinococcus granulosus a species parasitic in dogs and wolves and occasionally in cats; its larvae may develop in nearly all mammals, forming hydatid cysts in the liver, lungs, kidneys, and other organs. It reverses the usual process of development in human and animal hosts; the adult is found in the intestine of dogs, whereas the larva develops in the human intestine, penetrates the intestinal wall, and settles in various organs, most often the liver, where in forms a cyst (hydatid cyst) that grows slowly. Treatment is by surgical removal of the cyst Medical Therapy: Albendazole; Mebendazole.

DIFFERENTIAL DIAGNOSIS: Complex pyogenic abscess hemorrhagic cyst Infected cyst Cystic metastases, Biliary cystoadenocarcinoma. A case of echinococcus in liver is reported here.

CASE REPORT: A 38-year-old man was admitted to hospital complaining of left liver lobe and epigastrium abdominal pain, and nausea. On routine physical examination an abdominal mass was discovered on the left liver lobe. Liver function tests were normal. Transabdominal ultrasound shows large cystic mass in the left lobe / Segments 2, 3, 4 / of the liver. There is a hyperechoic calcified rim associated with thick walled by mixed echogenicity.

SE 01 AB-52
Missed GB cancer interpreted as an inflammation only before surgery
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TEACHING POINTS: To learn and be familiar with the findings of concurrent GB cancer under the circumstances of GB inflammation.

TABLE OF CONTENTS:
1. GB cancer with acute cholecystitis.
2. GB cancer with perforated cholecystitis.
3. GB cancer with adenomyomatosis.

4. GB cancer with chronic cholecystitis.
5. GB cancer with xanthogranulomatous cholecystitis.
Old age, female, enlarged LNs near GB, adjacent hepatic mass, no intramural cysts and typical enhancement pattern of thickened GB wall may raise the possibility of concurrent GB cancer with inflammation.

SE 01 AB-53
Radiologic findings and mimics of IgG4-related sclerosing diseases of abdomen
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LEARNING OBJECTIVES:
1. To illustrate imaging findings of IgG4-related sclerosing diseases affecting various abdominal organs including liver, biliary system, pancreas, retroperitoneum, kidneys, lymph nodes and so on.
2. To inform the various forms of organ involvements and imaging findings of IgG4-related disease which can be helpful to differential diagnosis of IgG4-related sclerosing diseases from many of tumorous or other inflammatory diseases.

CONTENTS:
1. Clinical Manifestations and pathophysiology of IgG4-related sclerosing diseases
2. Spectrums of imaging findings of abdominal organs involvement and its mimickers
   - Autoimmune pancreatitis vs. pancreatic cancer, pancreatitis
   - Liver involvement vs. malignant hepatic tumor
   - Biliary involvement vs. primary sclerosing cholangitis, cholangiocarcinoma
   - Renal involvement vs. tumor, inflammation, infarct
   - Retroperitoneal fibrosis vs. lymphoma
   - Vascular involvement vs. other arteritis
   - Lymphadenopathy vs. lymphoma or metastasis

SE 01 AB-54
Comparison of imaging findings between sclerosing hemangioma and cavernous hemangioma of the liver using gadoxetic acid-enhanced liver MRI
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PURPOSE: To evaluate imaging characteristics of sclerosing hemangioma of the liver and compare with that of cavernous hemangioma using gadoxetic acid-
enhanced MRI.

**MATERIALS AND METHODS:** This retrospective study included histologically confirmed 9 sclerosing hemangiomas and 41 cavernous hemangiomas in 9 and 38 patients, respectively who underwent preoperative or prebiopsy liver MRI. Two radiologists evaluated the MRI findings in consensus. Statistically significant imaging findings were identified through Fisher’s exact test and Mann-Whitney test.

**RESULTS:** Irregular spiculated tumor margin (p < 0.0001), arterial peritumoral enhancement (p = 0.040), capsular retraction (p = 0.004) were more frequently observed in sclerosing hemangioma. Higher signal intensity than that of the spleen on heavily T2WI was more frequently seen in cavernous hemangioma (p = 0.003). Multiplicity (p = 0.263), diffusion restriction (p = 0.325) and ADC value (p = 0.637) did not show significant difference. Typical hemangioma like enhancement pattern such as globular, homogeneous high or dot like arterial enhancement and centripetal, homogeneous high or dot like portal and delayed enhancement was seen in 11.1% (1/9) of sclerosing hemangioma. Higher signal intensity than that of the spleen on heavily T2WI was more frequently seen in cavernous hemangioma (p = 0.001). 88.9% of sclerosing hemangioma showed atypical arterial enhancement pattern such as no or faint, rim or heterogeneous enhancement (p = 0.001).

**CONCLUSION:** Sclerosing hemangioma showed different MR imaging characteristics and atypical enhancement pattern compared with cavernous hemangioma.

**SE 01 AB-55**

**MR significant factors for survival outcome in rectal cancer patients following neoadjuvant combined chemotherapy and radiation therapy: stratification of lateral pelvic lymph node**

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**PURPOSE:** To determine the significant magnetic resonance (MR) imaging factors of lateral pelvic lymph node (LPLN) on the assessment of survival outcomes of neoadjuvant combined chemotherapy and radiation therapy (CRT) in patients with mid/low rectal cancer.

**MATERIALS AND METHODS:** The Institutional Review Board approved this retrospective study of 63 patients with mid/low rectal cancer who underwent MR before and after CRT and patient consent was not required. Surgery performed within 4 weeks after CRT. The location of LPLNs was divided into following four groups; 1) common iliac, 2) external iliac, 3) obturator, and 4) internal iliac lymph nodes. The short and long axis diameters, numbers, shape (ovoid vs. round), signal intensity (homogenous vs. heterogeneous), margin (smooth vs. irregular), and diffusion-weighted restriction of LPLN were analyzed on pre- and post-CRT images.

For treatment response using size, lymph node groups were defined as group 1) short axis diameter ≤ 5 mm on both MR, group 2) > 5 mm change into ≤ 5 mm after CRT, and group 3) persistent size > 5 mm before and after CRT. Clinical findings were also evaluated. The disease-free survival and overall survival rate were evaluated and the risk factors for survival outcomes were analyzed using cox regression analysis.

**RESULTS:** Patients in the group 3 (persistent size > 5 mm) showed significantly lower survival rates than the group 1 and 2 (disease-free survival rates of 36.1% and 78.8, 88.8%, p < 0.001). The size response (group 1-3), multiplicity of LPLN, the level of carcinoembryonic antigen (CEA), patient’s age, T and N stage, vessel invasion, perineural invasion were significant factors affecting disease-free survival rate or overall survival rate using univariate analysis (p < 0.05). The persistent size (group 3) and multiplicity of LPLN were independent risk factors among MR imaging features influencing disease-free survival rate (HR = 10.087, p < 0.05; HR = 4.808, p < 0.05). Perineural invasion and T stage were shown as independent histologic risk factors (HR = 16.594, p < 0.05; HR = 15.891, p < 0.05).

**CONCLUSION:** The persistent size greater than 5 mm and multiplicity of LPLN on both pre- and post-MR after CRT were significant MR factors affecting survival outcomes in the patients with mid/low rectal cancer.

**SE 01 AB-56**

**Imaging findings and differential points of the interesting diseases of the spleen, Revisited**

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**PURPOSE:** Imaging findings of diseases of the spleen have been limitedly evaluated with insufficient concern. There are only a few articles concerning imaging findings of diseases of this organ. This presenter will review imaging findings and pathologic findings of diseases of the spleen with a particular attention to differential points and diagnostic tips. The purpose of this exhibit is:

1. To review imaging findings and pathologic findings of primary vascular neoplasms, non-tumorous benign lesions, and other interesting lesions of the spleen
2. To discuss key points to differentiate various interesting lesions of the spleen
CONTENTS ORGANIZATION:
1. Primary vascular neoplasms of the spleen: radiologic-pathologic correlation
   - Imaging findings, pathologic findings, and key points for differential diagnosis
2. Nontumorous benign lesions of the spleen
   - Imaging findings, pathologic findings, and key points for differential diagnosis
3. Other interesting diseases of the spleen
   - Imaging findings, pathologic findings, and key points for differential diagnosis

SUMMARY:
1. Discuss imaging findings and differential points of primary vascular neoplasm of the spleen.
2. Discuss imaging findings and differential points of nontumorous benign lesions of the spleen.
3. Discuss imaging findings and differential points of other interesting lesions of the spleen.

SE 01 AB-57
A comprehensive approach to portal hypertension
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BACKGROUND: Portal hypertension is a common consequence of chronic liver diseases and leads to the major complications of liver cirrhosis, such as ascites, hepatic encephalopathy, variceal bleeding, and decompensation. Therefore, early diagnosis of portal hypertension is crucial to prevent severe portal hypertension-related complications. Moreover, as management and treatment of portal hypertension and its complications can vary depending on the type of portal hypertension, radiologists should understand the type and mechanism of portal hypertension and its complications and be familiar with various findings on angiographic, sonographic, CT, and MR imagings.

LEARNING OBJECTIVES:
1. Describe the cause, mechanism, clinical manifestations, and complications of portal hypertension
2. List various techniques for assessment and prediction of portal hypertension
3. Outline the various findings of portal hypertension on angiographic, sonographic, CT and MRI (e.g. varices in portal hypertension)
4. Discuss the interventional and surgical management and treatment for portal hypertension and its complications

SE 01 AB-58
New TNM staging system in the abdomen: what radiologists need to know
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PURPOSE:
1. To know the major changes of the new TNM staging system from the 7th to 8th edition in the abdomen
2. To illustrate cases of the new TNM staging system in the abdomen
3. To identify pearls and pitfalls of imaging for cancer staging in the abdomen

CONTENTS:
1. Introduction
2. Major changes of the new TNM staging system in the abdomen
3. Case illustrations in the abdomen
   1) Liver, 2) Biliary system, 3) Pancreas, 4) Stomach, 5) Small intestine, 6) Appendix, 7) Colon and rectum

SE 01 AB-59
Usefulness of the automatic segmental hepatic fat quantification with proton density fat fraction in healthy young Korean male
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PURPOSE: To evaluate the usefulness of the automatic segmental proton density fat fraction (PDFF) for measuring liver and body fat compared with region of interest-proton density fat fraction (ROI-PDFF) and magnetic resonance (MR) spectroscopy.

MATERIALS AND METHODS: This prospective study was approved by the Institutional Review Board, and informed consent was obtained from all volunteers. Nineteen healthy young Korean male volunteers were enrolled in our study (mean age, 23.8 years; range, 20-32 years). They underwent automatic segmental PDFF, ROI-PDFF and MR spectroscopy for measuring liver fat content. We could not obtain PDFF value of four patients due to fat-water swapping during Dixon MRI. We obtained their height, body weight, and dual energy X-ray absorptiometry (DXA)-measured body composition.

RESULTS: The mean fat fraction of automatic segmental PDFF, ROI-PDFF and MR spectroscopy was 3.94% ± 1.5 (standard deviation), 14.3% ± 13.7 and 4.5%
± 3.5, respectively. There was significant difference of mean fat fraction between segmental PDFF and ROI-PDFF (p = 0.007). Segmental PDFF was more correlated with DXA total body tissue fat (%) (r = 0.601, p = 0.014), DXA total body fat (kg) (r = 0.587, p = 0.017), and fat mass index (FMI, kg/m²) (r = 0.588, p = 0.017), compared with MR spectroscopy (r = 0.516, p = 0.041; r = 0.489, p = 0.049; r = 0.498, p = 0.050) and ROI-PDFF (r = 0.071, p = 0.827; r = 0.108, p = 0.739; r = 0.077, p = 0.812), and, respectively.

CONCLUSION: Automatic segmental PDFF helps accurately estimate fat of liver and body, compared with MR spectroscopy and ROI-PDFF.

SE 01 AB-60
Usefulness of advanced Dixon VIBE sequence for repairing fat-water swapping for fat quantification with proton density fat fraction in healthy young Korean male
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PURPOSE: The aim of our study is usefulness of advanced Dixon VIBE sequence for repairing fat-water swapping during segmental proton density fat fraction (PDFF).

MATERIALS AND METHODS: This prospective study was approved by the Institutional Review Board, and informed consent was obtained from all volunteers. Twenty healthy young Korean male volunteers were enrolled in our study (mean age, 24.3 years; range, 20-35 years). Eighteen volunteers performed advanced Dixon VIBE and 19 volunteers performed conventional Dixon VIBE sequence for PDFF.

RESULTS: The technical success rates were significant difference between advanced Dixon VIBE (100%, 18/18) and conventional Dixon VIBE (78.9%, 15/19) sequence, respectively (p = 0.039). PDFF using advanced Dixon VIBE was slightly more correlated with DXA total body tissue fat (%) (r = 0.601, p = 0.014), DXA total body fat (kg) (r = 0.587, p = 0.017), and fat mass index (FMI, kg/m²) (r = 0.588, p = 0.017), compared with conventional Dixon VIBE (r = 0.591, p = 0.030; r = 0.574, p = 0.040; r = 0.586, p = 0.035), respectively.

CONCLUSION: Advanced Dixon VIBE is useful sequence for repairing fat-water swapping during segmental proton density fat fraction (PDFF).

SE 01 AB-61
Comparison of MRI and transient elastography: liver fat evaluation of healthy young Korean male
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PURPOSE: To compare with proton density fat fraction (PDFF) and T1 parametric mapping with MRI, and transient elastography for assessment of liver and body fat evaluation of healthy young Korean male volunteers.

MATERIALS AND METHODS: This prospective study was approved by the Institutional Review Board, and informed consent was obtained from all volunteers. Twenty healthy young Korean male volunteers were enrolled in our study (mean age, 24.3 years; range, 20-35 years). They underwent PDFF and T1 parametric mapping with MRI and transient elastography (FibroScan®). We obtained their controlled attenuation parameter (CAP) from transient elastography and dual energy X-ray absorptiometry (DXA)-measured body composition.

RESULTS: The mean fat fraction of PDFF was 4.5%. The mean value of T1 parametric mapping and CAP was 731.7 ms and 218.7 dB/m, respectively. PDFF and T1 parametric mapping with MRI were correlated with DXA total body tissue fat (%) (r = 0.601, p = 0.014; r = 0.565, p = 0.023), DXA total body fat (kg) (r = 0.587, p = 0.017; r = 0.607, p = 0.013), and fat mass index (FMI, kg/m²) (r = 0.588, p = 0.017; r = 0.613, p = 0.012). There was no significant correlation between PDFF, T1 mapping of MRI and transient elastography. And there was no significant correlation between CAP from transient elastography and DXA total body tissue fat (%) (r = 0.349, p = 0.186), DXA total body fat (kg) (r = 0.244, p = 0.362), and FMI (kg/m²) (r = 0.307, p = 0.248), respectively.

CONCLUSION: PDFF and T1 mapping with MRI helps accurately assessment of liver and body fat, compared with transient elastography.

SE 01 AB-62
Setting US diagnostic criteria for pancreatic cancer
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PURPOSE: Study objectives are to set ultrasound (US) diagnostic criteria for pancreatic cancer.

MATERIALS AND METHODS: In 2013-2015, we had processed survey cards and evaluated them for US findings of 35 patients diagnosed by pancreas cancer
RESULTS: By considering US findings of pancreatic cancer, the following US findings could be statistical true probability: in 74.4% of the US findings cancer is in head and body of pancreas (p < 0.001), in 60.0% of them irregular shaped cancer (p < 0.01), and cancer density decreased (p < 0.05), in 80.0% of them cancer size more than 2.1 cm (p < 0.001), in 68% of them irregular margin of cancer (p < 0.01), in 65.7% of them bile duct enlargement (p < 0.05), in 57.1% of them gallbladder enlargement (p < 0.05).

CONCLUSION: It is determined that the following findings are criteria to diagnose or to differential diagnose pancreatic cancers: location, shape, size, margin, structure and density of focal or mass of pancreatic cancer; inner or external hepatic ducts enlargement; pancreatic duct enlargement and lymph nodes changes of abdominal vein or aorta.

SE 01 AB-64
Intrahepatic cholangiocarcinoma- MR imaging and enhancement features using gadobenate dimeglumine
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PURPOSE: To learn the enhancement pattern of the cholangiocarcinoma using gadobenate dimeglumine (MultiHance) MRI contrast agent with context to hepatobiliary phase.

MATERIALS AND METHODS: This retrospective analysis in 38 patients with histopathological proven intrahepatic cholangiocarcinoma. MRI liver imaging using gadobenate dimeglumine contrast agent was performed in dynamic phase and hepatobiliary phase. Assessment of the signal intensity and enhancement pattern of lesions were demonstrated.

RESULTS: Majority of the lesions were hypointense in T1W and iso-hyperintense on T2W images. The lesions showed peripheral rim of restricted diffusion with reduced ADC values. Capsular retraction was observed. On dynamic post contrast phase peripheral enhancement with gradual heterogeneous central enhancement was observed. Hepatobiliary phase acquired demonstrate hypointensity (cellular component) in the peripheral aspect and retention of the contrast in the central region (fibrotic component).

CONCLUSION: Gadobenate dimeglumine helps in better conspicuity, description in diagnosis and assessment of the intrahepatic cholangiocarcinoma. Hepatobiliary phase better delineation and aid in qualitative estimation of the fibrotic component of the lesion.
**SE 01 AB-65**

**Perivascular infiltration and histologic differentiation: is it helpful to determine T stage of advanced gastric cancer in CT?**

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**PURPOSE:** To determine whether there are specific CT and histologic features that can be used to evaluate CT T stage of advanced gastric cancer (AGC) and to assess the performance of radiologists using these features.

**MATERIALS AND METHODS:** A review of medical records yielded the 82 patients with AGC, whose stomach CT scans were available for review and pathologically confirmed. Individual review of stomach CT scans subsequently was performed by two experienced radiologists, who were blinded to pathologic tumor stage. CT T stage of AGC was analyzed according to three CT T stage criteria: standard T stage, T stage with perivascular infiltration, and T stage with histologic differentiation. We compared the performance of CT according to each CT T stage criteria. Among AGCs showing perigastric infiltration in CT, correlation between perivascular infiltration and pathologic T stage was analyzed.

**RESULTS:** The diagnostic accuracy of standard T stage, T stage with perivascular infiltration, and T stage with histologic differentiation was respectively 77%, 52%, and 78%. There was no significantly difference between standard T stage and T stage with perivascular infiltration. There was statistically significant difference between standard T stage and T stage with histologic differentiation. Of AGCs with perigastric infiltration, CT feature of perivascular infiltration was significantly difference between pathologic T3 and T4 lesions.

**CONCLUSION:** Perivascular infiltration and histologic differentiation are useful ancillary features for CT T staging of AGC.

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**SE 01 AB-66**

**Hepatic hemangiomas: typical and atypical imaging findings and clinical significance**

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**LEARNING OBJECTIVES:**

1. Classification of typical and atypical imaging findings of hemangiomas on US, CT, MRI, RI scan.
2. Causative factors of atypical hemangioma on imaging findings.
3. Analyses of differential diagnostic points between hemangioma from malignant neoplasms such as metastasis, cholangiocarcinoma, and epithelioid hemangioendothelioma in certain clinical situations and imaging findings.

**IMAGING FINDINGS OR PROCEDURE DETAILS:**

1. Radiological classification of typical and atypical hemangiomas on US, CT, MRI and RI scan.
2. Pattern analyses based on causative factors of atypical hemangioma such as sclerosing and sclerosed hemangiomas and giant hemangiomas on imaging findings.
3. Possible suggestion for differential diagnostic points between the hemangiomas and mimicking hemangiomas such as metastasis, cholangiocarcinoma, epithelioid hemangioendothelioma based on radiological and clinical findings.
A 32-year-old woman with a hemangioma
Transabdominal ultrasonography with transverse oblique plane demonstrates a hypoechoic nodule with marginal hyperechoic rim (arrows) in hepatic segment VII.

A 46-year-old man with a giant hemangioma
Transabdominal ultrasonography with oblique transverse plane demonstrates a large complex echoic mass (arrows) in right hepatic lobe.

A 46-year-old woman with a cavernous hemangioma
Axial CT scans show a well-defined low attenuating nodule (arrow) on pre-contrast image (A), and peripheral globular enhancement (arrow) on arterial phase (B), progressively centripetal enhancement on portal venous phase (C), and complete fill-in the nodule (arrow) on equilibril phase (D) contrast-enhanced images.

A 51-year-old woman with a hemangioma
Axial contrast-enhanced CT scans show a low attenuating nodule with focal globular enhancement (arrows) on arterial (A) and equilibril (B) phase images. Axial gadoxetic acid disodium enhanced T1-weighted MR images of the same patient show a low intensity nodule with focal peripheral nodular enhancement (arrows) on portal venous (C) and transitional phase (D) images.

A 73-year-old woman with a sclerosed hemangioma
Contrast-enhanced axial CT scans show a large lobulated mass with peripheral nodular enhancement (arrows) on arterial phase image (A) and progressive centripetal enhancement (arrows) of enhancing nodules and slowly mild enhancing portion (arrowhead) in the mass on portal venous (B) and equilibril phase (C) images. Large region of the mass (asterisks) was not shown enhancement after intravenous contrast administration from arterial to equilibril phase CT images. Gradually decreased size of the mass with decreased area of contrast-enhancing portion and progressively retraction of surrounding hepatic capsule was noted for the last eight-year imaging follow-up.

A-C: A 80 year-old woman with single hepatic metastasis
Fat-suppressed gradient echo T1-weighted arterial (A) and portal venous (B) phase MR images with GE-EOB-DTPA enhancement show a small lesion with peripheral nodular enhancement (arrows) in left lateral hepatic segment. Fat-suppressed T2-weighted MR image (C) shows a small nodular lesion with marginal slight high signal intensity & central low signal intensity in left lateral segment. The patient was diagnosed colon carcinoma with a liver metastatic nodule.

A-B: A 27-year-old woman with epithelioid hemangioendothelioma
Contrast-enhanced coronal reformatted portal venous phase CT images show hepatic subcapsular located, multiple variable sized heterogeneous low attenuating lesions with surrounding hepatic capsular retraction; a large coalescent mass (black arrow) with marginal tiny calcification and other a few smaller low attenuating lesions with peripheral focal enhancing nodules (white arrows). The patient has had intermittent right upper abdominal discomfort for a few years.
Rectus abdominis diastasis: usefulness of MDCT for the surgical repair

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PURPOSE: Evaluation of MDCT criteria of rectus abdominis diastasis for myoaponeurotic surgical repair.

MATERIALS AND METHODS: 50 surgical patients examined on 40-MSCT scanner (mean age, 51 years) where 32-women and 18-men. Maximum inter-rectus interval (IRI) calculated. Antero-posterior diameter of both rectus muscles were measured at L3, L4 and L5 mid-vertebral body level and average (RM1 and RM2 respectively) obtained. Rectus abdominis diastasis index (RADI) was calculated using formula RADI = (RM1+RM2)/IRI.

RESULTS: Mean IRI in patients below 50 year of age (48%) was 29 mm, mean IRI in patients above 50 years of age (52%) was 37 mm. Mean average antero-posterior diameter of rectus abdominis muscles in patients below 50 year of age (48%) was 12.95 mm, mean average antero-posterior diameter of rectus abdominis muscles in patients above 50 years of age (52%) was 8.67 mm. In 16 patients (32%) RADI was over 1.15, in 21 patients (42%) RADI was 0.53-097, in 13 patients (26%) RADI was less than 0.46. On basis of acquired MDCT data of RADI we created 3 grades of RAD for future surgical differential approach:

Grade-I (RADI > 1) - no special surgical repair needed.
Grade-II (RADI = 0.5-1) - abdominoplasty with interrupted sutures.
Grade-III (RADI < 0.5) - abdominoplasty with use of mesh implant.

CONCLUSION: Based on RADI rectus abdominis diastasis were distinguished into Grade I, II and III. The calculation of represented simple MDCT criteria can help surgeons in future myoaponeurotic surgical repair.

Utility of MDCT in emergency patients with bowel obstruction and its comparison with the operative findings

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PURPOSE: To evaluate the diagnostic performance of MDCT in emergency patients with bowel obstruction and its comparison with the operative findings.

MATERIALS AND METHODS: The study was performed for one year duration from the January 2016 to December 2016. Total of 1159 MDCT Abdomen study was performed in patients with acute abdomen presented in emergency. The exams were performed with intravenous contrast medium, using a Toshiba 64 slice MDCT. Out of these patients, 97 patients with bowel obstruction were studied. In study 52 men and 45 women, mean age of 58.5 years (range, 20-80 years). MDCT findings were compared with clinical data and operative details. We calculated sensitivity, specificity, positive (PPV) and negative (NPV) predictive value. Diagnostic concordance of underlying etiology and site has been evaluated using K Cohen’s coefficient.

RESULTS: Out of 97 patients with bowel obstruction: 44.32% (43 patients) inflammation, 31.96% (31 patients) tumors, 8% (12 patients) hernias, 6.19% (6 patients) malrotation, 4.12% (4 patients) intussusception, 2.06% (2 patients) volvulus. The localization has been in small intestine in 58.78% (57 no) patients and in large intestine in 41.24% (40 no) patients. The sensitivity of MSCT is 91.5%, specificity is 83.7%, PPV 94.1% and NPV 87.4%. The K Cohen’s coefficient is 0.93 for underlying etiology and 0.89 for site of bowel obstruction.

CONCLUSION: MDCT is a gold standard diagnostic method in intestinal obstruction with acute abdomen in emergency. MDCT evaluates with a good concordance both the underlying etiology and localization of the intestinal obstruction compared with clinical and operative findings.
SE 01 AB-70
Appendicitis in pregnant women: role of US diagnosis
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PURPOSE: Ultrasoundography (US) is the initial imaging study in the pregnant woman with an acute abdomen. The purpose of our study was to assess the reliability and value of US examinations in the diagnosis of acute appendicitis in pregnant women.

MATERIALS AND METHODS: Study was done over the period of one year from February 2016 to January 2017. Total 55 pregnant women with clinically suspected acute appendicitis underwent US evaluation. US was performed on a GE Volusion E8 Diagnostic US System with convex 3-5 MHz and 5-12 MHz linear transducers. All examinations were performed using gray scale graded compression in the left lateral decubitus position, in addition to color Doppler imaging, is a highly accurate method for the diagnosis of acute appendicitis in pregnant women and should be performed as the first imaging test. Additional advantage of US is accurate, noninvasive and readily available, and does not use ionizing radiation.

RESULTS: Average age was 24.5 years with an average gestational age of 25 weeks. In the 55 cases included in our series, 3 patients (5.45%) had nondiagnostic exams due to obesity and/or > 34 weeks pregnant. 5 patients (9.62%) had positive US findings of acute appendicitis of the 52 remaining cases. US findings were correlated with surgical findings and clinical follow-up.

CONCLUSION: Gray-scale US graded compression in the left lateral decubitus position, in addition to color Doppler imaging, is a highly accurate method for the diagnosis of acute appendicitis in pregnant women and should be performed as the first imaging test. Additional advantage of US is accurate, noninvasive and readily available, and does not use ionizing radiation.

SE 01 AB-71
Liver fibrosis assessment with diffusion-weighted MR imaging: the value of liver ADC normalization using spleen as a reference organ
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PURPOSE: To evaluate investigate whether the value of liver the normalized apparent diffusion coefficient (nADC) normalization using spleen as a reference organ in liver fibrosis assessment, in comparison with transient elastography (TE) can help determine the stage of liver fibrosis. In patients by using the spleen as reference organs.

MATERIALS AND METHODS: We retrospectively evaluated 66 patients who underwent liver MRI, TE, and surgical resection for hepatic mass had histopathologic diagnosis of liver fibrosis from surgical excision. MR examinations were performed using three different 3.0 Tesla (T) and one 1.5T systems, with variable b value combinations and respiratory motion compensation techniques. The ADC values of the liver (ADC_{liver}) and spleen (ADC_{spleen}) from three different image points were analyzed, and using the ADC values of the spleen for normalization and ADC_{spleen} was used for normalization of ADC_{liver} (nADC_{liver}). Liver AADC_{liver} DC and nADC_{liver} nADC were compared by with liver stiffness measurement (LSM) using transient elastography (TE) and METAVIR liver fibrosis staging. All statistical analyses were performed using Spearman’s rank correlation analysis, Pearson correlation test, and the receiver operating characteristic (ROC) curve and area under the receiver operating characteristic ROC (AUROC) curve analysis were used for statistical analysis.

RESULTS: Liver ADC and nADC correlate with TE and liver fibrosis stage. Pearson correlation test showed LSM showed negative correlation with both that ADC_{liver} liver ADC (n = 67; r = -0.269; p = 0.029) and nADC (n = 67; r = -0.428; p < 0.001), respectively decreased with rising TE. Liver fibrosis stage had showed negative significant correlation with ADC_{liver} liver ADC (r = -0.268; p = 0.030) and nADC_{liver} nADC (r = -0.574; p < 0.001). With nADC_{liver} Distinguishing individual stage of liver fibrosis compared by liver ADC was failed. ROC curve analysis showed that liver fibrosis stage can be distinguished. nADC_{liver} nADC was superior to ADC_{liver} liver ADC for detection of staging cut-off value.

CONCLUSION: Normalizing liver Normalized liver ADC using spleen as a reference organ with spleen ADC had showed significant negative correlation with TELSM and liver fibrosis stage. Liver fibrosis stage can be distinguished using normalized liver ADC.
SE 01 AB-72

Transient severe motion in liver MRI: effect of modified breath-holding method in matched within-patient cohort of gadoxetate disodium and gadopentetate dimeglumine enhancement

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OBJECTIVES: To compare the occurrence of transient severe motion (TSM) between gadoxetate disodium- and gadopentetate dimeglumine-enhanced MRI and between gadoxetate disodium-enhanced MRI without the application of a modified breath-holding technique.

MATERIALS AND METHODS: We reviewed 80 patients who underwent two magnetic resonance examinations (gadoxetate disodium-enhanced MRI and sequentially acquired gadopentetate dimeglumine-enhanced MRI) with the application of a modified breath-holding technique (dual group). This group was compared with a cohort of 100 patients who underwent gadoxetate disodium-enhanced MRI without the application of the modified breath-holding technique (single group). Patient risk factors and motion scores for each dynamic phase imaging were analyzed. Independent samples t test, Chi-squared test, Fisher exact test, and the intraclass correlation coefficient were used for statistical analysis.

RESULTS: In the dual group, mean motion scores did not differ significantly between gadoxetate disodium- and gadopentetate dimeglumine-enhanced MRI (P = 0.096-0.807) in any phase. However, in all phases except the late dynamic phase, mean motion scores of the dual group were significantly lower than those in the single group (P = 0.104). TSM incidence did not differ significantly between gadoxetate disodium and gadopentetate dimeglumine-enhanced MRI in the dual group (3.8% vs. 1.3%, P = 0.620).

CONCLUSION: Applying the modified breath-holding technique significantly decreased the incidence of TSM in gadoxetate disodium-enhanced MRI. With proper application of the modified breath-holding technique, TSM occurrence with gadoxetate disodium administration was comparable to that associated with gadopentetate dimeglumine-enhanced MRI.

KEYWORDS: Gadoxetate disodium; gadopentetate dimeglumine; motion artifact; arterial phase; magnetic resonance imaging

SE 01 AB-73

Determination of hepatic segment in intrahepatic tumor using US contrast agent (sonazoid): can it help the surgeon decide hepatic segmentectomy or sectionectomy?

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PURPOSE: In the case of intrahepatic tumors requiring surgical removal, especially malignant tumors such as HCC, many patients have chronic liver disease or cirrhosis. In these patients, hepatic resection requires minimal resection, such as segmentectomy or sectionectomy because of decreased liver function. The Couinaud classification performed by radiologic examination determines the hepatic segment based on the position of the hepatic vein and the portal vein. However, in the actual operation, portal vein ligation is performed and the liver is resected based on the distribution of hepatic portal blood flow. These discrepancies between Couinaud classification and portal flow distribution which can lead to a number of problems. The purpose of this study is to segment the liver based on the portal flow, as in the actual operation, using sonazoid and compared with the postoperative hepatic segment of intrahepatic tumor.

MATERIALS AND METHODS: Total 11 patients underwent contrast enhanced ultrasound (US) and hepatic resection between 10/03/2016 and 02/24/2017. First, we identified the intrahepatic tumors, theirs’ segment, and target portal vein in conventional radiologic exam. And then, after injection of sonazoid, high MI imaging at target portal vein that was used to destroy the sonazoid. Finally, the hepatic segment of intrahepatic tumor was determined at the delayed images and compared with the postoperative hepatic segment. Kappa statistic was used to evaluate the agreement between 1) The postoperative segment and the Couinaud classification, and 2) The postoperative segment and the hepatic segment based on the portal flow using sonazoid.

RESULTS: In Cohen’s kappa coefficient, as compared with the postoperative segment, the hepatic segment using sonazoid (k = 1.000) showed a higher agreement than the Couinaud classification (k = 0.680).

CONCLUSION: The hepatic segment using sonazoid can be helpful for the surgeon such as accurate resection, preservation of hepatic function, and could be lowering the postoperative tumor recurrence.
SE 01 AB-74
Intraindividual comparison of hepatocellular carcinoma imaging features on contrast-enhanced CT, gadopentetate dimeglumine-enhanced MRI, and gadoxetic acid-enhanced MRI
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PURPOSE: To evaluate typical imaging features of hepatocellular carcinoma (HCC) and capsule appearance with three imaging studies: dynamic computed tomography (CT), gadopentetate dimeglumine-enhanced magnetic resonance imaging (Gd-DTPA-MRI), and gadoxetic acid-enhanced MRI (Gd-EOB-MRI).

MATERIALS AND METHODS: We retrospectively reviewed 56 HCCs (2.1 ± 1.4 cm; range, 0.8-9.3 cm) in 49 patients with chronic hepatitis or cirrhosis. Lesion attenuation/signal intensity was graded using a five-point scale (1 = most hypoattenuated/hypointense; 5 = most hyperattenuated/hyperintense) based on dynamic phase and hepatobiliary phase (HBP) imaging. Subjective washout and capsule presence were evaluated on portal venous phase (PVP) or delayed/transitional phase (DP/TP) imaging. The tumor-to-liver contrast ratio (TLCR) was calculated. The Friedman test, Chi-square test, repeated measures ANOVA, and independent samples t-test were used for statistical analysis.

RESULTS: Gd-DTPA-MRI and Gd-EOB-MRI was graded higher than CT on arterial phase (p < 0.001). Gd-EOB-MRI was graded lower than Gd-DTPA-MRI on PVP and DP/TP (p < 0.05). The detection rate of subjective washout did not differ among the three imaging studies on either PVP or DP/TP. The prevalence of capsule appearance, either on PVP or DP/TP, did not differ among the three imaging studies. TLCR of Gd-EOB-MRI was lower than CT on PVP (p = 0.004) and was lower than Gd-DTPA-MRI on DP/TP (p = 0.001).

CONCLUSION: Arterial phase hyperenhancement and washout of HCC were well demonstrated in Gd-EOB-MRI. The detection of capsule appearance using Gd-EOB-MRI was not inferior to Gd-DTPA-MRI or CT.

SE 01 AB-75
Gastrosplenic fistula after chemotherapy for lymphoma: systematic review with a new case of extranodal NK/T-cell lymphoma
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PURPOSE: Gastrosplenic fistula (GSF) is a very rare complication occurring in lymphomas. Due to its rarity, GSF have not been well investigated. Therefore, we intend to provide overall spectrum of GSF occurring in lymphomas through a systematic review including a patient at our hospital who had extranodal NK/T-cell lymphoma.

MATERIALS AND METHODS: A comprehensive literature search was performed in the MEDLINE database to identify studies of GSF occurring in lymphomas. A computerized search of our institutional database was also performed. In all cases, we analyzed the clinopathologic/radiologic features, treatment, and outcome of GSF occurring in lymphomas.

RESULTS: A literature search identified 25 relevant studies with 26 cases. Our institutional data search added one case. Systematic review of the 27 cases revealed that GSF occurred mainly in diffuse large B-cell lymphoma (n = 23), but also in diffuse, histocytic lymphoma (n = 1), Hodgkin’s lymphoma (n = 2), and NK/T-cell lymphoma (n = 1, our patient). The common clinical presentations are constitutional symptoms (n = 20) and abdominal pain (n = 17), although acute gastrointestinal bleeding (n = 6) and infection symptoms due to splenic abscess (n = 3) are also noted. In all patients, computed tomography scanning was very helpful for diagnosing GSF and evaluating the lymphoma extent. GSF could occur either post-chemotherapy (n = 10) or spontaneously (n = 17). Surgical resection has been the most common treatment. Once patients have recovered from acute illness status after undergoing surgery, their long-term outcome has been good.

CONCLUSION: This systematic review provides an overview of GSF occurring in lymphomas, which would be helpful for physicians to become aware of this rare disease entity.
SE 01 AB-76  
Diagnostic performance and interobserver variation in MR reporting of extramural venous invasion in rectal cancer  
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PURPOSE: To determine diagnostic performance and interobserver variation in MR reporting of extramural venous invasion (EMVI) among the three radiologists with different expertise.  

MATERIALS AND METHODS: Between 2007 and 2016, 878 patients with histopathologically proven rectal cancer who underwent preoperative MRI were retrospectively enrolled. Of them, 75 patients had positive EMVI on histopathology. Among the remaining 803 patients who had negative EMVI, 75 patients were selected as a control after matching using age, sex, T and N staging. Finally, 150 patients (M:F = 106:44; mean age, 61.3 years) were included. Of 150 patients, 76 patients underwent preoperative concurrent chemoradiation therapy (CCRT) while the remaining 74 patients underwent surgery without CCRT. Three radiologists with 4 (resident), 6 (junior faculty), and 11 (senior faculty) years of experience for abdominal radiology were asked to determine the presence of EMVI on MRI using a 5-point grading system (0, definitely absent; 1, probably absent; 2, indeterminate; 3, probably present; 4, definitely present). Using histopathologic results as a reference standard, radiologists’ performance were analyzed and compared with multi-reader receiver operating characteristics analysis. For interobserver variation, interclass correlation coefficient (ICC) was used.  

RESULTS: For all 150 patients, the area under the ROC curve (AUC) was highest in the senior faculty radiologist (0.775), followed by junior faculty (0.697) and resident (0.658). The difference of AUC between senior faculty and resident was statistically significant (p = 0.0022). ICC was 0.537 among the three radiologists. For all three radiologists, AUCs for 74 patients who did not undergo CCRT were higher than for those 76 patients who underwent neoadjuvant CCRT (0.839 vs. 0.693 for senior faculty; 0.708 vs. 0.659 for junior faculty; 0.672 vs. 0.591 for resident). ICC was also higher for patients without CCRT (0.593) than for patients with CCRT (0.460).  

CONCLUSION: MR can be useful to predict EMVI with a good diagnostic performance and moderate interobserver agreement. MR-EMVI yields better results in patients who did not undergo neoadjuvant CCRT than in those who did.  

SE 01 AB-77  
Can CT quantitative volumetric histogram analysis be used to differentiate duodenal adenocarcinoma from other solid tumors arising from the periampullary area?  
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PURPOSE: To investigate whether quantitative volumetric histogram analysis on computed tomography (CT) is helpful for distinguishing duodenal adenocarcinoma from pancreatic head carcinoma (PC) and duodenal gastrointestinal stromal tumors (GIST) arising from the periampullary area.  

MATERIALS AND METHODS: A total of 74 patients who underwent surgery and had histopathology available were included in this retrospectively study (26 with duodenal adenocarcinoma, 20 with PC, 28 with GIST). All patients underwent the whole abdominal dual-phase enhanced MSCT before surgery. Volumetric histogram quantitative analysis on the image of these three types of tumors was performed with post-processing software CT Kinetics. The mean, median and the 10th, 25th, 75th, 90th percentile of CT value, kurtosis, skewness, and entropy of the entire tumor of arterial and venous phase were calculated. Multiple receiver operating characteristic (ROC) curves analysis was used to determine and compare the diagnostic value of each significant parameter.  

RESULTS: Duodenal adenocarcinoma had significantly higher CT mean, median and the 10th, 25th, 75th, 90th percentile of both arterial and venous phase compared with PC (arterial phase, p = 0.000, p = 0.000, p = 0.001, p = 0.000, p = 0.000, p = 0.000, venous phase, p = 0.001, p = 0.000, p = 0.000, p = 0.000, p = 0.000, p = 0.000, p = 0.004, respectively). There were no significant difference on skewness, kurtosis and entropy of both phase (arterial phase, p = 0.219, p = 0.251, p = 0.128, venous phase, p = 0.414, p = 0.265, p = 0.510). Significant difference was found between duodenal adenocarcinoma and GIST on CT mean, median, the 25th, 75th, 90th percentile, skewness, kurtosis and entropy of arterial phase (p = 0.001, p = 0.001, p = 0.012, p = 0.000, p = 0.000, p = 0.005, p = 0.025, p = 0.003). All the parameters of venous phase showed no significant difference (p > 0.05). In the ROC analysis, the 75th percentile of venous phase generated the highest AUC for differentiating duodenal adenocarcinoma from PC (AUC, 0.854; sensitivity, 92.3%; specificity, 80%; cut-off
value, 94.46 HU). The 75th percentile of arterial phase generated the highest AUC for differentiating duodenal adenocarcinoma from GIST (AUC, 0.809; sensitivity, 100%; specificity, 64.3%; cut-off value, 123.51 HU).

**CONCLUSION:** CT Quantitative volumetric histogram analysis may be helpful for differentiating duodenal adenocarcinoma from PC and GIST arising from the periampullary area.

**SE 01 AB-78**

**Noise reduction and texture restoration in abdominal digital radiography: phantom and preliminary patient studies**

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**PURPOSE:** To prove diagnostic non-inferiority of the low-dose abdominal radiography compared to the conventional-dose radiograph, by applying new post-processing technique.

**MATERIALS AND METHODS:** In the phantom study, radiographs of an abdominal phantom were taken firstly by the conventional abdominal radiograph protocol of our institution followed by low-dose radiography protocol with new post-processing technique. The image subjects of the new post-processing technique utilizing noise reduction and texture restoration, were taken reduced doses of the conventional. After post-processing, quantitative analysis was performed by an abdominal radiologist with 10-year experience regarding on signal-to-noise ratio (SNR) and contrast-to-noise ratio (CNR).

In the preliminary patient study of 15 subjects who needed abdominal radiography clinically, two abdominal radiographs were taken for each subject at supine position, by the conventional protocol as well as one of 5 levels of low-dose protocol. Images from the low-dose protocol were post-processed using noise reduction and texture restoration. For qualitative assessment, three radiologists reviewed and scored the quality of images independently.

**RESULTS:** In the phantom study, SNRs of post-processed low-dose radiographs were not significantly different from radiographs with conventional setting at least at 50% of dose of conventional abdominal radiograph protocol of our institution (U = 153, p = 0.090). There was no significant difference in CNR. In the preliminary patient study, images from low-dose protocol marked same or higher scores than the images from conventional protocol until 50% dose rate by all three radiologists. At 40% dose rate, reviewers scored images from two patients were inappropriate to evaluate.

**CONCLUSION:** From the result of two studies, low-dose abdominal radiographs post-processed with the proposed method were not significantly different from the conventional radiographs by means of SNR and the diagnostic quality evaluated by radiologists, even with dose reduction of 50%.

**SE 01 AB-79**

**Hepatic fat fraction in liver transplant candidates: comparative MR study using high speed T2-corrected multiecho acquisition at MR spectroscopy, single-peak and multi-peak two point Dixon**

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**PURPOSE:** To compare the diagnostic accuracy and reproducibility of hepatic fat fraction (HFF) determined by high speed T2-corrected multiecho acquisition 1H MR spectroscopy (MRS), single peak two-point Dixon (SPTD), and multi-peak two-point Dixon (MPTD) method in living donor liver transplant candidates.

**MATERIALS AND METHODS:** Forty three patients of living donor liver transplant candidates who underwent MR study were included in the study group (M:F = 33:10; average, 33.81 years; range, 21-59 years). All MR study included MRS, SPTD, and MPTD. HFFs were analyzed in right and left regions of interest (ROIs) of the liver in each image. Imaging data from each method were compared with the liver biopsy results before the living donor liver transplantation.

**RESULTS:** Grade scales of fatty infiltration on liver biopsy were grade 0 (normal < 5%, n = 16), grade 1 (mild, 5-33%, n = 22), grade 2 (moderate, 34-66%, n =
The range of HFFs was measured by 0.57-22.33% (5.29 ± 4.76%), 0.18-27.08% (5.04 ± 5.83%), 0.16-17.63% (3.79 ± 3.90) on MRS, SPTD, and MPTD, respectively. The HFFs measured by MRS were highly correlated with those measured by SPTD and MPTD (p < 0.05). MRS had the highest accuracy compared to the other two techniques, especially for small amount of HFF (p < 0.05). The HFFs in the ROIs of each MRI methods correlated well with the biopsy results in the cases of grade 0 and 1 (p < 0.05), but were underestimated in cases of grade 2 (p < 0.05).

CONCLUSION: HFF more than 30%, one of the exclusion criteria of living donor liver transplantation, were all underestimated by three MR methods. MRS showed the highest accuracy in quantitative assessment of small amount of hepatic fat compared to SPTD and MPTD method.

CLINICAL RELEVANCE/APPLICATION: Compared to single peak two-point Dixon and multi-peak two-point Dixon method, MR spectroscopy showed the highest accuracy in assessing hepatic fat fraction, especially for small amount of HFF.

SE 01 AB-80
Hounsfield unit as CT imaging biomarker in portal vein thrombosis
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PURPOSE: 1. To evaluate HU value of thrombus in portal vein as imaging biomarker to identify the underlying cause of thrombus- neoplastic vs. bland thrombus. 2. To evaluate HU value of thrombus on NCCT imaging as imaging biomarker.

MATERIALS AND METHODS: Sample size: 30 cases of portal vein thrombus. Further cases done till October will be included if required. We found total of 30 cases of portal vein thrombosis with various etiologies between 2011 and 2017 till date. Inclusion criteria: All patients with portal vein thrombosis on CT imaging; where both NCCT and portal venous phase CT has been performed. Exclusion criteria: Follow up cases of HCC with tumor thrombus has been excluded. All positive cases of portal vein thrombosis have been tabulated and classified into two main group neoplastic thrombus and nonneoplastic thrombus. HU value of thrombus on portal vein phase CT imaging has been recorded using a uniform ROI of 0.5 sqcm. Retrospectively on NCCT imaging, HU value of thrombus and adjacent blood also recorded.

RESULTS: In our study of 30 cases of portal vein thrombus we found 10 cases of neoplastic portal vein thrombosis (due to HCC) and 20 cases of bland thrombus, where etiology ranges from spontaneous portal vein thrombosis, portal hypertension, pancreatitis. The average HU value of bland thrombus is 53 HU on plain CT and 67 HU on CECT. The average HU value of neoplastic thrombus is 45 HU on plain CT and 95 HU on CECT. Neoplastic thrombus shows 100% increase in HU value from NCCT to CECT. Nonneoplastic thrombus shows 25% increase in HU value. The HU value of thrombus on NCCT is significantly different from adjacent portal vein blood.

CONCLUSION: Significant difference in HU value of bland thrombus vs. neoplastic thrombus is confirmed on NCCT as well as CECT. On NCCT, HU value of thrombus is different from that of adjacent blood. HU value can be used as quantitative imaging biomarker for evaluation of portal vein thrombosis.
PURPOSE: To study whether the measurement of hepatic fibrosis on gadolinium-ethoxybenzyl-diethylentriamine pentaacetic acid (Gd-EOB-DTPA) magnetic resonance (MR) imaging using the coefficient of variation (CV) might be correlated with the presence of small hepatocellular carcinoma (HCC) in patients with chronic hepatitis B (CHB), and to compare it with a clinical biomarker.

MATERIALS AND METHODS: This study included 104 patients with and without CHB, who were divided into 4 groups: control group, CHB without liver cirrhosis (LC; Group I), CHB with LC (Group II), and CHB with LC and small HCC (Group III). MR images were analyzed to measure the inhomogeneity of signal intensities calculated using the CV map of the liver parenchyma. We also investigated alpha-fetoprotein (AFP) levels. Intergroup comparisons of CV values were performed using ANOVA. The diagnostic performance of the CV map and AFP for diagnosing small HCC was evaluated using the receiver operating characteristic (ROC) curve. The ROC curves of CV values and AFP were compared.

RESULTS: In qualitative analysis, most of HCCs in the steatotic group did not show washout on delayed CT phase compared with the non-steatotic group (68% vs. 23%, p < 0.001). All attenuation criteria of hepatic steatosis were significantly different between both groups (LAI [p < 0.001], absolute [p < 0.001], STL [p < 0.001]). The optimal cut-off points for each method to determine the degree of hepatic steatosis to make washout vanished were as follows: LAI (7.5 Hounsfield Unit [HU]), Absolute (46.8 HU), and STL (1.16).

CONCLUSION: Hepatic steatosis significantly affected vanishing washout of HCC on CT. Our specific cutoff value of fat quantification may be helpful to predict this phenomenon in patients with hepatic steatosis.
RESULTS: On the hepatobiliary phase of Gd-EOB-DTPA-enhanced T1-weighted imaging, the mean CV values of the control group and Groups I, II, and III were 3.9 \pm 0.99, 3.97 \pm 1.09, 5.58 \pm 2.05, and 6.80 \pm 2.34, respectively (p = 0.000). On ROC analysis of the CV value for predicting HCC, the area under the curve (AUC) on Gd-EOB-DTPA MR imaging was 0.788 (95% CI: 0.697-0.862). The sensitivity and specificity respectively (p = 0.000). On ROC analysis of the CV curve (AUC) on Gd-EOB-DTPA MR imaging was 0.788 value for predicting HCC, the value of the area under the curve (AUC) was 0.766.

CONCLUSION: The CV value for hepatic fibrosis on Gd-EOB-DTPA MR imaging may be correlated with the presence of small HCC in patients with CHB, and shows comparable diagnostic performance to AFP analysis.

SE 01 AB-84
Comparison of point shear wave elastography and two-dimensional shear wave elastography techniques equipped on a same machine for applicability and elasticity values
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PURPOSE: To prospectively compare applicability rate of point shear wave elastography (pSWE, ElastPQ) and a new two-dimensional shear wave imaging (2D-SWE, ElastQ Imaging) and to correlate liver stiffness (LS) values measured by the two elastographic techniques equipped on a same machine.

MATERIALS AND METHODS: We prospectively enrolled 62 patients (M:F = 32:30, age, 20-83 years), 10 of whom were previously diagnosed with chronic liver disease. LS values were measured in the same session using two techniques equipped on a same ultrasound machine. The applicability rates of the two techniques were compared by Chi square. LS values obtained by the two techniques were correlated and compared using Spearman correlation coefficient, 95% Bland-Altman limit of agreement, and Wilcoxon signed-rank test.

RESULTS: The applicability rate of ElastQ Imaging (94.5%) was significantly higher than that of ElastPQ (80.0%, p = 0.023). The LS values obtained by the two techniques showed strong correlation (r = 0.973, p < 0.001). The 95% limit of agreement of the two techniques was 13% of the mean. The mean LS value of ElastQ Imaging (5.97 \pm 4.30 kPa) was significantly higher than that of ElastQ Imaging (5.13 \pm 3.07 kPa, p < 0.001).

CONCLUSION: ElastQ Imaging showed better applicability rate than ElastPQ. However, LS values obtained by ElastQ Imaging was significantly higher than those obtained by ElastPQ. Therefore, further study for diagnostic performance of ElastQ Imaging in discriminating liver fibrosis staging was warranted.

SE 01 AB-85
The value of gadoxetic acid-enhanced and diffusion-weighted MR imaging for differentiating hepatocellular adenoma from hepatocellular carcinoma
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PURPOSE: To evaluate the value of gadoxetic acid-enhanced and diffusion-weighted (DW) magnetic resonance (MR) imaging for differentiating hepatocellular adenoma (HCA) from hepatocellular carcinoma (HCC).

MATERIALS AND METHODS: This study had Institutional Review Board approval; the requirement for informed consent was waived. One hundred and thirty-seven patients with 143 lesions (45 HCAs and 98 HCCs) were included in the study. There were 37 female patients and 100 male patients (mean age, 58 years). Two radiologists evaluated morphologic features, signal intensity (SI) of tumors on MR images including DW (b = 800) imaging and dynamic enhancement pattern in consensus. For quantitative analysis, tumor-to-liver SI ratio and contrast enhancement index (CEI) on unenhanced, dynamic, and hepatobiliary phase images and apparent diffusion coefficient (ADC) maps were calculated. Statistically significant imaging findings were identified through univariate and multivariate analyses, and their diagnostic performance for predicting HCA was analyzed.

RESULTS: In univariate and multivariate analyses, high SI on portal phase images (p = 0.0009), lower tumor-to-liver SI ratio on T2-weighted images (< 1.647, p = 0.0009), and higher tumor-to-liver SI ratio on T1-weighted images (≥ 0.807, p = 0.0068) and tumor-to-liver SI ratio on ADC maps (≥ 0.841, p < 0.001) were independently significant factors for predicting HCA. When three of these four criteria were combined, 68.9% (31/45) of HCA were identified with specificity of 92.9%. When all four criteria were satisfied, specificity was 100%.

CONCLUSION: Gadoxetic acid-enhanced and DW MR imaging may be helpful for differentiating HCA from HCC.
SE 01 AB-86
Comparison of whole-body diffusion-weighted MRI and PET/CT in staging lymphoma
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PURPOSE: To compare diagnostic efficacy of whole-body magnetic resonance imaging (MRI), including diffusion-weighted imaging (DWI), and 18-uorodesoxyglucose positron emission tomography combined with computed tomography (PET/CT) for lymphoma staging.

MATERIALS AND METHODS: We prospectively enrolled 22 not previously treated lymphoma patients (Hodgkin and non-Hodgkin lymphoma 11 patients each) in whom whole-body 1.5T MRI with T1-weighted imaging, STIR and DWI (b-values 0 and 800 s/mm²) and PET/CT were performed before treatment. MRI-DWI criterion for lymph node (LN) involvement was a short axis size > 1 cm. LNs ≤ 1 cm were considered involved in case of diffusion restriction, that is having a high signal intensity on b 800 images and low signal intensity (below that of muscles on the same slice) on apparent diffusion coefficient maps. PET was rated as positive if focally increased tracer accumulations relative to the surrounding tissues or mediastinal blood pool activity was present. Otherwise size criterion for LNs was applied. Comparison was performed by 17 groups of LNs, 4 organs (lungs, spleen, bone marrow (BM), other) and Ann Arbor stages. Biopsy, PET/CT and follow-up of a minimum 6 months served as a reference standard.

RESULTS: According to reference standard, 114 LN groups > 1 cm, 37 LN groups ≤ 1 cm in 22 patients and 12 organs in 8 patients (BM and lungs in 4 patients each, spleen in 2 patients, kidneys and adrenal glands in 1 patient each) were positive. Final Ann Arbor stages were II in 9 patients, III in 6 and IV in 7. The sensitivity of MRI-DWI and PET/CT for LNs > 1 cm was 97% and 100%, for all LNs 90% and 95% respectively. Sensitivity of MRI-DWI and PET/CT for organs involvement was 58% and 75% respectively. Stages were the same for MRI-DWI and PET/CT in 19 patients (86%). MRI-DWI correctly assigned stage in 20 (91%) patients and PET-CT in 21 (95%). Two patients were wrongly understaged by MRI-DWI and one patient was wrongly up-staged by PET/CT.

CONCLUSION: MRI-DWI is a highly sensitive technique for LNs involvement in lymphoma. Ann Arbor stages agreed between MRI-DWI and PET/CT in majority of patients.

SE 01 AB-87
Can we predict gangrenous changes and GB fossa adhesions in acute cholecystitis on plain MRI? - Radiological and per-op correlation
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Gangrenous cholecystitis is a severe advanced form of acute cholecystitis with high morbidity and mortality. Clinical findings are indistinguishable from non-gangrenous cholecystitis with increased risk of perforation. MRI scores over US and CT as it provides comprehensive information about GB and hepatopancreatic ductal anatomy and potential complications of acute cholecystitis.

PURPOSE: To investigate whether plain MRI can be used to predict the diagnosis of acute gangrenous cholecystitis and GB fossa adhesions.

MATERIALS AND METHODS: The study included 54 patients over a period of 3 years, 2013-2016. MRCP scans showing inclusion criteria for gangrenous cholecystitis were included. Studies suggesting GB fossa adhesions were included and these were correlated with per operative findings.

RESULTS: MRI findings included and their percentages are as follows:
1) Irregular mucosa - 100%, 2) Absent wall - 90.7%, 3) Hyperintense signal on T1W- 92.6%, 4) Hyperintense signal on DWI- 89%, 5) Intraluminal debris on T2W - 94.4%, 6) Hypointense signal on T2W - 85%, 7) Pericholecystic inflammation and fluid - 78%, 8) Adjacent liver parenchymal signal changes - 93%. Suggestion of adhesions in GB fossa did not necessarily correlate in all pericholecystic inflammatory changes intraoperatively.

CONCLUSION: MRI accurately diagnoses hemorrhage, necrosis, abscess in GB wall. Early detection helps manage and prognosticate the patients better by surgeons. Anatomical information aids in better surgical planning and reduce postoperative complications. Plain MRI can be used with a good degree of confidence to detect complications of acute cholecystitis.
SE 01 AB-88
Artifacts during the arterial phase of gadoxetate disodium-enhanced MR imaging: multiple arterial phases using view-sharing from two different vendors versus single arterial phase imaging
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PURPOSE: To assess the usefulness of multiple arterial phase (AP) of gadoxetic acid-enhanced MR imaging using view-sharing (4D time-resolved angiography with keyhole [TRAK] or time-resolved imaging with interleaved stochastic trajectories [TWIST]) of two different vendors to reduce AP artifacts.

MATERIALS AND METHODS: This retrospective study was approved by the Institutional Review Board with a waiver of informed patient consent. A total of 298 patients (M:F = 187:111; mean age, 63.0 years) underwent gadoxetic acid MR imaging with multiple AP from two different vendors; either triple (4D-TRAK, n = 174) or quadruple (TWIST, n = 124) AP. A total of 202 patients underwent follow-up MR imaging with single AP (143 vs. 59). To compare multiple AP with single AP and between subcohorts, we used the mean artifact score rated by two observers using a five-point scale and frequency of significant artifacts. Acquisition of late AP was also assessed.

RESULTS: There was no difference in either mean artifact score (p = 0.444) or frequency of significant artifacts during AP (p = 0.219) between multiple AP and single AP. With regard to the mean best score for multiple AP, TWIST view-sharing was better than 4D-TRAK view-sharing (p < 0.0001). Late AP was achieved more often with multiple AP (74.8%, 98.3%) than with single AP (64.3%, 64.4%) in both subcohorts.

CONCLUSION: There was no difference in AP artifacts between multiple AP using view-sharing from two different vendors and single AP, while acquisition of late AP was higher with multiple AP. For multiple AP, TWIST view-sharing is beneficial at minimizing AP artifact compared to 4D-TRAK view-sharing.
<table>
<thead>
<tr>
<th>Presenting No.</th>
<th>Final Abstract No.</th>
<th>Title</th>
<th>Presenting Author</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISP 03_AB 02</td>
<td>SE 01 AB-65</td>
<td>Perivascular infiltration and histologic differentiation: is it helpful to determine T stage of advanced gastric cancer in CT?</td>
<td>Jiyoun Kim</td>
<td>430</td>
</tr>
<tr>
<td>ISP 03_AB 03</td>
<td>SE 01 AB-85</td>
<td>The value of gadoxetic acid-enhanced and diffusion-weighted MR imaging for differentiating hepatocellular adenoma from hepatocellular carcinoma</td>
<td>Jisun Lee</td>
<td>440</td>
</tr>
<tr>
<td>ISP 03_AB 04</td>
<td>SE 01 AB-88</td>
<td>Artifacts during the arterial phase of gadoxetate disodium-enhanced MR imaging: multiple arterial phases using view-sharing from two different vendors versus single arterial phase imaging</td>
<td>Ji Hye Min</td>
<td>442</td>
</tr>
<tr>
<td>ISP 04_AB 01</td>
<td>SE 01 AB-08</td>
<td>Getting the abdominal hernia: CT approach to correct diagnosis</td>
<td>Sung Jae Jo</td>
<td>402</td>
</tr>
<tr>
<td>ISP 04_AB 02</td>
<td>SE 01 AB-10</td>
<td>Getting the cystic lesions in the abdomen: CT approach to correct diagnosis</td>
<td>Jung-Hee Yoon</td>
<td>404</td>
</tr>
<tr>
<td>ISP 04_AB 03</td>
<td>SE 01 AB-15</td>
<td>Follow-up and characterization of indeterminate spleen lesions in primary CT after blunt abdominal trauma: potential of MR imaging</td>
<td>Oyundari Lkhagvasuren</td>
<td>407</td>
</tr>
<tr>
<td>ISP 04_AB 04</td>
<td>SE 01 AB-46</td>
<td>The diagnostic usefulness of US-guided peritoneal biopsy for solitary peritoneal thickening of unknown cause visualized as only infiltrated fat tissue on CT scan</td>
<td>Yun Ju Chu</td>
<td>423</td>
</tr>
<tr>
<td>ISP 05_AB 01</td>
<td>SE 01 AB-49</td>
<td>Radiologic manifestations at abdominal imaging and approach to diagnosis of amyloidosis as a systemic disease</td>
<td>Soo Won Nam</td>
<td>424</td>
</tr>
<tr>
<td>ISP 05_AB 02</td>
<td>SE 01 AB-53</td>
<td>Radiologic findings and mimics of IgG4-related sclerosing diseases of abdomen</td>
<td>Seri Kang</td>
<td>425</td>
</tr>
<tr>
<td>ISP 05_AB 03</td>
<td>SE 01 AB-39</td>
<td>Imaging of pancreatic adenocarcinoma with emphasis on prediction of resectability how radiologists guide the GI surgeons: a pictorial representation</td>
<td>Bharat Gupta</td>
<td>419</td>
</tr>
<tr>
<td>ISP 05_AB 04</td>
<td>SE 01 AB-75</td>
<td>Gastrosplenic fistula after chemotherapy for lymphoma: systematic review with a new case of extranodal NK/T-cell lymphoma</td>
<td>Jimi Huh</td>
<td>435</td>
</tr>
<tr>
<td>ISP 06_AB 01</td>
<td>SE 01 AB-72</td>
<td>Transient severe motion in liver MRI: effect of modified breath-holding method in matched within-patient cohort of gadoxetate disodium and gadopentetate dimeglumine enhancement</td>
<td>Hyejin Yang</td>
<td>434</td>
</tr>
<tr>
<td>ISP 06_AB 02</td>
<td>SE 01 AB-73</td>
<td>Determination of hepatic segment in intrahepatic tumor using US contrast agent (sonazoid): can it help the surgeon decide hepatic segmentectomy or sectionectomy?</td>
<td>Sangyun Lee</td>
<td>434</td>
</tr>
<tr>
<td>ISP 06_AB 03</td>
<td>SE 01 AB-74</td>
<td>Intraindividual comparison of hepatocellular carcinoma imaging features on contrast-enhanced CT, gadopentetate dimeglumine-enhanced MRI, and gadoxetic acid-enhanced MRI</td>
<td>Weon Jang</td>
<td>435</td>
</tr>
<tr>
<td>ISP 06_AB 04</td>
<td>SE 01 AB-79</td>
<td>Hepatic fat fraction in liver transplant candidates: comparative MR study using high speed T2-corrected multiecho acquisition at MR spectroscopy, single-peak and multi-peak two point Dixon</td>
<td>Jun Mee You</td>
<td>437</td>
</tr>
</tbody>
</table>