Menstrual Cycle-related Fluctuations in Breast Density Measured by Using Three-dimensional MR Imaging

**PURPOSE:**
To investigate the fluctuation of fibroglandular tissue volume (FV) and percentage of breast density (PD) during the menstrual cycle and compare with postmenopausal women by using three-dimensional magnetic resonance (MR)-based segmentation methods.

**MATERIALS AND METHODS:**
This study was approved by the Institutional Review Board and was HIPAA compliant. Written informed consent was obtained. Thirty healthy female subjects, 24 premenopausal and six postmenopausal, were recruited. All subjects underwent MR imaging examination each week for 4 consecutive weeks. The breast volume (BV), FV, and PD were measured by two operators to evaluate interoperator variation. The fluctuation of each parameter measured over the course of the four examinations was evaluated on the basis of the coefficient of variation (CV).

**RESULTS:**
The results from two operators showed a high Pearson correlation for BV ($R^2 = 0.99$), FV ($R^2 = 0.98$), and PD ($R^2 = 0.96$). The interoperator variation was 3% for BV and around 5%-6% for FV and PD. In the respective premenopausal and postmenopausal groups, the mean CV was 5.0% and 5.6% for BV, 7.6% and 4.2% for FV, and 7.1% and 6.0% for PD. The difference between premenopausal and postmenopausal groups was not significant (all $P$ values $> .05$).

**CONCLUSION:**
The fluctuation of breast density measured at MR imaging during a menstrual cycle was around 7%. The results may help the design and interpretation of future studies by using the change of breast density as a surrogate marker to evaluate the efficacy of hormone-modifying drugs for cancer treatment or cancer prevention.

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Use of 18F-FLT PET in Evaluating Suspicious Findings on Mammography or Breast Ultrasound: A Pilot Study

**PURPOSE:**
To evaluate the diagnostic usefulness of 18F-FLT (18F-3'-fluoro-3'-deoxy-L-thymidine) PET for women with suspicious findings on mammography or ultrasound.

**MATERIALS AND METHODS:**
From August 2010 to November 2011, a total of 24 patients (age ranged 25 to 73 years; mean $47.0 \pm 11.7$) were enrolled in this study. Before the PET study, all the participants had been fast (NPO) for at least 6 hours. A whole-body 18F-FLT PET in supine position was first performed 60 minutes after intravenous injection of 0.07 mCi/kg 18F-FLT, followed by another PET of breast region in prone position. For each lesion, the SUVmax of the first (supine, SUV1) PET and the second PET (prone, SUV2) were measured. The 18F-FLT PET results were correlated with final histopathology.

**RESULTS:**
A total of 39 breast lesions from the 24 patients were analyzed. Of them, 11 were malignant and 28 were benign. The SUV1 and SUV2 of 11 malignant lesions ($4.4 \pm 3.6$ and $4.6 \pm 4.2$, respectively) were significantly higher than the SUV1 and SUV2 of 28 benign lesions ($1.2 \pm 0.5$ and $1.2 \pm 0.4$, respectively) ($P = 0.015$, $P = 0.022$, respectively). SUV1 and SUV2 were highly correlated ($R = 0.9824$). The dSUV, defined as $(SUV2 - SUV1)/SUV1$, showed no statistical significance between malignant lesions ($0.03 \pm 0.21$) and benign lesions ($0.02 \pm 0.37$, $P = 0.95$). When using SUV1 of 1.9 or SUV2 of 1.7 as cutoff points and test-positive as any one of the values above or equal to the cutoff, the sensitivity, specificity, positive predictive value, negative predictive value of 18F-FLT PET were 81.8% (9/11), 85.7% (24/28), 69.2% (9/13), 92.3% (24/26).

**CONCLUSION:**
18F-FLT PET shows not so high sensitivity possibly due to relatively limited sampling size for malignant lesions. However, its high negative predictive value may reduce the unnecessary biopsies. The result needs to be further validated by larger scaled-studies.
The Sonographic Patterns of Duct Carcinoma in Situ (DCIS) of Breast

Huay-Ben Pan1, Giu-Cheng Hsu2, Huei-Lung Liang1, Chen-Pin Chou1, Tsung-Lung Yang1, Jer-Shyung Huang1, Hsian-Her Hsu2

Department of Radiology1, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan; Department of Radiology2, Tri-Service General Hospital, Taipei, Taiwan

PURPOSE: We retrospectively categorized the sonographic findings of duct carcinoma in situ (DCIS) breast cancer.

MATERIAL AND METHODS: Six radiologists reviewed the medical records and sonographic findings of pathologically proved DCIS of breast in Kaohsiung Veterans General Hospital and Tri-service General Hospital. Totally 100 women had breast sonogram examinations before surgery between 2008 and 2011.

RESULTS: Up to 40% of women with DCIS revealed no related findings on breast sonograms even their mammograms showed malignant suspicion. Under consensus of radiologists, the pattern of DCIS of breast can be divided into 1)Irregular mass; 2)Hypoechoic region with microcalcification; 3)Hypoechoic region without microcalcification; 4)Benign looking mass; 5)Microcalcification with ductal distribution; 6)Dilated duct with intraluminal lesion; 7)Dilated duct with wall thickening.

CONCLUSION: Knowledge with the sonographic patterns of DCIS of breast can promote early breast cancer detection and early intervention.
Detecting Asymptomatic Breast Cancer: Whole body Diffusion-weighted MRI versus Whole body PET-CT

Bao-Hui Hung  Chen-Pin Chou  Huay-Ben Pan
Department of Radiology, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan

**PURPOSE:** Comparison between whole body Diffusion-weighted MRI (DW-MRI) and Whole body PET-CT to detect asymptomatic breast cancer.

**MATERIAL AND METHODS:** Total 25 asymptomatic women with abnormal screening mammography (BIRADS 4 or 5) underwent whole body DW-MRI (b=50, 800 s/mm2) using 3T Siemens scanner and whole body PET-CT before biopsy. The images of DW-MRI were prospectively evaluated by two radiologists.

**RESULT:** Biopsy results showed 12 breast cancers (IDC = 5, DCIS = 7) and 13 benign breast diseases. The patients underwent breast operation and revealed early breast cancer in final pathology with stage 0 (n = 6) or stage IA (n = 6). The sensitivity of whole body DW-MRI and PET-CT for diagnosing breast cancers is 75% (9/12) and 42% (5/12) respectively.

**CONCLUSION:** Whole body DW-MRI has higher sensitivity than whole body PET-CT for detecting asymptomatic breast cancer.

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Detecting Asymptomatic Breast Cancer: 3T breast MRI versus Whole body PET-CT

Chen-Pin Chou  Bao-Hui Hung  Huay-Ben Pan
Department of Radiology, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan

**PURPOSE:** Comparison between 3T breast MRI and whole body PET-CT to detect asymptomatic breast cancer.

**MATERIAL AND METHODS:** Total 25 asymptomatic women with abnormal screening mammography (BIRADS 4 or 5) underwent 3T dynamic contrast-enhancing breast MRI using 3T Siemens Skyra scanner and whole body PET-CT before biopsy. The images of breast MRI were prospectively evaluated by two radiologists.

**RESULT:** Biopsy results showed 12 breast cancers (IDC = 5, DCIS = 7) and 13 benign breast diseases. The patients underwent breast operation and revealed early breast cancer in final pathology with stage 0 (n = 6) or stage IA (n = 6). The sensitivity of breast MRI and PET-CT for diagnosing breast cancers is 100% (12/12) and 42% (5/12) respectively.

**CONCLUSION:** 3T breast MRI has higher sensitivity than whole body PET-CT for detecting asymptomatic breast cancer.
Visualization of Microcalcifications on Breast Specimens of Core-Biopsy is to Positive Diagnosis

张尊厚 許居誠 徐先和 黃國書
Tsun-Hou Chang Giu-Cheng Hsu Hsian-He Hsu Guo-Shu Huang
三軍總醫院 放射診斷部
Department of Radiology, Tri-Service General Hospital, Taipei, Taiwan

PURPOSE: To evaluate the importance of microcalcifications visualized on breast sonography.

MATERIALS AND METHODS: To survey cases in our Women Health Center from Oct-2010 to Oct-2011, there are 1569 core-biopsy specimens, and 97 specimens are obtained owing to visualization of microcalcifications sonographically. We analyzed the pathological results of these 97 specimens, and correlated with their corresponding mammographic findings.

RESULTS:

Table 1: Results of microcalcifications in specimens

<table>
<thead>
<tr>
<th>Ca. SPEC / Path.</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>45</td>
<td>23</td>
<td>68</td>
</tr>
<tr>
<td>Negative</td>
<td>13</td>
<td>16</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>39</td>
<td>97</td>
</tr>
<tr>
<td>Ca. PPV(%)</td>
<td>66.2%</td>
<td></td>
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</tr>
</tbody>
</table>

Table 2: Results of microcalcifications in specimens correlation with amorphous Ca.

<table>
<thead>
<tr>
<th>Ca. SPEC / Path.</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>19</td>
<td>16</td>
<td>35</td>
</tr>
<tr>
<td>Negative</td>
<td>6</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>29</td>
<td>54</td>
</tr>
<tr>
<td>Ca. PPV(%)</td>
<td>54.3%</td>
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<td></td>
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</tbody>
</table>

Table 3: Results of microcalcifications in specimens correlation with pleomorphic Ca.

<table>
<thead>
<tr>
<th>Ca. SPEC / Path.</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>21</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>Negative</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>Ca. PPV(%)</td>
<td>75.0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Results of microcalcifications in specimens correlation with Ca. (Amor.+Pleo.)

<table>
<thead>
<tr>
<th>Ca. SPEC / Path.</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>40</td>
<td>23</td>
<td>63</td>
</tr>
<tr>
<td>Negative</td>
<td>12</td>
<td>15</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
<td>38</td>
<td>90</td>
</tr>
<tr>
<td>Ca. PPV(%)</td>
<td>63.5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Results of microcalcifications in specimens correlation with Ca. (mal. appearance)

<table>
<thead>
<tr>
<th>Ca. SPEC / Path.</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>45</td>
<td>23</td>
<td>68</td>
</tr>
<tr>
<td>Negative</td>
<td>13</td>
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</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>38</td>
<td>96</td>
</tr>
<tr>
<td>Ca. PPV(%)</td>
<td>66.2%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CONCLUSION:
1. Grouped microcalcifications of pleomorphic appearance are easy to be visualized sonographically, and this kind of specimens are prone to be proved as malignancy (PPV=75.0%).
2. Visualization of microcalcifications on breast specimens under core-biopsy procedure is valuable (PPV=66.2%).
Purpose: Bleeding nipple is a common complaint during daily practice. Ductography is always considered an invasive and difficult procedure. Ductography allows diagnosis of the underlying condition, definition of the extent of disease, identification of central and peripheral lesions, and guidance of surgical excision.

Material and Methods: From 2009 to December 2011, 6 women patients with bleeding nipples underwent ductography. 5 patients received excision biopsy/surgery.

Results: There were one IDC (invasive ductal carcinoma), one DCIS (ductal carcinoma in situ), and three intraductal papillomas. One case with contrast medium extravasation, we repeated ductography one week later. Cannulation of the bleeding nipple was easier than expected.

Conclusion and Discussion: Surgical duct excision remains the gold standard to exclude underlying malignancy. Procedure of ductography is not time consuming (less than 30 mins), including mammographic study. Ductography is not a difficult procedure to perform for evaluating bleeding nipple. Before excision biopsy/surgery, ductography may show the location of bleeding site and possibility of the etiology.

Purpose: We refuted the possibility of breast cancer on a male case of breast panniculitis based on a heterogeneously hypoechoic mass on sonography at a pathologic examination.

Case Report: A 54-year-old man, who had a history of type 2 diabetes mellitus and hypertension, complained of a firm painful subcutaneous nodule at lower inner quadrant of the right breast for one month. Clinicians considered the possibility of breast carcinoma and ordered sonography. The sonogram showed a heterogeneously hypoechoic nodule (1.4 cm x 0.4 cm in size) with increased color flow signals in the adjacent area at the right breast (3-4 o'clock, 2 cm from the nipple). Another satellite hypoechoic nodule appeared in the surrounding area. This condition is rather unusual for men. Biopsy was recommended, and pathology confirmed breast panniculitis, consisting of fibroadipose tissue with prominent inflammation and fibrotic change in a vague perivascular pattern. Hemorrhage and hemosiderin pigments were also present.

Discussion: Subcutaneous panniculitis (inflammation of subcutaneous fat) may result from traumatic, idiopathic, immunologic, infectious, metabolic, and paraneoplastic causes. Clinically, subcutaneous panniculitis usually presents as tender or painless nodules. Subcutaneous panniculitis typically is associated with the fat of the lower extremities. Presence of subcutaneous panniculitides in breast is rare and can be misjudged as cancer at clinical examination and on imaging studies like this case. On sonography, subcutaneous panniculitis usually appears as a hyperechoic focus within the hypoechoic subcutaneous fat, leading to non-uniformity of the subcutaneous tissue. In contrast, breast panniculitis has a wide variety of sonographic presentations, including hypoechoic or hyperechoic solid masses, complex masses, and cystic masses. The margins of these masses on sonogram may be well circumscribed, indistinct or spiculated. Subcutaneous masses with increased echogenicity are almost always benign. Breast cancer may be wrongfully diagnosed when breast panniculitis shows a heterogeneously hypoechoic mass with increased blood flow signals and indistinct margins on sonography.

Conclusion: In the reported case, breast panniculitis was hypoechoic rather than hyperechoic as subcutaneous panniculitis described previously on sonogram. Sonoguided biopsy can help provide a correct diagnosis.
Diabetic Mastopathy of Bilateral Breasts: a case report

Yi-Li Lin1, Yi-Hsuan Lee2, Wen-Shih Kao1, Wei-Ti Huang1, Chun-Lin Huang1
Department of Radiology1, Department of Pathology2, Ditmanson Medical Foundation Chia-Yi Christian Hospital, Taoyuan, Taiwan

PURPOSE: To demonstrate a case of diabetic mastopathy by ultrasound, mammography and MRI for prevention of unnecessary excisional biopsy.

MATERIAL AND METHODS: A 58-year-old lady manifested with right breast palpable mass for months and it became larger recently. She has personal history of type 2 diabetes for more than 13 years, which was poorly controlled. Physical examination showed right breast mass about 7cm and left breast nodule about 2cm, both were firm in consistence.

RESULTS: Ultrasound showed hypoechoic masses with ill-defined margin and strong acoustic shadowing, (BI-RADS category 5). Mammographic findings were dense glandular tissue, in which lesion could be masked. Diabetic mastopathy is considered for core biopsy. Breast MRI was arranged to exclude inadequate tissue sampling and coexistent malignancy, which had been reported in the literature. No obvious enhancing mass could be identified.

CONCLUSION: Diabetic mastopathy is a rare benign entity mimicking malignancy in PE and ultrasound. First reported in IDDM patients but could be found in type 2 diabetes patients. Diagnosis could be established by core biopsy and excisional biopsy could be prevented. This patient should be routinely followed up with MR or US and core biopsy if the lesions become clinically or radiologically suspicious.
Evaluation of Therapeutic Response of Tumor Angiogenesis in Lung Cancer Mice Model with Diffusion and Perfusion MR Imaging

Yeun-Chung Chang1 Ang Yuan2 Jason Chia-Hsien Chen3 Yi-Chien Lu3 Kuan-Hung Cho4 Ching-Po Lin5

PURPOSE: This study is aimed to evaluate treatment response of lung cancer in mice model to anti-angiogenesis agents, radiotherapy (RT) or combination by using dynamic contrast enhanced (DCE) and diffusion-weighted (DW) magnetic resonance (MR) imaging.

METHODS: Mice bearing non-small cell lung cancer (CL-1-0) with VEGF isoform 189 xenografts were treated with a single dose of bevacizumab (BV) (5 mg /kg twice/week i.p.), radiation therapy (RT) (10 Gy in one fraction), or a combination of the two on different schedules. DW and DCE MRI were performed in 7T animal scanners at the tumor age of 2 and 4 weeks. All implanted subcutaneous tumor was excised after MRI study and prepared with H&E stain and immunohistochemical stain (CD 31) for morphologic correlation and microvessel count. Model-based analysis of DCE MRI and apparent diffusion coefficient (ADC) mapping were used for imaging analysis.

RESULT: Tumor vessel permeability (Ktrans) and microvessel density was also significantly decreased after RT and BV treatment. Tumor growth delay was enhanced in treated group and treatment with RT after BV. Combination of RT and BV resulted in the greatest anti-tumor activity.

CONCLUSION: DCE MRI and DW MRI are sensitive to the longitudinal changes in NSCLC during therapy. Ktrans and ADC are sensitive parameters and enable functional response of tumor to variable treatment regimen. Relationships between MR parameters provide information on water distribution and vascular geometry in the tumor microenvironment.
Segmentation of Lung Nodules in CT Images Using Graph Based Region Merging and Anatomical Structural Information

Chi-Hsuan Tsou1, Yeun-Chung Chang2, Chung-Ming Chen1
Institute of Biomedical Engineering1, National Taiwan University, Taipei, Taiwan; Department of Medical Imaging2, National Taiwan University Hospital, Taipei, Taiwan

PURPOSE: Chest computed tomography (CT) is crucial for detecting small pulmonary nodules. Measurement of nodule size is important for tumor staging and evaluation of therapeutic response. To develop an accurate and reproducible algorithm of lung nodule segmentation and characterization, an image segmentation framework was proposed by unifying the techniques of anatomical structural information and graph-based region merging to address the difficult problem of lung nodule demarcation in CT images.

MATERIAL AND METHODS: There were 77 CT studies which had definite histopathologic diagnosis included in this study. In order to alleviate the effect of surrounding tissues, 3D thinning algorithm which was applied to vessel trees, bronchial airway and lung wall were adopted to model the gain distributions of the foreground and background. Following that, a graph cut framework was carried out to identify the object of interest using these skeletons as scribbles.

RESULTS: The proposed segmentation algorithm was evaluated with four sets of manual delineations on 77 lung CT images, including 47 ground glass opacity nodules and 30 solid nodules. The experiment results showed that more than 79% of the derived boundaries lie within the span of the manually delineated boundaries indicating that the derived boundaries agree as much with the manually delineated boundaries as the manually delineated boundaries agree with one another.

CONCLUSION: The derived boundaries of the proposed algorithm are comparable to manual delineations. This algorithm is suitable for developing computer aided nodule segmentation.

Non-rigid Registration of Chest sequential CT Using the Skeletonization Transform and Thin Plate Spline Model

Yu-Tzu Lee1, Yeun-Chung Chang2, Chung-Ming Chen1
Institute of Biomedical Engineering1, National Taiwan University, Taipei, Taiwan; Department of Medical Imaging2, National Taiwan University Hospital, Taipei, Taiwan

PURPOSE: The morphology of small lung nodules is usually nonspecific and the difference of location of the same nodule between studies due to different degree of inspiration might occur. This study was aimed to register the location of lung nodule according to its relationship to adjacent local environment.

MATERIAL AND METHODS: In order to extract robust feature points for distributing uniformly around the interesting organ, 3D thinning algorithm applied to anatomical structures was adopted to model the gain distributions of the feature points. A TPS scheme was then carried out to establish the pixel correspondence for the object of interest. The proposed computer-assisted algorithm was evaluated both qualitatively and quantitatively by using five cases which had both baseline and follow-up CT 3 months later. The target registration error (TRE) was used to estimate the distance between corresponding nodules in the baseline and follow-up CT scans before and after registration.

RESULTS: The experiment results of the lung nodule alignment in six nodules with sizes ranging from 3.75 to 36.25 mm are reported on a per-center-of-mass point basis using TRE. TRE ranged from 17.1 to 58.1 mm before registration. According to the average of TRE after registration, our proposed method improves robustness as well as accuracy.

CONCLUSION: Skeletonization transform and TPS technique in a 3D non-rigid image registration framework can be effectively applied for the registration of lung nodules in longitudinal follow-up CT studies.
Novel Swine-origin Influenza A (H1N1) Virus Infection of the Lung Presenting with a “Crazy-paving” Pattern on High-resolution CT

Yu-Hsiu Juan1, Hsian-He Hsu2, Wei-Chou Chang2

Department of Radiology1, Buddhist Hualien Tzu Chi General Hospital, Hualien, Taiwan; Department of Radiology2, Tri-service General Hospital, Taipei, Taiwan

A novel swine-origin influenza A (H1N1) virus (S-OIV) infection has nonspecific clinical presentations and imaging findings, usually presenting pulmonary involvement. We report a 37-year-old man with S-OIV pneumonia had unusual high-resolution computed tomography (HRCT) findings, and he passed away soon after hospitalization 7 days later. The unusual HRCT findings showed crazy-paving pattern of both lungs. We suggest the inclusion of S-OIV pneumonia in the differential diagnosis of patients with crazy-paving pattern on HRCT, and this imaging pattern may be an indication of severe ill status.

Esophageal Submucosal Mixed Cyst and Spindle Cell Tumor Mimicking Boerhaave Syndrome: a case report

Che-Hung Lin1, Hsiu-Chen Shih2, Shu-Chiang Hsieh2, Chih-Hsing Wu2

Department of Radiology, En Chu Kong Hospital, New Taipei, Taiwan

PURPOSE: We report a rare case of mixed esophageal submucosal cyst and spindle cell tumor.

CASE REPORT: An 86 year-old male who suffered from post-prandial vomiting for 1 month, and sudden onset substernal chest pain. He visited the emergency department. Panendoscopy revealed a submucosal polypoid lesion in the esophagus. Computed tomography (CT) revealed a 7.0 x 3.0 x 2.5 cm cystic lesion with the same density with fluid. Clear mediastinal fat. No extraluminal air. Multiplanar reformation delineated the relationship between the lesion, the esophagus and surrounding structure.

RESULTS: Operative finding showed intact esophageal mucosa and a cystic tumor. The pathological report showed a esophageal submucosal cyst and a small, benign spindle cell tumor.

CONCLUSION: Esophageal submucosal cyst is rare and the imaging findings are similar with mucosal tear and fluid accumulation (Boerhaave syndrome). The latter is fatal unless accurate diagnosis and prompt treatment. The differential diagnosis for a patient with chest pain in the emergent department should enroll both diseases.
Spontaneous Pneumomediastinum Due to Achalasia: a case report

Yi-Lan Lin
Department of Radiology, Machay Memorial Hospital, Hsinchu, Taiwan

Spontaneous pneumomediastinum is a rare clinical entity characterized by free air around mediastinal structures. Precipitating factors include violent cough, asthma, inhalational drugs, labor and exercise. We report a case of spontaneous pneumomediastinum due to achalasia. The radiologists play extremely roles in the emergency department to distinguish benign from more ominous causes, such as esophageal rupture, particularly in the setting of associated esophageal disease.

The CT Manifestation of Leptospirosis with Lung Involvement: three cases report

Sho-Ting Hung Chin-Yin Sheu Fei-Shih Yang
Department of Radiology, Mackay Memorial Hospital, Taipei, Taiwan

PURPOSE: To describe the pulmonary manifestation in leptospirosis with lung involvement on computed tomography and review existing articles for obtaining proper diagnostic clues.

CASE REPORT: We retrospectively analyze the CT images of three males with clinically diagnosed leptospirosis. They are from 26 to 59-year-old. The occupations among the three cases are two sewage workers and an internet cable constructor. They are presented as fever, hemoptysis and gross hematuria. Thoracic CT scan with and without contrast medium from lung apex to adrenal glands is performed while initial hospitalization.

RESULT: Among CT scan of the three patients, two of them reveal bilateral diffuse nodular lesions in lung parenchyma and one displays the pattern of acute respiratory distress syndrome (ARDS). The laboratory data of each shows acute renal failure and abnormal liver function. After antibiotic therapy, they undergo uncomplicated admission course with recovery of renal as well as liver function and discharge from our hospital.

CONCLUSION: Image-based diagnosis of leptospirosis with lung involvement is possible as it has characteristic pattern and clinical symptoms. Due to its potentially high mortality and morbidity rate, accurate and early diagnosis can offer clinicians correct therapeutic strategy.
Mucoepidermoid Cancer of The Lung in a Twenty-year-old Boy: a case report

David Carroll Chen  Yen-Lin Huang  Jan-Wen Ku  Hui-Ling Hsu
Department of Radiology, Shuang Ho Hospital, Taipei Medical University, New Taipei, Taiwan

PURPOSE: To present a case of mucoepidermoid carcinoma of the lung in a 12 year old boy.

CASE REPORT: A 12-year-old boy suffered from intermittent cough and hemoptysis for a month. He was at first diagnosed and treated as mycoplasma pneumonia. However, the symptoms persisted. Follow up chest plain film revealed suspicious right middle lobe collapse. Further chest CT study showed an endobronchial tumor at the bronchus of right lower lobe with extension into the intermediate bronchus, causing atelectasis of the right lower lobe and stenosis of the right middle lobe bronchus with air-trapping. Bilobectomy was performed by the chest surgeon and the pathology revealed a mucoepidermoid cancer of lung.

RESULTS: Mucoepidermoid carcinoma of the lung is an extremely rare tumor, comprising less than 5% of primary bronchial tumours and 0.1-0.2% of all lung cancers. The average age of patients is between 35 and 45 years. However, it is the second most endobronchial malignancy of the children followed by carcinoid tumor. It arises from the minor salivary glands of the bronchial tree and occurs most commonly in the main and lobar bronchi. The chest radiograph may be interpreted as normal but usually shows signs of abnormal ventilation or perfusion to the affected lung, atelectasis, or pneumonia. A distinct endobronchial mass is often seen only on CT.

CONCLUSION: When an endobronchial tumor was detected in a child, endobronchial carcinoma should be considered.

Multiple Myeloma with Pulmonary Plasmacytoma: a case report

Chia-Hao Chan  Kao-Lun Wang  Clayton Chi-Chang Chen
Department of Radiology, Taichung Veterans General Hospital, Taichung, Taiwan; Department of Radiological Technology, Central Taiwan University of Science and Technology, Taichung, Taiwan; Department of Physical Therapy, Hungkuang University of Technology, Taichung, Taiwan; Department of Physical Therapy and Assistive Technology, National Yang Ming University, Taipei, Taiwan

Multiple myeloma represents a hematological malignant disorder of plasma cells characterized by the occurrence of plasma cell tumours within the bone marrow. Extramedullary plasmacytomas form a small percentage of plasma cell tumors, and although most of extramedullary lesions occur in the head and neck including the sinonasal or nasopharyngeal regions, pulmonary plasmacytomas are exceedingly rare to be a clinical entity. Hereby, we present a case of multiple myeloma with lung plasmacytoma of a 55-year-old female. Serial films of chest X ray and CT scan will be presented and brief differential diagnosis will be reviewed.
Pulmonary Volumetric HRCT to Detect Mediastinal Abnormality: Marfan Syndrome with Pneumothorax and Aortic Aneurysm

Jhih-Wei Chen1,2, Hsin-Hui Huang1,2, Yi-Liang Wu3, Jang-Fang Kuo4, Hao-Hung Tsai1,2, Da-Mien Yeh1,2

Department of Medical Imaging1, Division of Cardiovascular Surgery, Department of Surgery3, Division of Pathology4, Chung Shan Medical University Hospital, Taichung, Taiwan; School of Medical Imaging and Radiological Sciences2, Chung Shan Medical University, Taichung, Taiwan

High resolution computed tomography (HRCT) is used for the preoperative evaluation of spontaneous pneumothorax. However, the conventional step and shoot technique for HRCT only expresses axial images with lung reconstruction kernel and gaps in Z-axis. The technique results in diagnostic pitfalls for the concomitant soft tissue disorders. In contrast, the helical scan technique with modern multi-detector computed tomography (MDCT) makes it possible to generate volumetric HRCT. The raw data set from HRCT has the ability of multi-planar reformation (MPR) in various reconstruction parameters according to clinical necessary. The mediastinal abnormality can be detected by the volumetric HRCT images with soft tissue reconstruction kernel.

We report a 16-year-old male patient of Marfan syndrome with the initial presentation of left spontaneous pneumothorax and abnormal widened mediastinum. The reconstructed coronal images of volumetric HRCT showed subpleural bleb at apex of the left lung. Images with soft tissue reconstruction kernel, obtained from the same image raw data, revealed the fusiform, dilated aortic root. These findings help raising the suspicion of Marfan syndrome and allowing appropriate work-up.

Progressive Enlarging Symptomatic Mediastinal Mullerian Cyst in a Female Patient with High Estradiol Level

Tsan-Chieh Liao1, Chun-Ku Chen1,2, Ming-Huei Sheu1,2, Mei-Han Wu1,2, Cheng-Yen Chang1,2, Fu-Pang Chang2,3, Teh-Ying Chou2,3

Department of Radiology1, Department of Pathology3, Taipei Veterans General Hospital, Taipei, Taiwan; School of Medicine2, National Yang-Ming University, Taipei, Taiwan

Mullerian cyst is a rare disease. We reported the case of a 48-year-old woman with a high estradiol having a progressively enlarging posterior mediastinal cystic mass that caused intermittent chest tightness. The computed tomography and magnetic resonance imaging showed a well-defined cystic mass with homogenous fluid content located in right paravertebral area. The mass was surgically removed and was proven to be Mullerian cyst pathologically. This is the first report that Mullerian cyst enlarges over time.
Primary Pleural Angiosarcoma: a case report

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BACKGROUND: Angiosarcoma is a rare soft tissue sarcoma (Skin, deep soft tissue, liver, breast and spleen; more rarely in the pleura and other serous membranes. Potential causative factors of this disease include TB related chronic pyothorax, prior radiation or asbestos exposure. Age ranging from 22-79 with an average age of 57 years old. Male to female ratio of 9:1. Symptoms are usually chest pain, hemosputum, and dyspnea. Prognosis is poor with this aggressive tumor with life expectancy of about 6 months from the time of diagnosis. Only 48 patient of pleural angiosarcoma is documented in English literature.

CASE PRESENTATION: We present a 49 year old man presenting with chest pain and cough for about 1 month. Patient had no history of asbestos exposure, no previous history of TB. CT scan with and without IV contrast enhancement shows thickening and enhancement of the right side pleura with effusion, patient underwent surgery and was diagnosed by pathology to have primary pleural angiosarcoma. Post operatively, patient received adjuvant chemotherapy and radiotherapy.

Bronchial Atresia with Mucoid Mimicking a Lung Nodule: a case report

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BACKGROUND: Bronchial atresia is a rare congenital anomaly. It results from focal obliteration of a proximal segmental or subsegmental bronchus with normal development of distal structures. Approximately two-third of cases involves the left upper lobe, especially the apicoposterior segment. The lung distal to the atresia can develop normally but has decreased vascularity and is hyperinflated because of unilateral collateral air-drift through pores of Kohn and canals of Lambert from the adjacent normal lung. These collateral channels act as check valves resulting in air trapping in the distal lung. Most of these cases are diagnosed incidentally and are asymptomatic. Up to 42% of patients may present with recurrent chest infections, cough, hemoptyisis, and dyspnea.

CASE PRESENTATION: A 51-year-old woman had suffered from nonproductive cough for 1 month. She had previously been quite well without systemic disease. Physical examination revealed no abnormality. Chest x-ray showed a small nodule in the left upper lung close to the hilar region and mild emphysematous change over the left upper lung field. Chest computed tomography (CT) images showed fluid affecting the bronchus of the apicoposterior segment of the left upper lobe and hyperinflation and hypovascularity of the left lung. The CT findings were compatible with bronchial atresia.

CONCLUSION: Although bronchial atresia can be easily diagnosed on chest X-ray and confirmed by CT findings, it can be mistaken for pneumonia, focal emphysema, a solitary pulmonary nodule, granuloma, complications of asthma or a vascular lesion. The awareness of this entity and correct diagnosis can obviate unwarranted surgery.
Pneumatocele or Pneumothorax?

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INTRODUCTION: Pneumatocele is an air filled lung cyst and may occur single or clusters. The causes of pneumatocele included infections, chemical exposure, autoimmune diseases and trauma. The physiologies of pneumatocele formation are varied and the most common acceptable therapy was bronchiole obstruction with air into alveolus. The increased pressure ruptures the alveolar lumen and creates an air pocket. The clinical features showed fever, respiratory distress, tachypnea and retractions. Focal decreased breathing sound was audible depending on the size of the pneumatocele. To distinguish pneumatocele or pneumothorax is important. The treatment of pneumatocele is conservative treatment with medication or chest surgery. The treatment of pneumothorax is observation or immediately air drainage with chest tube or pig-tail due to critical condition. If we performed air drainage treatment for pneumatocele, the air cyst may rupture with massive air-leakage. The critical tension pneumothorax may occur and the emergency intervention must do. Therefore, we must distinguish pneumatocele or pneumothorax before intervention.

CASE REPORT: The 47 year-old gentlemen had smoking and asthma history with regular medication control for years. This time, the patient was brought to our emergency department due to dyspnea for days. The patient also complained about chest pain, coughs with sputum and decreased appetite. Physical examination showed bilateral rales and right decreased breathing sound. The Chest X-ray showed lower density area over right upper lung field. A huge bulla in the right upper lung field was noted but pneumothorax could not be rule out. The bedside echo showed positive lung sliding sign. Due to stable condition, the patient received chest CT and it showed multiple bullous formation and the larger one was around 14x12x20 cm at RUL. With the tentative impression right upper lung large bullous, the patient was admitted into chest surgery department for further treatment.

DISCUSSION: Pneumatocele is air filled lung cyst and may occur single or clusters. The causes of pneumatocele included infections, chemical exposure, autoimmune diseases and trauma. The physiologies of pneumatocele formation are varied and the most common acceptable therapy was bronchiole obstruction with air into alveolus. The increased pressure ruptures the alveolar lumen and creates an air pocket. The clinical features showed fever, respiratory distress, tachypnea and retractions. Focal decreased breathing sound was audible depending on the size of the pneumatocele. To distinguish pneumatocele or pneumothorax is important. The treatment of pneumatocele is conservative treatment with medication or chest surgery. The treatment of pneumothorax is observation or immediately air drainage with chest tube or pig-tail due to critical condition. If we performed air drainage treatment for pneumatocele, the air cyst may rupture with massive air-leakage. The critical tension pneumothorax may occur and the emergency intervention must do. Therefore, we must distinguish pneumatocele or pneumothorax before intervention. The ultrasound is more sensitive in pneumothorax than X-ray image. If the X-ray image couldn’t help us to distinguish pneumatocele or pneumothorax, we may perform chest ultrasound. If lung sliding sign was not visible, the pneumothorax was high suspected. If the patient’s vital sign was stable, we may send the patient for chest CT. The HRCT will show the lung structure. Therefore, if the X-ray image couldn’t distinguish pneumatocele or pneumothorax, we suggested performed chest ultrasound and chest CT to find which the truth is.
Invasive Thymoma with High F-18 Fluorothymidine Uptake

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Thymomas are slow growing capsulated tumors often found incidentally in imaging studies for other investigations. It is known that thymomas may have the potential of local malignant invasion. Thus, an evaluation of the invasiveness of thymomas would help to predict the prognosis and guide the treatment modality for different categories of thymoma diseases. It has been mentioned that X-ray CT being a predictor of the invasiveness is questionable. We report an invasive thymoma discovered incidentally by an F-18 fluorothymidine (FLT) PET study on a 48-year-old woman. The patient had equivocal breast lesions in her bilateral breasts. She entered a clinical F-18 FLT PET trial in our hospital to differentiate malignant breast tumors from benign ones. No F-18 FLT avid lesions in her breasts were revealed. But an intense F-18 FLT uptake lesion was noted in her right anterior mediastinum. Whereas, an F-18 FDG PET scan showed only mild F-18 FDG uptake in the lesion. VATS thymomectomy was subsequently performed and the final pathology showed invasive thymoma, WHO type AB and Masaoka staging II. The patient subsequently received adjuvant radiotherapy applied to the mediastinal tumor bed. F-18 FLT PET, a thymidine analog, has been used to evaluate cell proliferation in several tumors. The F-18 FLT uptake, which is much higher than the F-18 FDG uptake, may be an indication of high invasiveness.
Pleuropulmonary Synovial Sarcoma: a case report

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Pleuropulmonary synovial sarcoma (PPSS) is an extremely rare intrathoracic malignant tumor. Here we represent one case of PPSS who suffered from spontaneous hemothorax at emergency department. The CT manifestations of tumor mimic mixed stage hematoma in the pleural cavity. Only subtle chest wall invasion is noted at pleural base, without definite bone destruction. We review the etiology of spontaneous hemothorax and the literature of PPSS. Be familiar with the typical clinical and radiologic manifestations of PPSS may help in differentiation of the malignant chest wall tumors in clinical practice.

Coronary Calcium Score as a Better Predictor of Severe Coronary Stenosis in Asymptomatic Female

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PURPOSE: To evaluated the relationship between coronary calcium score and severe coronary stenosis in asymptomatic female population

MATERIAL AND METHODS: We collected the images and laboratory data of asymptomatic female subjects from PACS and HIS data of our hospital (n = 200; mean age 59 years) from Aug. 2010 to Oct. 2011. All of them were evaluated for coronary calcium score and coronary CT angiography with 320 slice MDCT. Coronary risk variables and coronary calcium score were analyzed using linear regression model according weather severe (> 70%) coronary stenosis existed or not. ROC curve analysis was then applied for significant valuable to find out appropriate cut-off value.

RESULTS: The incidence of severe coronary stenosis in asymptomatic female was about 5%. The fasting blood glucose, family history of coronary arterial disease, coronary calcium score (the area under the ROC curve: 0.96; best cut-off value: 350; sensitivity: 90.00%; specificity: 95.11%), and Framingham cardiac risk grade (the area under the ROC curve: 0.76; best cut-off value: intermediate risk; sensitivity: 66.67%; specificity: 78.46%) were significantly correlated with severe coronary stenosis. There was no difference in variables including age, BMI, waist, HTN, anti-hypertensive drug, DM, anti-diabetic drug, hyperlipidemia, anti-hyperlipidemia drug, serum cholesterol profile, smoking habit, menopause and hormone replacement therapy.

CONCLUSION: Coronary calcium score might be a better predictor of severe coronary stenosis in asymptomatic female population than traditional Framingham cardiac risk grade. If women have coronary calcium score greater than 350, coronary CT angiography might be recommended to exclude severe coronary arterial stenosis.
GOAL: To investigate left atrial function and the potential risk of causing embolic brain infarction.

MATERIALS AND METHODS: 55 patients enrolled in this IRB-approved prospective study, which included two patient groups, one referred from neurology with imaging-evident brain infarction and suspected to be cardiogenic in origin and the other from cardiology with ECG-evident atrial fibrillation, but without history of brain infarction.

RESULTS:
1. No matter brain strokes occur or not, there exist the statistical difference regarding LA function between two patient groups: patients with A-fib and with NSR.
2. For patients with brain strokes, the LA function (most of the parameters including the LA area and dimension measured from 2-chamber and 4-chamber images) is different between two group patients with and without A-fib. Cardiac MRI can facilitate the diagnosis in the brain infarction etiologies.
3. For A-fib patients, the larger LA area change (eg. better LA function), the smaller their CHADS2 scores.
4. Based on LA function parameters, the A-fib patients with and without previous brain stroke are dividable by using 4c and 2c area differences.
5. Based on TOAST classification, the brain strokes in patients with A-fib, 67% (8/12) considered to be cardiogenic, 33% (4/12) to be intrinsic brain small vessel disease. On the contrary, in NSR patients with brain stroke, 100 % (8/8) were considered resulting from intrinsic brain small vessel disease.

CONCLUSION: Cardiac MRI is at least as reliable as echocardiography enabling the assessment of the LA function with which to predict the brain infarction risk.
Role of Concomitant Computed Tomography Angiography and Computed Tomography Venography in Evaluation of the Left Iliac Vein in Patients with Chronic Lower Limb Edema

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PURPOSE: The aim of this study was to assess the role of concomitant computed tomography venography and computed tomography arteriography supplementary to two-dimensional (2D) digital subtraction venography (DSV) in evaluation of the bilateral iliac veins in patients with chronic lower limb edema. Concomitant computed tomography venography and computed tomography arteriography demonstrate precise anatomical relationship of the compressed iliac vein and adjacent arteries or abnormal structures by three-dimensional (3D) volume-rendering (VR).

METHODS: We reviewed 60 patients with chronic lower limb edema who had undergone bilateral iliac 2D DSV and concomitant computed tomography venography and computed tomography arteriography with 3D VR.

RESULTS: Among 120 iliac veins in 60 patients, 50 iliac veins (right: 15; left: 35) were diagnosed no compression on 2D DSV but significant compression on 3D VR with variable severity. The factors causing negative results on 2D DSV among these 49 iliac veins included unrecognizable ventrally-dorsally compression, superimposed bowel gas or superimposed metallic devices (ex: transpedicular screws at spine). Two-dimensional DSV alone had ideal specificity (100%) but unsatisfactory sensitivity (28%). If the patients were also undergone concomitant computed tomography venography and computed tomography arteriography, we could improve 72% sensitivity.

CONCLUSION: The more detailed imagine information also helps surgeons diagnose more quickly and accurately and make surgical plans more easily.

Prevalence of Accessory Left Atrial Appendage and Diverticula in Atrial Fibrillation Patient Undergoing Radiofrequency Ablation

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PURPOSE: Accessory left atrial appendage (ALAA) are reported to be the origin of ectopic activity, to have symptoms associated with cerebral embolism and to cause complications in atrial fibrillation (AF) catheter ablation. The purpose of this study is to determine the prevalence, number, size, and location of accessory left atrium appendage or diverticula in atrial fibrillation patients undergoing 64-channel multidetector computed tomography (MDCT) for left atrium (LA) before receiving radiofrequency ablation and to find the predicting factors for their presence.

MATERIALS AND METHODS: From January 2010 to December 2010, 94 patients of atrial fibrillation that need to be radiofrequency ablated underwent pre-procedural MDCT. Two radiologists retrospectively analyzed the number (single or multiple), size (diameter and length), and location of LAD. We calculate LA diameter, LA maximal and minimal volume, LA stroke volume and LA ejection fraction as LA parameters to find the predicting factors for the presence of LA diverticula.

RESULTS: Forty-eight LA diverticula were identified in 40 patients (42.6%, male to female ratio: 27:13, mean age 55.4±/11.6 years). Among 48 LA diverticula, the right superior region (24/48, 50%) was the most common location, followed by the left superior region (9/48, 18.8%). The average diameter was 5.6±/2.1mm (range from 2.2-10.2mm), and the average length was 6.4±/3mm (range 2.5-16.7mm). There are no significant difference in age, gender, the type of atrial fibrillation, duration of arrhythmia, LA dimension, LA maximal and minimal volume between presence and absence of ALAA. The LV ejection fraction, LA stroke volume and LA ejection fraction were significantly higher in group with LA diverticula than group without ALAA (LVEF: 60.9 % vs 57.7 %, respectively, p = 0.02; LA stroke volume: 42.8 ml vs 29.1 ml, p = 0.002; LAEF: 33.4 % vs 23.4 %, p = 0.002).

CONCLUSION: ALAA is a common finding in patients with atrial fibrillation. The prevalence rate is about 42.6% and the right superior region is the most common location. The LA stroke volume and LA ejection fraction were significantly higher in group with ALAA. Further studies are needed to determine their clinical significance and pathogenesis of ALAA.
Basic Study on Low Dose and Uniform Image Quality in the Prospective Gating Coronary CT angiography using ASiR Low Dose Technique and High Definition Scan Mode

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Objective: Adaptive statistical iterative reconstruction (ASiR) preserves image quality while lowering the radiation dose, and high definition scan mode increases spatial resolution. We demonstrated the clinical performance of HDCT using ASiR Low Dose Technique and High Definition Scan Mode.

Methods and Materials: We evaluated 35 patients who underwent prospective gating coronary CT angiography using high definition mode and ASiR low dose technique. The tube voltage (100~120Kvp), current (300~550mA) and filter (Bowtie small and large) were chosen according to body mass index (BMI). The image noise, SNR and effective radiation dose were measured, and calculated. The image noise was defined as the SD of attenuation of ascending aorta.

Results: The image noise, SNR, effective dose was 45.1, 10.2 and 1.76 (mSV). Low radiation dose can be achieved while preserving image quality. The radiation dose was decreased in the group of lower BMI (1.10, 1.51, 2.32mSV at BMI < 23, 23~25, > 25), The SNR between different BMI groups were 11.1, 10.3, 9.4.

Conclusion: By using BMI-based scanning parameters, high definition mode and ASiR low dose technique, we can pursue good image quality and decrease radiation dose.

Comprehensive MDCT Evaluation of Patients Suspected With Catheter-Related Thrombosis: From Protocol to Interpretation

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Objective: Early and accurate diagnosis of the catheter-related thrombosis facilitates proper management to alleviate the symptoms and to avoid related complications. Recently, indirect CT venography with multi-detector row technology has become an important noninvasive diagnostic tool in clinical practice. This article will introduce the scanning techniques, interpretation algorithm, and image findings including catheter-related thrombosis and other associated and alternative diagnoses.

Conclusion: With proper scanning techniques and interpretation, MDCT can be a powerful diagnostic tool to comprehensively evaluate patients suspected with catheter-related thrombosis.
Proximal Interruption of Right Pulmonary Artery: a case report

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A 53y/o female suffered from dyspnea on exertion for a long time and wheezing in recent 2 years was scheduled for CT study.

**IMAGE FINDINGS:** CT revealed marked enlarged main pulmonary trunk and dilated left pulmonary artery; only proximal part of right pulmonary artery was depicted. There presented some right anterior intercostals arteries, posterior transpleural systemic vessels and prominent bronchial arteries around trachea and carina.

**DISCUSSION:** Proximal interruption of right pulmonary artery is not common. Radiography may show smaller right lung and rib notching due to collaterals. Hemoptysis occurs in 10% of cases as rupture of hypertrophied collateral vessels. Reticular pattern of lung can be found due to postinflammatory change and fibrosis. Most of the right lung is supplied by bronchial arteries; supplemented by intercostals, internal mammary arteries & transpleural systemic vessels.

MDCT Diagnosis of Hypertrophic Cardiomyopathy: a case report

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**PURPOSE:** We described the 64-slice multidetector CT (MDCT) cardiac findings of young-aged women with hypertrophic cardiomyopathy. 

**CASE REPORT:** A 34-y-o female without past history of major systemic disease was investigated for recent atypical chest pain. ECG demonstrated normal sinus rhythm and signs of left ventricular hypertrophy. Cardiac enzymes were within normal ranges. To investigate the cause of chest pain, cardiac MDCT was ordered.

**RESULT:** CT coronary angiography disclosed absence of significant luminal narrowing of coronary arteries. By using end diastolic and end systolic reformats of the CT data; the global left ventricular function analysis disclosed an ejection fraction of 71%. Systolic anterior motion of the mitral valve and asymmetric thickening of the interventricular septum were demonstrated in the dynamic study. So the diagnosis of hypertrophic cardiomyopathy was made, and the patient was placed on medical therapy with β-blockers and remained under close clinical follow-up.

**CONCLUSION:** MDCT enabled non-invasive evaluation of the coronary arteries and dynamic images of myocardial thickness and wall function. This case illustrates the capabilities of MDCT in the evaluation of hypertrophic cardiomyopathy.
**DP040-CV**

**Congenital Heart Anomaly: criss-cross heart**

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**PURPOSE:** To describe a rare case of congenital heart disease with criss-cross heart structure with 3D CT reconstruction.

**CASE REPORT:** A 8-month old girl was born uneventful. At 5 months of age, cardiac murmur was noted at routine check-up without clinical symptoms. Echocardiogram disclosed a complex congenital heart. She underwent cardiac CT for detail evaluation. It revealed situs inversus. The ventricles are in normal D-loop position, with right ventricle was right, superior and anterior to the left ventricle. However, the atrioventricular connections are concordant. The concordant atrioventricular connections occurred because the pulmonary and systemic blood streams crossed in the midheart through a premium type atrial septal defect and an inlet type ventricular septal defect, so that the inversed-positioned atria supplied the appropriate normal-positioned ventricles. The ventriculoarterial connection is malpositioned for double-outlet right ventricle and hypoplastic right pulmonary artery. Presenting with a {I; D; L-MGA,} of Van-Praagh structure.

**CONCLUSION:** Criss-cross heart is a rare and complex congenital anomaly with frequency no more than 8 per 1,000,000 per live birth. Diagnosis of crisscross heart is based on crossing of the long axes of the atrioventricular valve, which gives the appearance of each atrium emptying into the contralateral ventricle. The most common segmental set was {S, D, L}. Cases of situs inversus are extremely rare and only {I; L; L} have been reported. CT has the advantage of 3D reconstruction to disclose such complex anatomy.

**DP041-CV**

**Spontaneous Reopening of Persistent Left Superior Caval Vein: a case report**

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**PURPOSE:** To report a case with spontaneous reopening of persistent left superior vena cava (SVC).

**CASE REPORT:** This 14-year-old girl was diagnosed with situs solitus, ventricular septal defect, and patent ductus arteriosus at birth. Patent ductus arteriosus ligation was performed at the age of 8 months. She did not receive any cardiac surgery after patent ductus arteriosus (PDA) ligation was done.

**RESULTS:** Cardiac computed tomography (CT) at the age of 8 months revealed ventricular septal defect and patent ductus arteriosus, but persistent left SVC was not demonstrated. Repeated cardiac CT at the age of 7 years incidentally showed a reopened left SVC draining to the coronary sinus. Cardiac CT performed at age 14 showed persistent left SVC, dysplastic thickened aortic valve, and aortic incompetence noted on CINE images.

**CONCLUSION:** During embryogenesis, the bilateral anterior cardinal venous systems usually develop into a unilateral right-sided SVC. If the left anterior cardinal vein fails to regress, persistent left SVC will occur. Persistent left SVC is seen in 0.4% of the general population. Reopening of persistent left SVC in patients with congenital heart disease receiving bidirectional cavopulmonary connection or a Fontan-type procedure has been demonstrated in previous reports. It has been postulated that increased pressure gradient between the pulmonary and the systemic connections following the establishment of cavopulmonary connections may cause reopening of persistent left SVC. These findings support that left SVC obliterates rather than disappears during prenatal development. The case in our report did not have cavopulmonary connection, but reopening of persistent left SVC was confirmed by cardiac CT. This patient only underwent PDA ligation at age of 8 months, and it would not increase right atrial or coronary sinus pressure. On the following CT, no cardiac chamber enlargement was noted. We speculate that obliteration of the left anterior cardinal vein is a reversible process. The definite pathway is not well understood. However, there may be other factors rather than pressure gradient that initiate reopening of persistent left SVC.
Intracavitary Metastatic Hepatocellular Carcinoma of Left Atrium

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CASE REPORT: A 50-year-old female patient presented to our institution with shortness of breath and hemoptysis. Her past history included right lobectomy of liver for hepatocellular carcinoma (HCC). Plain radiograph of chest showed enlargement of left pulmonary hilum. A contrast-enhanced CT of chest disclosed a cardiac mass in left atrium, which extended into left pulmonary veins. Metastatic tumor thrombus from HCC was subsequently confirmed at surgery.

DISCUSSION: The most common malignant cardiac tumor is metastasis. Metastasis of HCC to cardiac cavity is rare. Kojiro et al. reported 18 (4.1%) cases of intracavitary metastasis in 439 HCC autopsy cases. Intracavitary metastasis occurs mostly in the right atrium, with few reports of other cardiac chamber involvement. Possible mechanism of tumor thrombus in left atrium includes: tumor growth from the pulmonary veins following massive metastasis to the lung, direct invasion of the atrial septum, or tumor implantation via a subclinical right-to-left shunt through the patent foramen ovale. CT is a useful diagnostic tool to detect and characterize cardiac metastasis in case of HCC.

Aortic Arch Nutcracker Syndrome in a 1-Month and 8-day-old Infant- CT and MRI Findings

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The cardiovascular MRI is an important diagnostic tool in the neonates and infants with congenital heart disease for no radiation and high tissue resolution. However, for the fast heart rates and small size of the patients, pulse sequence parameter adjustment and specific equipments are required for good image qualities in addition to the suggested general anesthesia with transient breath holding techniques. We reported an 1-month and 8-day-old infant with aortic arch nutcracker syndrome that is diagnosed by the CT and 1.5T MRI with the head coil and pulse-gating equipment used in the adult and the common intravenous sedation.
MR Imaging Features of Cardiac Amyloidosis: a case report

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Amyloidosis is a rare disease caused by accumulation of insoluble fibrillar proteins. Cardiac involvement is a common finding and can progressively lead to congestive heart failure due to restrictive cardiomyopathy, vascular abnormalities, autonomic dysfunction, and conduction abnormalities. The gold standard to prove this diagnosis is through myocardial biopsy. Cardiac MR Imaging (MRI) is a non-invasive and promising modality to evaluate many kinds of cardiac diseases at present. We present a case of Multiple Myeloma, who suffers from congestive heart failure recently. Cardiac amyloidosis is proven by endocardial biopsy during catheterization, and many characteristic features (such as circumferential myocardial hypertrophy, diastolic dysfunction, and diffuse myocardial delayed enhancement...) about cardiac amyloidosis are also demonstrated by his cardiac MRI findings. Cardiac MRI provides much important information for the diagnosis, treatment and longitudinal assessments.

Cardiac Computed Tomography Presentation of Periannular Abscess, Sinus of Valsalva Aneurysm, Pseudoaneurysm, and Fistulas: Another Image Tool for Complicated Infective Endocarditis before Surgery

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PURPOSE: To evaluate complicated infective endocarditis before surgery, cardiac computed tomography was performed and comparing with traditional echocardiograph.

CASE REPORT: Complications of infective endocarditis were suspected in patients with resistant infective endocarditis and new complete AV block. We presented 2 cases, one case S/P double valve replacement + Bentall’s operation with recurrent subacute infective endocarditis and another case was diagnosed freshly. Due to pre-surgery evaluation, cardiac computed tomography was performed and comparing with transthoracic echocardiography and transesophageal echocardiography results.

RESULTS: Cardiac CT presented complications of infective endocarditis including periannular abscess, sinus of Valsalva (SV) aneurysm, fistulas between left ventricle and SV aneurysm, bicuspid aortic valve with vegetations, valve regurgitation, aortic dissection, complicated and confluent pseudoaneurysms between aortic valve and left ventricular outflow tract. One patient survived and the other expired after surgery.

CONCLUSION: Although echocardiography is the primary diagnostic modality, underdiagnosis is still common in complicated infective endocarditis. Cardiac CT is another powerful image tool for the latent and serious complications of infective endocarditis including periannular extension, abscess, aneurysm, fistula, valvular dysfunction, dissection and the adjacent anatomy before surgery.
Aortic vascular occlusion is a wide spectrum of vascular disease with aortic luminal narrowing. According to the occlusion level, different disease had its characteristics for radiologists to differentiate. Coarctation of aorta is congenital vascular disease related to stenosis of the proximal descending thoracic aorta. Aortoiliac occlusive disease means stenosis or occlusion below the renal arteries to the level of the aortic bifurcation related with deposition of atherosclerotic plaque. And Takayasu arteritis is another situation of chronic vasculitis that can affect aorta and pulmonary artery and occlusion can develop due to embolus or intramural thrombus. Each of these diseases had different etiology, clinical presentation, and occlusion level, and can cause different collateral circulation pathway.

Traditionally, we used aortography to evaluate the aorta occlusion site. However, multi-detector row computed tomography (MDCT) can bring us good quality images of vessels by reconstruction three-dimensional image and need no invasive procedure. Using MDCT, we can recognize the occlusion level and find the thoracoabdominal collateral pathways to illustrate how collaterals work. It is not only a useful diagnostic tool for radiologist but also useful for surgeons for further surgical planning.

PURPOSE:
We report a case of uncommon partial anomalous pulmonary venous return (PAPVR) diagnosed with MR and CT.

CASE REPORT:
A 22-year-old female visited our hospital due to intermittent chest tightness and dyspnea on exertion for about 8 months. Initial chest radiograph showed no obvious abnormality, but abnormal pulmonary venous drainage was suspected from echocardiography. Thorax MRI and CT study depicted cardiomegaly with right ventricular hypertrophy and engorged pulmonary trunk and left side pulmonary artery. Abnormal drainage of both left upper and lower pulmonary veins in a vertical vein into the left brachiocephalic vein was detected. Normal drainage of left side pulmonary veins into left atrium was absent. Therefore, the diagnosis of PAPVR was considered. Investigational cardiac catheterization examination was performed, and PAPVR was confirmed with left pulmonary veins draining into the left brachiocephalic vein. Correction surgery of the left pulmonary venous drainage was advised, and the patient was transferred to cardiovascular surgeon for further surgical reconstruction evaluation.

RESULTS:
Abnormal drainage of both left upper and lower pulmonary veins in a vertical vein into the left brachiocephalic vein was detected. Normal drainage of left side pulmonary veins into left atrium was absent. Therefore, the diagnosis of PAPVR was considered. Investigational cardiac catheterization examination was performed, and PAPVR was confirmed with left pulmonary veins draining into the left brachiocephalic vein. Correction surgery of the left pulmonary venous drainage was advised, and the patient was transferred to cardiovascular surgeon for further surgical reconstruction evaluation.

CONCLUSION:
Anomalous veins of the left lung most often drain the left upper lobe. After entering the mediastinum, these pulmonary veins continue cephalad and lateral to the aortic arch via a vertical vein which then joins the left brachiocephalic vein. Both the upper and lower pulmonary veins drain via a vertical vein into the left brachiocephalic vein in this case, with no single drainage vein into the left atrium. Our patient has a relatively uncommon PAPVR detected by MRI and CT with cardiac catheterization confirmation.
Determining Optimal Monochromatic Level by Measuring Contrast-Noise Ratio (CNR) in Gemstone Spectral Imaging (GSI) Technique for Better Evaluation of Hepatocellular Carcinoma (HCC)

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PURPOSE: To investigate which kiloelectron volts (keV) is optimal in evaluating HCC by using GSI technique.

MATERIAL AND METHODS: Twenty-three patients with pathology-proven HCC were investigated by spectral CT (GE Discovery CT 750 HD) with GSI. In each patient unenhanced and contrast-enhanced imaging with arterial phase (AP) and portovenous phase (PVP) were performed. Hypervascular nodules were documented on conventional 140 kilovolt peak (kVp) polychromatic and monochromatic (40-140 keV) images by two radiologists with consensus. Software measuring optimal tumor-to-liver contrast-noise ratio (CNR) as well as subjective optimal image quality on which keV for detecting hypervascular nodules were recorded by two radiologists. A paired t test was used to analyze whether the CNR was significantly different by software calculation and subjective assessment.

RESULTS: Total 51 hypervascular nodules were found on 140 kVp and 40-140 keV images. The optimal CNR of 30 hypervascular HCC nodules detected on AP and PVP 140 kVp images was located at 52.3 ± 4.1 and 55.4 ± 7.3 keV on GSI respectively. The optimal CNR of extra 21 hypervascular HCC nodules detected only on AP and PVP 40-140 keV images was located at 52.3 ± 1.2 and 50.5 ± 3.1 keV, while the averaged subjective optimal CNR was at 53.3 ± 2.8 and 51.5 ± 4.5 keV.

CONCLUSION: Low 50-52 keV images provided by GSI on workstation could detect maximal amount of HCC, which is no statistically differences from subjective assessment (p = .114 on AP and p = .391 on PVP). The optimal CNR of 21 hypervascular nodules detected additionally was at lower keV (50.5 keV) on PVP than that on AP (52.3 keV). Hence, the 50-52 keV images on AP and PVP are optimal for better evaluating HCC and should be offered routinely in PACS system.

Added Value of Monochromatic 50-70 Kiloelectron Volts (Kev) Images to Conventional 140 Kilovolt Peak (Kvp) Polychromatic Images on New Spectral CT in the Detection of Hepatocellular Carcinoma (HCC)

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PURPOSE: To investigate added value of low monochromatic images to conventional 140 kVp images for detecting HCC using spectral CT.

MATERIAL AND METHODS: Fifty-one HCC in 23 patients were investigated by spectral CT (GE Discovery CT 750 HD). All patients underwent unenhanced and contrast-enhanced imaging with arterial phase (AP) and portovenous phase (PVP). Interval reviews for both 140 kVp images on PACS and low monochromatic images (50-70 keV) on workstation were performed by two radiologists with consensus. We measured each tumor size, tumor iodine concentration derived from iodine-based material-decomposition images and tumor-to-liver attenuation differences on AP and PVP. The additional value of monochromatic images was evaluated by independent and paired t tests.

RESULTS: Thirty (58.8%) hypervascular nodules were detected on 140 kVp images with 27 (52.9%) on AP and 26 (51%) on PVP. On 50-70 keV images, extra 21 (42.2%) hypervascular nodules including 19 (37.3%) nodules on AP and 4 (7.8%) nodules on PVP were found. Their tumor-to-liver attenuation differences were also significant higher on 50-70 keV images than on 140 kVp images on AP and PVP statistically (p < .05). The nodules (1.07 ± 0.58 cm) detected only on 50-70 keV were significantly smaller than nodules (3.27 ± 4.13 cm) detected on 140 kVp images (p = .007), while no significant differences in those iodine concentration on AP (p = .762) and PVP (p = .326).

CONCLUSION: Significantly extra hypervascular nodules could be detected on 50-70 keV images due to higher contrast resolution with average smaller in size without differences in iodine concentration. Most of extra nodules (90.5%) were detected on AP 50-70 keV images. Hence added value of monochromatic 50-70 keV images to 140 kVp images was significant for detecting small HCC.
Applying Gray Level and Color Mapping During Electronic Biopsy in 3D CT Virtual Colonoscopy for Colorectal Cancer

PURPOSE: The major disadvantages of CT colonoscopy that limit its application are its inability to differentiate various endoluminal lesions and to perform biopsy. To increase differentiation between various endoscopic lesions in 3D CT colonoscopy, gray level and color mapping are applied to specific tissue during electronic biopsy for colorectal cancer.

MATERIAL AND METHODS: The CT colonoscopy system takes a spiral CT scan of the patient's abdomen in prone position after the entire colon is distended with room air. The histogram of the Hounsfield Units of the known fat, fluid and tumor region will be analyzed. The intensity curves for gray level and color mapping of above region will be adjusted manually. The best intensity curve for specific tissue evaluated by the radiologists will be stored and applied during the new exploration of another CT endoscopic lesion.

RESULTS: The gray level range of normal colon mucosa and tumors is higher than fat and fluid. Color mapping of the fat and fluid enhances the visible difference between them and tumors. The visible difference of normal mucosa and tumors can be increased by adjusting the level, window and gray level intensity curve.

CONCLUSION: Applying gray level and color mapping during electronic biopsy in CT colonography greatly helps the differentiation and staging of colorectal tumors.

Small Bowel Perforation in Blunt Abdominal Trauma – CT Images Analysis

PURPOSE: Blunt small bowel injury is uncommon, but it leads to higher mortality and morbidity. The most contributed factor is in delay or inaccurate diagnosis. Although Computed tomography (CT) is the diagnostic tool of choice for the detection of intra-abdominal injuries associated with blunt trauma, especially those affecting the small bowel, the CT imaging features of small bowel injury are subtle and easily missed. The purpose of this retrospective review tries to determine which CT imaging features are useful in diagnose blunt small bowel perforation.

MATERIAL AND METHODS: From Sep. 2006 to Sep. 2009, 179 patients with blunt abdominal trauma, follow by laparotomy were included in this study. Their initial CT films were reviewed by radiologist who was blind to the result of operation. Seven CT features (free floating free air, free fluid without solid organ injury, bowel wall thickening, bowel wall enhancement, bowel wall defect, mesentery hematoma, active mesentery contrast extravasation) were evaluated in every single case. The sensitivity and specificity of each CT features were calculated.

RESULT: In the cases of small bowel perforation, the CT features of bowel wall thickening had sensitivity of 80% and specificity of 64% and bowel wall defect had sensitivity of 30% and specificity of 100%. Extraluminal air was a specific but relatively insensitive sign (sensitivity 35%, specificity 100%). Mesenteric hematoma had sensitivity of 60% and specificity of 74%. Free fluid without solid organ injury had sensitivity of 54% and specificity of 64%.

CONCLUSION: CT is adequate for depiction of bowel and mesenteric injuries that require surgical repair. Free floating free air and bowel wall defect were the two most specific signs, but less sensitive to predict small bowel perforation. Bowel wall thickening is most sensitive but less specific. Carefully evaluated these CT features help to improve the detection of small bowel perforation.
CT Images in Predicting the Need of Surgery in Isolated Superior Mesenteric Artery Dissection: Preliminary Experience

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PURPOSE: The spontaneous dissection of the main trunk of the superior mesenteric artery (SMA) without associated with aortic dissection is rare. Most of these cases were managed surgically, or died before surgery in patients with bowel ischemia but some were managed by observation. The purpose of this study is to evaluate the role of computed tomography (CT) in diagnosing isolated SMA dissection and predict the need of surgery.

MATERIAL AND METHODS: CT images and medical records of 6 patients with isolated SMA dissection were reviewed. The CT criteria of double barrel SMA, compression of true lumen by false lumen, obstruction of SMA branches, thrombosis of false lumen and bowel ischemia were evaluated. The criteria for CT images, alone or combination, in predicting the need of surgery were analyzed.

RESULTS: There were 5 patients with sign of double barrel SMA, 3 patients with sign of compression of true lumen by false lumen, 4 patients with sign of obstruction of SMA branches, 4 patients with sign of thrombosis of false lumen and one patient with sign of bowel ischemia. Three patients received thrombectomy with vasculoplasty and one of them received bowel resection due to ischemia. CT criteria of compression of true lumen by false lumen, obstruction of SMA branches, and bowel ischemia were highly correlation to the need of surgery.

CONCLUSION: Isolated SMA dissection should be considered in the differential diagnosis of abdominal angina. CT can be a good alternative method than angiography to diagnose SMA dissection and predict the need of surgery.

Delayed Perforation of Sigmoid Colon Due to Seat Belt Injury: a case report

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PURPOSE: Delayed small bowel perforation is uncommon after blunt abdominal trauma, including seat belt injury. Delayed perforation of colon is even rarer. We now represent a case of colonic perforation occurred two days after seat belt injury.

MATERIAL AND METHODS: A 21 year-old man suffered from multiple facial, thoracic and abdominal ecchymosis in a car accident. CT of brain, chest and abdomen performed in the outside hospital did not reveal any internal bleeding or hollow organ perforation. Then, he was transferred to our emergency room three hours later and admitted for hospitalization. A transverse band of skin ecchymosis on the lower abdomen was seen, corresponding to the seat belt lapstrap. The abdomen was soft. No special complaint was noted and the vital sign was normal. The patient was discharged two days later. However, he came back to our emergency room 6 hours after discharge with acute abdomen at left lower abdomen. Blood analysis revealed WBC = 11870/μl.

RESULTS: Contrast-enhanced CT revealed diffuse wall thickening of the small bowel loop and colon. Pockets of intraperitoneal air were found in the non-dependent site of the peritoneal cavity. A larger air accumulation was noted in the pelvic cavity contiguous to the sigmoid colon, distal ileum and appendix. Hollow organ perforation with the perforation site at one of the above bowel loops was impressed. Associated transverse subcutaneous infiltration was appreciated, corresponding to the seat belt lapstrap. The abdomen was soft. No special complaint was noted and the vital sign was normal. The patient was discharged two days later. However, he came back to our emergency room 6 hours after discharge with acute abdomen at left lower abdomen. Blood analysis revealed WBC = 11870/μl.

RESULTS: Contrast-enhanced CT revealed diffuse wall thickening of the small bowel loop and colon. Pockets of intraperitoneal air were found in the non-dependent site of the peritoneal cavity. A larger air accumulation was noted in the pelvic cavity contiguous to the sigmoid colon, distal ileum and appendix. Hollow organ perforation with the perforation site at one of the above bowel loops was impressed. Associated transverse subcutaneous infiltration was appreciated, corresponding to the seat belt lapstrap. Emergent exploratory laparotomy revealed avulsion of the sigmoid mesentery and a 2cm perforation hole at the middle portion of the sigmoid colon. High anterior resection and end-to-end anastomosis were performed. The post-operative course was uneventful during the 9 days of hospitalization.

CONCLUSION: Delayed perforation of colon is rare after seat belt injury. This incidence should be kept in mind for differential diagnosis when a patient suffered from acute abdomen days or weeks after blunt abdominal trauma. CT is a good modality for detecting bowel and mesenteric injury and prompts emergent surgical exploration.
Retrograde Jejunogastric Intussusception after a Subtotal Gastrectomy More Than Twenty Years Ago: a case report and review of the literature

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Retrograde jejunogastric intussusception (JGI) is a rare complication of gastric surgery with unknown mechanism. Around 200 cases have been reported in the literature till 2008. Presence of a tender mass with vomiting and pain in a patient with a history of prior gastric surgery is the typical presentation. The current state-of-the-art CT scan allows for the detection of the characteristic target-shaped soft-tissue mass with adjacent mesenteric vessels within the stomach, this is pathognomonic of JGI.

Herein, we report a case of JGI with the presentation of typical clinical features and CT imaging. An emergency exploratory laparotomy showed an efferent loop jejunum of 25 cm in length herniating into the stomach leading to the retrograde intussusception. The intussused loop had gangrenous changes and was resected; an end-to-end jejunojejunal anastomosis was performed.

We review the literature of retrograde jejunogastric intussusception and discuss the typical clinical findings and CT imaging.
**Purpose:** Stercoral perforation of the colon is rare with under 150 cases reported in the world literature. The prognosis is poor with post-operative mortality rates of about 35-40%. We present a case of stercoral perforation of sigmoid colon about its CT findings.

**Case Report:**
A 84-year-old female was sent to our emergency room with the chief complaint of severe abdominal pain for 3 days. Physical examination revealed diffuse abdominal tenderness, muscle guarding and rebounding pain. Vital signs and laboratory studies showed septic shock and severe metabolic acidosis. Peritonitis was impressed. The supine chest and abdominal radiograph revealed a large amount of fecal material in the colon and rectum without obvious evidence of pneumoperitoneum. Then, abdominal CT was arranged.

**Results:**
The abdominal CT showed a large wall defect, focal wall thickening and fecal impaction in the sigmoid colon. Diffuse extraluminal collection of fecal material and free air within the abdominal cavity was noted also. A diagnosis of sigmoid colon perforation with fecal peritonitis was made. Then, the patient received sigmoid colon resection and Hartmann’s procedure by surgeon. She had a good post-operative outcome.

**Conclusion:**
Fecal impaction may lead to ischemic pressure necrosis of colon and subsequent colonic perforation. It is an uncommon but life-threatening complication. Early CT diagnosis and surgical treatment may improve survival.
Detecting the Cholesterol Stones in Common Bile Duct by the New Spectral CT: a case report

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PURPOSE: Biliary stones composed primarily of cholesterol show lower density and thus are harder to identify on conventional CT. Here we present a case of cholesterol stones in common bile duct detected by the new spectral CT.

CASE REPORT: A 71-years-old male patient with surgical history of cholecystectomy for cholelithiasis suffered from epigastralgia, nausea and vomiting for 2 days. She was sent to our emergent department where laboratory tests revealed elevated amylase (2210 U/L), lipase (5150 U/L), total bilirubin (1.79 mg/dL), aspartate aminotransferase (360 U/L) and alanine aminotransferase (256 U/L). Then unenhanced and contrast-enhanced abdominal CT examinations were performed by the new CT device (GE Discovery CT 750 HD) with fast tube voltage switching. Besides conventional 140 kilovolt peak (kVp) polychromatic images provided, Gemstone spectral imaging (GSI) technique yielded 40-140 kiloelectron volts (keV) monochromatic images and fat-calcium pair for material-decomposition images.

RESULTS: Acute interstitial pancreatitis without visible common duct calculi was noted on conventional polychromatic images. However, 140 keV monochromatic images revealed two small nodules of faint high density in common bile duct, indicative of choledocholithiasis. As lower keV levels of monochromatic images, the calculi became harder to be seen. Fat-based material-decomposition images revealed high density of the calculi, while low density on calcium-based images. Cholesterol stones were impressed due to primarily fatty content. Then MRCP was performed with a 1.5T MR system and choledocholithiasis was compatible.

CONCLUSION: With new CT technique, we can obtain higher detection rate for choledocholithiasis, especially for those composed primarily of cholesterol hardly identified on conventional CT.

Amyand’s Hernia with Scrotal Abscess Presenting as Acute Scrotum

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Amyand’s hernia is a rare condition of inguinal hernia that occurs when an inflamed appendix is included in a hernial sac and becomes incarcerated there. Clinical presentation of Amyand’s hernia usually varies, depending on the extent of inflammation involved in the hernial sac and the presence or absence of a scrotal abscess. If a scrotal abscess presents, the condition usually indicates appendix in the hernia sac is perforated. However, without the availability of computed tomography scans, it is often preoperatively misdiagnosed as a strangulated inguinal hernia. We present such a rare case in a 64-year-old man at our emergency room complaining of scrotal swelling and pain. Diagnosis of Amyand’s hernia with a scrotal abscess was confirmed preoperatively by CT scan.
INTRODUCTION: Adult intussusception differs from childhood intussusception in its presentation, etiology and treatment. Childhood intussusception mostly involves ileocecal valve and is 95% idiopathic. In adult, 90% occur in small bowel or colon and 10% in stomach or surgically created stoma. We report a case of ileal intussusception with classical appearance on computed tomography and a mass identified as a lead point.

CASE REPORT: A 55-year-old woman came to emergency service with abdominal pain and vomiting for three days. Physical examination revealed abdominal distension and hypoactive bowel sound. Abdominal CT showed oval and round masses consisting of thickened bowel walls with mesenteric fat and vessels suggesting intussusception. A soft tissue mass was identified within a mostly dilated bowel segment and considered as a lead point. Laparotomy disclosed ileal intussusception and a sausage-like segment in which a 4 x 3 cm tumor was found. Pathology examination revealed a submucosal inflammatory fibroid polyp.

DISCUSSION: Adult intussusception arises in the small bowel in two-thirds of cases and often associates with underlying pathological conditions. These include primary or metastatic neoplasms, Meckel’s diverticulum, lymphadenitis, trauma, and placed tubes. The characteristic CT appearance is a complex round or elongated mass consisting of multilayered thickened bowel walls with entrapped mesenteric fat and vessels. Identification of a lead mass amid the thickened bowel walls is usually difficult. However, the degree of bowel wall thickening, dilatation, proximal obstruction and presence of ascites or pneumoperitoneum can be diagnosed confidently by CT which helps prompt decision to surgical intervention.

Spontaneous pneumoperitoneum is infrequently encountered as a radiographic finding in association with a perforated appendicitis. It accounts for about 0-7% of all patients with pneumoperitoneum. We report on a 11-years-old boy presenting a history of abdominal pain and distension associated with nausea, vomiting. Plain chest radiography and CT scan revealed free air beneath the right leaf of the diaphragm. The patient was taken immediately to the operation room and, during surgery, perforated appendix and fecal peritonitis and intraabdominal abscess was verified.

Perforated acute appendicitis is rarely associated with pneumoperitoneum, but it must be considered in the differential diagnosis of patients presenting right abdominal pain and free intraperitoneal air.
An internal hernia means the protrusion of a viscus through a congenital or pathogenic aperture and into a compartment in the abdominal cavity. Transmesenteric hernia accounts for 5-10% of all internal hernias. 65% of this kind of internal hernia occurred at adults. Most of the adult patients have past history of previous surgery, abdominal trauma or intraperitoneal inflammation. The defect of such kind internal hernia is rather small and absent of a hernial sac. Thus, the incidence of strangulation and intestinal gangrene is relatively high. The mortality rate of patients treated with or without surgery is 50% or 100%, respectively.

We present a case of 56-year-old male with transmesenteric hernia with diagnostic approach by MDCT. This patient didn’t have past history of previous surgery or abdominal trauma. There was no repetitive obstructive symptom such as nausea, vomiting or abdominal pain before. MDCT showed a C-shaped distended closed small bowel loop with radial configuration of its mesentery with a beak sign at the proximal end. The mesenteric defect was located close to the ligament of Treitz. He received laparotomy. Internal hernia of small bowel with congestive change, from 310cm to 360cm distal from Treitz ligament, was noted. Segmental resection of small bowel with end-to-end anastomosis and repair of the defect of Treitz ligament were performed. After the surgery, the wound healed well without any complication.

**Caroli disease的磁振照影表現：病例報告**

**MRI Features of Caroli Disease: a case report**

**BACKGROUND:** Caroli disease is a rare congenital disorder characterized by segmental, nonobstructive dilatation of intrahepatic bile ducts affecting all or part of the liver that is often associated with renal disorders. We describe a patient with typical MRI and MRCP findings of Caroli disease.

**CASE REPORT:** A 33-year-old, otherwise healthy woman was admitted to our hospital because of abdominal fullness associated with mild pain in the right upper abdominal quadrant. Laboratory test results (reference ranges shown parenthetically): serum alkaline phosphatase, 82 IU/L (42-98 IU/L); GPT, 40 IU/L (1-35 IU/L); T-bil, 0.4 mg/dL (0.2-1.2 mg/dL); Creatinine, 1.4 mg/dL (0.6-1.2 mg/dL). Magnetic resonance imaging of the abdomen showed multiple communicating, irregular, tubular, and cystic dilations of the intrahepatic bile ducts involving the bilateral lobes of liver. Splenomegaly and other findings suggestive of portal hypertension were absent, but bilateral renal tubular ectasia and cysts was evident. Magnetic resonance cholangiopancreatography also showed communications between saccular dilatations of the intrahepatic biliary tract and normal bile ducts. The gallbladder was dilated but without thickened walls, and the extrahepatic bile duct was normal. These findings were indicative of type I Caroli disease.

**CONCLUSION:** MRI and MR cholangiography is capable of noninvasively demonstrating the communication between the cystic dilations and the biliary tree, thus helping rule out conditions such as polycystic liver disease and biliary hamartomas.
Biloma Mimicking Double Gallbladder: a case report

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CASE PRESENTATION: A 66-year-old overweight gentleman suffered from intermittent right upper quadrant pain and fever for about 3 weeks. The symptoms had first started 2 years before, and he had been treated conservatively for biliary colic. He had no history of surgery. Laboratory tests showed hyperbilirubinemia and elevated liver enzymes. Ultrasound revealed nondiagnostic. MRI revealed suspected duplication of the gallbladder, with common bile duct stone. Under the impression of acute cholecystitis, he then received laparoscopic cholecystectomy, which showed a biloma. After surgery, the patient recovered well without complications.

DISCUSSION: Biloma and duplicated gallbladder are two entities that may mimic each other on imaging appearance. The suggested contributing factors of biloma are raised intraductal pressure secondary to stone obstruction or previous surgery. The most common location is subphrenic or subhepatic. Accurate imaging diagnosis is important, as the management of biloma is mainly nonoperative which includes percutaneous aspiration.

Mesenteric GIST with Hemorrhage Mimicking Intraperitoneal Abscess: a case report

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INTRODUCTION: We report a rare case of mesenteric gastrointestinal stromal tumor (GIST) with hemorrhage mimicking intraperitoneal abscess.

CASE REPORT: A 23-year-old man presented to our emergency department with complaints of fever and diarrhea for three days. There was no history of weight loss over the last year and he denied any abdominal trauma or past surgeries. On physical examination, the abdomen was soft and not sensitive to touch and no palpable masses were felt. Hematological investigations revealed mild anemia. A mass in the lower abdomen was confirmed by an ultrasound study. A contrast-enhanced computerized tomography (CECT) scan of the abdomen showed a large lobulated cystic mass with peripheral enhancement, suggestive of abscess formation. CT-guiding drainage was performed and small amount of bloody fluid was aspirated. Tumor with hemorrhage was suspected. On pelvic MR imaging, the cystic mass showed low signal on T1WI and very high signal on T2WI and DWI. Mild contrast enhancement of the irregular wall was also seen. GIST with hemorrhage was suspected. Diagnostic laparoscopy with biopsy was performed and pathology revealed spindle cell morphologic characteristics, consider of gastrointestinal stromal tumor (GIST). The patient underwent exploratory laparotomy with segmental resection of jejunum and excision of gastrointestinal stromal tumor. No recurrence is identified in the one year follow-up.

CONCLUSION: Mesenteric gastrointestinal stromal tumor with hemorrhage is very rare. Our case demonstrated that MR is a valuable imaging tool for pre-operative diagnosis.
Inflammatory Fibroid Polyp with Ileo-Colic Intussusception in an Adult: a case report

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INTRODUCTION: Only approximately 5% of all intussusceptions occur in adults, which is frequently caused by underlying pathology. A lead point intussusception in an adult involving the small bowel is generally due to a benign condition, whereas it is often related to a primary or secondary malignant neoplasm when involving the colon.

CASE REPORT: We report a 46-year-old woman who presented to emergency department with complaints of intermittent epigastric pain. Computed tomography imaging demonstrated ileo-colic intussusception with a mass as the lead point. Further double contrast colon series revealed a large ovoid tumor with smooth contour in cecum. Subsequent operation confirmed a 5 cm polypoid tumor located at the terminal ileum about 2 cm proximal to the ileocecal valve. Histopathologic examination showed the mass to be an inflammatory fibroid polyp.

CONCLUSION: Inflammatory fibroid polyps are rare benign tumors originating in the submucosa of the gastrointestinal tract with the stomach being the most common site. Rarely, when located in the small bowel, it can result in ileo-ileal intussusception, or less commonly ileo-colic intussusception.

Unusual Presentation of Colon Cancer as Cecal Perforation: a case report and literature review

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Colon cancer is a major malignancy worldwide and patient usually presented as blood in stool or bowel habit change initially. However, some patient may appeared as bowel loop obstruction, and rarely lead to bowel loop perforation. Herein, we report a case visited our Emergency Department due to watery diarrhea and abdominal pain. Abdominal computed tomography (CT) revealed pneumoperitoneum and mass lesion over transverse colon causing bowel loop obstruction and obvious dilatation of proximal colon, especially over cecum. Emergent exploratory laparotomy was performed and cecal perforation was found. The history, laboratory data, images survey, including plain films and CT images, and literature are reviewed.
Influence of Hemangiomas with Underlying HCCs in the Same Vascular Territory

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PURPOSE: HCCs are the most common malignant tumors and hemangiomas are the most common benign tumors in liver. We may sometimes observe that significant involution of hemangiomas in case of HCCs located in the same vascular territory simultaneously. In this study, we discussed the factors associated with shrinkage rate of the hemangiomas.

MATERIAL AND METHODS: Between 2007 and 2011, a retrospective collection of HCCs and hemangiomas located in the same vascular territory in one patient revealed four cases. For at least half a year follow-up with enhanced CT or MR, we measured the size of them respectively.

RESULT: The size of HCCs ranged from 3.4 cm to 6.8 cm in diameter (mean 4.7 cm), the size of the hemangiomas ranged from 0.5 cm to 4.1 cm in diameter (mean 2.1 cm). In follow up images, the size of the hemangiomas ranged from 0 cm to 1.3 cm in diameter (mean 0.7 cm), with an average of decreased size about 0.5 cm. Hemangiomas revealed rapid shrinkage with underlying HCCs compared with those without underlying HCCs, especially in larger HCCs. In case of HCCs post treatment, the regression rate of hemangiomas may be changed.

CONCLUSION: We observed a trend that shrinkage rate of hemangiomas with adjacent HCCs is correlated with tumor size and treatment of HCC.

Navigator-Triggered Isotropic 3D Magnetic Resonance Cholangiography: An Initial Experience in Nine Living Liver Donors

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PURPOSE: The aim of this study is to compare the clinical applications of the navigator-triggered isotropic three-dimension magnetic resonance cholangiography (3D-MRC) and rapid acquisition relaxation enhancement (RARE).

MATERIALS AND METHODS: From April to August in 2011, nine donors before transplantation received RARE and 3D-MRC. The images were reviewed retrospectively. Visualization scores of different parts of biliary anatomy were used for image quality evaluation. Intraoperative cholangiography (IOC) was used as a gold standard. The results of visualization scores were compared with 3D-MRC and RARE by using Wilcoxon signed ranks test.

RESULT: The visualization scores were higher with 3D-MRC than those with RARE (9.66 +/- 1.32 vs 8.33 +/- 1; P<0.01).

CONCLUSION: The navigator-triggered isotropic 3D MRC is an effective and innovative way to evaluate biliary anatomy.
Does Transarterial Embolization Improve Survival in Recurrent Hepatocellular Carcinoma after Living Donor Liver Transplantation?

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PURPOSE: Hepatocellular carcinoma (HCC) is the second leading cause of cancer related death in Taiwan. However, HCC recurrence after LDLT is an undesirable outcome, and the treatment is controversial due to different recurrent patterns. The aim of this study is to evaluate the efficacy of TAE for HCC recurrence after LDLT.

MATERIAL AND METHODS: From March 2003 to February 2011, 217 patients received LDLT for HCC under Milan/UCSF criteria in Kaohsiung Chang Gung Memorial Hospital. The clinical profiles, imaging features, histopathologic diagnosis, treatment methods and outcomes of HCC recurrence after LDLT were retrospectively analyzed. TAE procedure was performed with a microcatheter system to protect hepatic artery anastomosis. The endpoints of this study were survival from time of recurrence.

RESULTS: Recurrences were found in 15 patients (6.9%) with LDLT for HCC, and were divided into three groups by treatment methods. Group 1 (n = 2) was surgical resection for localized extrahepatic recurrence. Group 2 (n = 4) was TAE for intrahepatic recurrence. Group 3 (n = 9) was systemic chemotherapy, radiation therapy or conservative treatment for multiple intrahepatic or extrahepatic recurrence. Kaplan-Meier survival estimates showed that the 6-months survival after recurrence in group1, 2 and 3 was 100%, 75% and 55.5%.

CONCLUSION: Surgery had significant benefit on survival after recurrence for solitary or localized resectable recurrence. TAE may have an effect in the locoregional control of intrahepatic recurrence to prolong survival, even where limited extrahepatic metastasis could be controlled by other treatment. Multiple metastasis was usually unresponsive to chemotherapy and/or radiation therapy with shorter survival after recurrence.

Radiologic Interventional Procedures for Biliary Complications after Liver Transplantation in Children with Biliary Atresia

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PURPOSE: Biliary complication is a major problem in pediatric living donor liver transplant (LDLT). The aim of this study is to evaluate the management of biliary complications after pediatric LDLT.

MATERIAL AND METHODS: From 1994 to 2010, 157 cases of pediatric LDLT (84 boys and 73 girls) were performed in our center with underlying of biliary atresia. Doppler ultrasound was initially given daily for two weeks postoperatively in evaluation of the biliary and vascular complications. Computed tomography (CT) and or magnetic resonance imaging (MRI) were performed if complications were suspected. Biliary complications were treated by radiological and or surgical intervention.

RESULTS: Among the total 157 cases, 10 (6.3%) biliary complications were found. These 10 biliary complications were devied to 3 groups as bile leakage (n = 3); biliary stricture without vascular complication (n = 4) and biliary stricture with vascular complication (n = 3). The 3 cases with biloma recovered after interventional procedure. Within the 7 biliary stricture cases, percutaneous transhepatic drainage (PTCD) were performed. All cases without vascular complications were complete cured after PTCD or further surgical re-anastomosis. Poor results were found in the 3 cases with hepatic artery occlusion that one expired after re-transplant and the other 2 required permanent biliary drainage.

CONCLUSION: Successful interventional radiographic approaches are effective for anastomotic biliary complications. For those patients coincidence with vascular complications, poor results were found even after surgical approach. However, palliative PTCD still keep patients survive to wait for re-transplantation.
**Liver Tuberculosis**

**CASE REPORT:** Our patient is a 54-year-old woman without systemic disease. She complained of right upper abdomen dull pain for weeks. Abdominal sonography disclosed an 8.5 cm tumor in right hepatic lobe. Elevated Alk-P and r-GT were noted. Liver function and serum AFP were within normal range. CT scan revealed a liver tumor in right lobe. Enhancement in arterial phase and washout in delayed phase were demonstrated. She underwent trisegmentectomy after admission. Pathology report revealed liver tuberculosis infection. The patient tolerated well after the surgery and was discharged five weeks later.

**DISCUSSION:** Tuberculosis has known to be an infectious disease cause by Mycobacterium tuberculosis. Although lung has known to be most frequently involved, a lot of articles clarify that tuberculosis could cause infection in extrapulmonary organs. Delayed diagnosis and treatment of tuberculosis may lead to morbidity and mortality. Familiarity with the diversity of radiological manifestation in tuberculosis infection and patient’s biochemical data can help radiologist making an early diagnosis.

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**Pseudoaneurysm of the Cystic Artery Secondary to Acute Cholecystitis Associated with Hemobilia**

**PURPOSE:** To present a rare case of pseudoaneurysm of the cystic artery secondary to acute cholecystitis.

**CASE REPORT:** A 40-year-old man was admitted to hospital presented with body weight loss in recent 6 months, and sudden onset of fever (38.5°C) with severe right upper quadrant pain and poor appetite for days. Abdominal computed tomography showed hemobilia in the common bile duct, hemorrhagic thickened gallbladder wall and pericholecystic hemorrhage in the precontrast images as well as an enhancing rounded pseudoaneurysm of the cystic artery after administration of contrast medium. The patient underwent emergency cholecystectomy and recovered uneventfully.

**DISCUSSION AND CONCLUSION:** Cystic artery pseudoaneurysm is a very rare entity. Patients usually present with hemobilia, rarely with upper gastrointestinal bleeding and hemoperitoneum. Most patients have a history of acute and/or chronic cholecystitis or erosion of the cystic artery after cholecystectomy. Optimal treatment is cholecystectomy plus ligation of the cystic artery and microcoil embolization of cystic artery pseudoaneurysms without the need for subsequent cholecystectomy has been reported rarely.
Malignant Fibrous Histiocytoma of Liver: CT and angiographic findings

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PURPOSE: To evaluate the CT and angiographic findings of malignant fibrous histiocytoma (MFH) of liver.

MATERIAL AND METHODS: Two rare cases of MFH of liver encountered at Shuang Ho Hospital during 2011 were reviewed for patient history, imaging findings, treatment and outcome. Relevant literature on this rare entity was also reviewed.

RESULTS: Both cases of MFH of liver showed an initial peripheral and gradual fill-in enhancement pattern, and central areas of necrosis on CT, and a peripheral or irregular hypervascular staining pattern on diagnostic angiography. One fulminant case died of recurrence within two months of surgery. The other case was disease-free with no recurrence at six months after surgical resection.

CONCLUSION: MFH of liver is a rare disease entity. A high clinical suspicion is needed for diagnosis due to ambiguous imaging characteristics.

Liver Hemangioma Complicating with Gas-Forming Abscess Formation: a rare case report

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PURPOSE: To present a rare case of liver hemangioma complicating with gas forming abscess formation.

CASE REPORT: One 41 y/o male with one 5.8x4 cm liver hemangioma was regularly followed in our GI OPD. The liver hemangioma showed typical peripheral nodular pattern enhancement and delayed central filling-in appearance in dynamic CT scan. During two years period, the hemangioma showed no change in serial CT images. The patient was admitted this time due to fever and jaundice. Laboratory examination showed WBC: 25560/ul, D/C: 88.5/4.5, total bilirubin: 3.97 mg/dl, and GOT/GPT level: 58/83 U/L. Under the impression of biliary tree infection, repeated CT was performed and showed bilateral intrahepatic ducts dilatation. Localized fluid and gas collection inside previous liver hemangioma indicating abscess formation was found. The peripheral nodular pattern enhancement in the lesion still preserved, but mimicked the ring-enhancement in typical liver abscess. Operation with liver segmentectomy was performed. Liver hemangioma complicating with abscess formation was confirmed.

CONCLUSION: Liver hemangioma complicating with abscess formation is very rare and may alter the typical hemangioma enhancement pattern. Without previous image, it would be difficult to make a correct diagnosis of the underlying lesion if the patient had clinical findings suggestive of an infectious process.
Liver Angiosarcoma Presenting as Budd-Chiari Syndrome in CT: a rare case report

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PURPOSE: To present a rare case of liver angiosarcoma with Budd-Chiari syndrome the initial presentation in CT scan image.

CASE REPORT: One 78 y/o female was admitted to our ward due to upper abdominal pain, abdominal fullness and poor appetite for 10 days. Abdominal sonography and panendoscopy study showed suspected hepatic and gastric tumor. Dynamic CT scan of whole abdomen showed diffuse heterogenous density and enhancement of liver parenchyma with mosaic pattern in portal venous phase image. The hepatic vein could not be well identified. One 2.3 cm well enhanced nodule with suspected hemangioma in right lobe of liver could be found. Hiatus hernia with one 4 cm mass lesion in gastric cardia region and right 8th rib bony destruction with one 3.6 cm soft tissue mass could be found. Under the impression malignant gastric GIST with bony metastasis and Budd-Chiari syndrome with unknown cause, the patient received gastric, right chest wall tumor excision and wedge liver biopsy. The pathological findings showed liver angiosarcoma with right 8th rib metastasis. Gastric tumor was just benign GIST.

CONCLUSION: Liver angiosarcoma presenting as Budd-Chiari syndrome in CT scan is very rare. Particular liver enhancement pattern in Budd-Chiari syndrome made the underlying liver lesion identification and preoperative diagnosis difficult. When facing Budd-Chiari syndrome at our daily practice, this unusual cause should be listed in the differential diagnosis.

Ketamine-Associated Ulcerative Cystitis: The Role of CT Urography

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PURPOSE: To invest the CT findings of ketamine-associated ulcerative cystitis (KAUC).

MATERIAL AND METHODS: We retrospectively reviewed the CT images of twenty-five patients diagnosed as KAUC in Taipei VGH from 2006 to 2011. The CT protocols varied, including unenhanced CT, two-phases (unenhanced and nephrographic phase) CT, three-phases CT (unenhanced, nephrographic phase and excretory phase) or split dose CT urography (CTU). The clinical information including age, duration of ketamine abuse, presenting symptoms and signs were recorded, as well as the CT findings.

RESULTS: In three patients with impaired renal function, only unenhanced CT was performed. One patient had two-phases CT, four had three-phases CT, and 17 had split dose CTU. The most predominant CT findings in KAUC were diffuse bladder wall thickening and small bladder volume. Other common findings included perivesical inflammation, ureteral wall thickening and hydronephrosis. Nephrographic phase (delay 90 second after contrast administration) could demonstrate the mucosal enhancement in both bladder and ureter and clearly delineate the extent of inflammation. However, vesico-vaginal (V-V) fistula, a rare while severe complication of KAUC, could be demonstrated by excretory phase only.

CONCLUSION: CT could demonstrate the extent and severity of KAUC. Nephrographic phase can provide most information for evaluating these patients, while excretory phase should be added in those with clinical suspicion of V-V fistula.
Evaluation of Short-term Drainage Prior to Percutaneous Ethanol Sclerotherapy in Simple Renal Cyst

 PURPOSE: To evaluate the efficacy and result of short-term drainage prior to the ethanol sclerotherapy in simple renal cyst.

 MATERIAL AND METHODS: Eleven cysts in 11 patients (39–77 years old) were enrolled into the study. Indications were soreness, flank pain, mass sensation, hypertension and hematuria. Mean follow-up period was 21.1 months. CT-guided drainages of renal cysts were performed one day prior to the sclerotherapy. After the cystogram was obtained in all cases, 95% ethanol with 30–40% of the original cyst volume was used as a sclerosing agent on an inpatient basis. Maximum volume of the injected ethanol was 200 ml. Success was defined as complete when there was total ablation and partial when there was a recurrence of less than half the original cyst volume with the resolution of symptoms. Failure was defined as the recurrence of more than half of cyst volume and/or persistent symptoms.

 RESULTS: Successful ablation was 100% with 8 patients (72.7%) complete ablation. Four (57%) and three (43%) showed free and improvement of soreness. In 9 patients with flank pain, 7 (78%) were free and 2 (22%) improved. Hypertension improvement was obtained in 2 patients (50%). Free in 1 (50%) and improvement in 1 (50%) of total 2 hematuria patients were found. Second intervention was required in 2 patients (18%). No major complication.

 CONCLUSION: Percutaneous ethanol sclerotherapy of simple renal cyst is a safe, effective and minimally invasive procedure. Short-term drainage prior to the sclerotherapy can increase the successful rate.

The Application of Diffusion Weighted MR Imaging in Diagnosing T Stage of Urinary Bladder Cancer

 PURPOSE: Most of patients with urinary bladder cancer in Taiwan associate with uremia and these patients is contraindication in gadolinium injection. This study aims to prospectively evaluate the use of diffusion-weighted (DW) magnetic resonance (MR) imaging to determine the T stage of bladder cancer without the use of gadolinium.

 MATERIAL AND METHODS: This study was approved by the local institutional review board. All patients gave written informed consent. Twenty patients with a total of 44 bladder tumors underwent MR imaging that included DW imaging. Two radiologists interpreted two image sets (ie, T1 and T2-weighted images, T1 and T2-weighted plus DW images). The staging criteria used on T2-weighted images were as usual. The staging criteria for DW images were following Takeuchi et al’s study. The McNemar test was used to examine differences in accuracy, sensitivity, and specificity. Differences in the performance were analyzed by comparing the areas under the receiver operating characteristic curves (Az values).

 RESULTS: The overall accuracy of T stage diagnosis was 67% for T2-weighted images alone, 88% for T2-weighted plus DW images. The overall accuracy, specificity, and Az for diagnosing T2 or higher stages were significantly improved by adding DW images (P < 0.01).

 CONCLUSION: T2-weighted plus DW images provided useful information for evaluating the T stage of bladder cancer.
Abdominal CT Findings in CAPD Patient

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PURPOSE: Our purpose is to find out common and incidental abnormal abdominal CT findings in CAPD patients.

MATERIALS AND METHODS: By using key word “CAPD” to search for CT reports from our RIS database from 2002/10 to 2011/10. Totally, 309 cases are collected but 83 cases are excluded due to non-abdominal CT study. Within these remaining 226 cases, there are only 139 patients, 67 males and 72 females, with age ranging from 11 to 81 years old (52.6 ± 15.8 years). Forty-three patients repeated CT study more than one time. We analyzed these cases with common abnormal abdominal CT findings in CAPD patients, such as: bowel wall thickening or thickening or increased enhancement of peritoneum or mesentery. Other incidental findings are also recorded.

RESULTS: Within these 139 cases, there are 8 patients (5.8%) with bowel wall thickening, 57 patients (41.0%) with thickening or increased enhancement of peritoneum, 6 patients (4.3%) with calcification over peritoneum, 3 patients (2.2%) with colonic diverticulosis, but none of them (0%) with thrombosis of SMV or PV. Other recorded incidental CAPD-related complicating abdominal CT findings include bowel adhesion, incisional hernia and encapsulated sclerosing peritonitis.

CONCLUSION: Prolonged usage of CAPD will mostly affect peritoneum and/or mesentery as consequence of thickening and/or increased enhancement.

The Sources of Pseudo-Mass of Kidney on Sonography

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PURPOSE: To evaluate the sources of the pseudo-mass of kidney.

MATERIALS AND METHODS: From January 2005 through November 2011, one hundred and sixty-two consecutive patients with pseudo-mass of kidney had been shown on initial sonography but not shown on immediately following sonography or CT scan. Retrospect analysis of the initial sonographic findings of those patients and compared with following sonography or CT scan were performed by two experienced radiologist.

RESULTS: No mass was demonstrated on following sonography or CT scan in all one hundred and sixty-two consecutive cases. The sources of pseudo-mass of kidney include malrotation, junctional parenchyma, column of Berti, Dromedary hump, hypoechoic mid-pole, lipomatosis of renal sinus. The effect of miss-interpretation of pseudo-mass could be multiple origins.

CONCLUSIONS: Recognizing the sources of the pseudo-mass of kidney is important to prevent significant error in diagnosis during ultrasound scanning and film reading.
Birt-Hogg-Dube Syndrome: a case report

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Birt-Hogg-Dube syndrome is a genetic disorder that inherited in an autosomal dominant pattern. The disorder has been reported in just more than 100 families worldwide. The clinical presentation involves susceptibility to renal cancer, renal and pulmonary cysts, and noncancerous tumors of the hair follicles.

This is a case of a 45-year-old female with a past history of recurrent pneumothorax, and bilateral renal stone status post ESWL twice in 2002 and 2006, and was regularly followed up at urology OPD. In 2011, a 2.2 cm nodular lesion was noted in right kidney by regular sonography follow-up. Further chest and abdominal CT study revealed three enhancing mass lesions at bilateral kidneys and emphysematous change, blebs formation, and loculated pneumothorax at bilateral lungs. She received bilateral partial nephrectomy in 2011, and the pathology report revealed chromophobe cell type renal cell carcinoma. In addition, white papules were noted in her face, skin excision was performed and the pathology report revealed dermatofibroma.

Birt-Hogg-Dube Syndrome is caused by mutations in the FLCN gene, located on the short arm of chromosome 17; the FLCN gene makes folliculin protein which is a tumor suppressor. The clinical trials include renal cancer, pulmonary cysts with recurrent pneumothorax, and noncancerous tumors of the hair follicles.

An Unusual Case of Right Retroperitoneal Primitive Neuroectodermal Tumor with Initial Presentation as a Retroperitoneal Hematoma: a case report

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CASE REPORT: A 46-year-old man with hypertension suffered from sudden onset of right flank pain and cold sweating while playing golf. Computed tomography revealed a right retroperitoneal heterogeneous mass with displacement of right kidney and adrenal gland. Angiomyolipoma (AML) with bleeding was suspected initially. However, about 3 months later, MRI showed a huge right retroperitoneal tumor with high signal intensity components at T1WI and T2WI. After intravenous contrast injection, mildly heterogeneous enhancement of this lesion was found accompanying with thrombus within right renal vein and multiple enhanced foci at vertebrae and pelvic bone respectively. Then he accepted right nephrectomy and adrenalectomy, venous thrombectomy. The pathological exam revealed a retroperitoneal primitive neuroectodermal tumor (PNET) with invasion of right kidney and adrenal gland. Bony metastases were also confirmed. He accepted chemotherapy for further treatment.

DISCUSSION: Although the imaging characteristics of PNET are nonspecific, it should be differentiated from AML, renal cell carcinoma or other sarcoma when a retroperitoneal tumor is disclosed. Tissue proof is necessary for further treatment.
Giant Diverticulum Mimic Duplicated Urinary Bladder: an interest case

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PURPOSE: To demonstrate an interest case of giant diverticulum arise from the urinary bladder which look like a duplicated bladder

CASE REPORT: An 81-years-old male patient admitted to the emergency room due to dysuria and abdominal distension. Low abdominal mass was suspected with physical examination. CT scan of abdomen disclosed abdominal distension due to two huge cystic masses arise from pelvic cavity. Detail inspection of the images showed that the right side cystic mass was the distended urinary bladder with hypertrophic prostate which causing urinary bladder outlet obstruction. The left side cystic mass was much larger than the urinary bladder. A channel between the cystic lesions with the urinary bladder depicted which flavoured a huge diverticulum arised at left sidewall of the urinary bladder. Left hydronephrosis also noted probably due to mass effect with left distal ureter compression.

RESULT: After on foley, the sign and symptom subside. Due to old age, the patient hesitated with operation and asked for discharge.

DISCUSSION: Diverticular disease is rather common with GI tract or GU tract. Chronic urinary bladder outlet obstruction which causing chronic cystitis and bladder wall thickening may lead to bladder diverticulum. They are usually small in size. Such a huge diverticulum with size larger than the urinary bladder is rare. We like to show the interest images.

Ureteroarterial Fistula Presented with Intermittent Bleeding from Percutaneous Nephrostomy

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CASE REPORT: A case of ureteroarterial fistula presented with delayed gross hematuria from PCN is reported. This 63-year-old female was a case of cervical cancer underwent surgery and radiotherapy 10 years ago. Bilateral ureteral stents were inserted to treat ureteral stricture for 9 years and was then changed to PCN. The first episode of gross hematuria from PCN occurred one month after the PCN placement. Emergent renal arteriogram was performed and showed no bleeding source. Then, she received contrast-enhanced abdominal CT after repeated episodes of gross hematuria from PCN for 4 months. CT showed common iliac artery pseudoaneurysm complicated with a ueteroarterial fistula. She received iliac artery stent placement and the gross hematuria resolves.

DISCUSSION AND CONCLUSION: Ureteroarterial fistula is a rare condition of massive hematuria and usually associated with chronic ureteral stent, previous pelvic surgery and radiotherapy. Bleeding from PCN is a rare presentation of ureteroarterial fistula and may lead to a serious consequence. In the presence of intermittent bleeding from PCN, contrast enhanced CT should be first performed to detect the bleeding source. Furthermore, an abdominal aortogram is recommended if renal arteriogram does not show the bleeding source and strong suspicious for arterial bleeding exist.
Renal Angiomyolipoma with Pseudoaneurysm Formation and Inferior Vena Cava Thrombus: an unusual case report

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Abstract Renal angiomyolipoma (AML) is known as a benign mesenchymal tumor, composed of blood vessels, smooth muscle and adipose tissue. Most of AMLs are found in asymptomatic patients as incidental findings on computed tomography (CT) or other imaging study. Usually AMLs have a benign slow-growing course without local invasion or complication. However, rare cases of renal AML have been reported with complications such as tumor thrombus extension to inferior vena cava (IVC) or hemorrhagic tumor rupture. There has been no report of AML with multiple coexistent complications yet. We report a complicated case of renal AML with CT and angiography evidence of hemorrhagic pseudoaneurysm formation and IVC thrombus.

Computed Tomography Imaging Features of Acute Pelvic Pain Related to Benign Tubo-ovarian Disorders: three year Experience at a Regional Hospital

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PURPOSE: To evaluate the possible cause of acute pelvic pain related to benign tubo-ovarian disorders, and to analyze the characteristic computed tomography (CT) imaging findings for pelvic inflammatory disease, ovarian tumor or cyst bleeding, tubo-ovarian lesions rupture complicated with hemoperitoneum, and variable tumor torsion or progression to hemorrhagic infarction.

MATERIAL AND METHODS: From Aug 2008 to Oct 2011, we found that 14 female patients presented with acute pelvic pain were related to benign tubo-ovarian disorders. They included ovary cyst rupture (n = 4), ectopic pregnancy with fallopian tube rupture (n = 1), ovarian teratoma torsion (n = 2), teratoma rupture (n = 1), giant endometrioma bleeding (n = 1) and pelvic inflammatory disease (n = 5). CT scan was performed for all 14 patients. And, CT imaging features were analyzed for the all patients.

RESULTS: Ruptured ovarian cyst or ectopic pregnancy is complicated with hemoperitoneum; which is life threatening. CT imaging features for active bleeding are seen as contrast medium extra-vasation and pooling of contrast-enhanced blood at the delayed imaging. Torsion of ovarian tumors exhibit thickened or hemorrhagic fallopian tube adjacent to the eccentric thickened ovarian tumor walls. Teratoma rupture can cause fat-contaminating chemical peritonitis. Pelvic inflammatory diseases included pyo-salpinx and tubo-ovarian abscess; which is detected as tubular dilated fallopian tube or rim-enhanced abscess; associated with adjacent peritonitis. Recognition of these characteristic CT imaging findings can provide early and accurate diagnosis; in order to prevent further progression to hypovolemic shock or peritonitis with sepsis.

CONCLUSION: Benign tubo-ovarian diseases should be differentiated from appendicitis, diverticulitis, enterocolitis, pyelonephritis or other etiology in female patients with acute pelvic pain. Pre-operative CT study can provide accurate diagnosis and save the ovary.
Unusual Finding of Mature Cystic Teratoma with Multiple Mobile Spherules

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Reng-Hong Wu
Wen-Sheng Tzeng

Purpose: To describe a case of mature cystic teratoma with multiple mobile spherules and its imaging findings.

Case Presentation: A 73-year-old woman presented with a history of constipation and abdominal distension for months. Physical examination revealed a palpable mass without tenderness over right lower abdomen. All laboratory findings were normal including serum tumor markers, namely CA 125 and CA 19-9. Sonography and MRI showed a large, well-defined, cystic mass containing multiple spherical globules in pelvis. Laparotomy revealed a large cystic tumor contained multiple various sized lipid globules of the right ovary, which was confirmed to be benign mature cystic teratoma in pathology.

Discussion: Unusual associated findings of mature cystic teratoma may result in occasional diagnostic difficulty. To our knowledge, only a small number of cases of cystic teratoma with multiple mobile spherules or globules have been reported. Among these cases, only three of them are found in postmenopausal women. The appearance of multiple spherules floating within a pelvic cystic tumor has not been found in other ovarian tumors; therefore this feature is pathognomonic for a dermoid cyst. Also, all previously reported patients and our’s had relatively large tumors, none were malignant.

Percutaneous Biliary Drainage in the Management of Bile Leakage after Living Donor Liver Transplantation

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Rhun-Chun Lee

Purpose: To evaluate the safety and efficacy of percutaneous biliary drainage (PTBD) in the management of bile leakage after living donor liver transplantation.

Material and Methods: From October 2004 to October 2011, 129 patients (87 men and 42 women; age from 3 months to 70 year-old) had received living donor liver transplantation in TPEVGH. 17 patients died in 1 month after operations were excluded. Totally 112 patients’ medical records were reviewed to analyze the outcome of bile leakage.

Results: Totally, 37 patients had bile leakage after operation. Five patients recovered spontaneously. One needed reoperation for peritoneal toilet and drainage, Four cured by sonoguide drainage only. Eighteen patients received endoscopy retrograde cholangiopancreatography (ERCP) with nasobiliary drainage or stenting. Only 4 patients recovered by ERCP only, while 14 patients needed further PTBD to resolve bile leakage. Eight patients received PTBD only to resolve bile leakage. One 3 month female baby recovered after percutaneous stenting through the Y-limb of hepaticojunostomy. No major complication happened in PTBD procedure.

Conclusion: PTBD is a safe and effective method to treat bile leakage after living donor liver transplantation.
Percutaneous Transabdominal Radiofrequency Ablation for the Treatment of Hepatocellular Carcinoma near The Diaphragm

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PURPOSE: To evaluate the effectiveness of and complications resulting from percutaneous transabdominal radio-frequency ablation (RFA) for treatment of hepatocellular carcinoma (HCC) near the diaphragm.

MATERIALS AND METHODS: Ninety-two patients (68 males & 24 females, age range 46-88 years, mean 68) with 102 lesions close to the diaphragm due to HCC were treated with RFA between February 2003 and February 2011. Tumor size ranged from 1.2 to 5cm in greatest dimension with a mean of 2.8cm. RFA was performed with one to six ablations each patient respectively, using a cooled-tip RF needle (Valleylab, Boulder, Colo) under CT-guidance and pain control with palm-controlled anesthesia. All patients were followed with biphasic helical computed tomography (CT) immediately after RFA and every 2-4 months.

RESULTS: Seventy-eight patients (88 of 102 lesions, 86%) had complete tumor necrosis demonstrated on follow-up biphasic spiral CT studies with tumor markers monitoring. All patients were successfully treated with CT-guidance only except one needed artificial pneumohydrothorax to avoid pulmonary injury. No procedure-related major complication was encountered during the procedure.

CONCLUSION: For the treatment of HCC near the diaphragm, percutaneous transabdominal RFA under CT-guidance is a safe and effective method no matter how close the lesion to the diaphragm is. The long term result of the lesions near the diaphragm is comparative to the lesions in the other sites of the liver.

Evaluate the Most Feasible Hand-Made CT-Guide Markers By Using Different Daily Raw Materials


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The purpose of this study is to evaluate our daily raw materials to make CT markers and to compare the radiating artefacts produced by those materials. We us different self-made markers under the condition of lung window (W: 1800 / L: -200); soft tissue window (W: 400 / L: 35); Bone window (W: 2000 / L: 400) to compare CT artefacts procedured by them in order to find the one with least artefact. The result shows the CT marks made by needle, iron wire, and guide-wires had the least artefacts.
Radiofrequency Ablation of Hepatocellular Carcinoma under CT Guidance: long term result at TCVGH

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PURPOSE: To determine the therapeutic effectiveness and complication of computed tomography (CT)-guided radiofrequency ablation (RFA) for hepatocelluar carcinomas (HCCs).

MATERIAL AND METHODS: From May 2003 to May 2011, CT-guided RF ablation with use of internally cooled electrodes was performed in 208 patients (130 men and 78 women) with 369 HCCs (diameter range, 10-80 mm) in 384 sessions. The efficacy of RFA was evaluated using contrast-enhanced dynamic CT 2 months after treatment and then every 3-4 months. Two radiologists retrospectively evaluated in consensus the presence or absence of complications and local tumor recurrence as well as the survival rate and the complete necrosis rate at CT performed 5-6 months after RF ablation.

RESULTS: Both major and minor complications of CT-guided RFA for HCCs immediately after RFA were 1.8%. Complete necrosis was seen in 91% with diameters of 3.0 cm or less and 63.6% with diameters more than 3.0 cm. The survival rates at 1, 3 and 5 years were 93.3%, 67.4% and 49.2%, respectively, while the local tumor recurrence rates at 1 and 3 years were 2.9% and 11.8%.

CONCLUSION: CT-guided percutaneous RFA is effective and safe technique for the treatment of unresectable HCCs.

Concomitant Computed Tomography Angiography and Computed Tomography Venography in Evaluation of Iliac Vein Compression Syndrome

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PURPOSE: Due to the limitations of current imaging modalities, this study aimed to develop a new technique in evaluation of iliac vein compression syndrome (IVCS) with concomitant iliac CT angiography (CTA) and CT venography (CTV). We investigated a new technique that uses direct injection of contrast medium into the bilateral external iliac vasculature in a timely fashion.

MATERIALS AND METHODS: A case presentation of IVCS with a step-by-step process of the DSA and MDCT protocol is provided. Ascending venography of common iliac vein was obtained after successful vascular access through right femoral approach. A nondiluted contrast agent and diluted contrast agent was directly injected at bilateral common iliac artery in a timely sequence through a sheath and a catheter for concomitant computed tomography angiography (CTA) and computed tomography venography (CTV).

RESULTS: The study was technically successful and the exact compression site common iliac vein by the common iliac artery was demonstrated with the degree of 50%. The stereotactic anatomical detail was obtained and was superior to the anteroposterior projection displayed on 2D images. Arterial and venous structures can be demonstrated simultaneously on concomitant CTA and CTV.

CONCLUSION: Concomitant CTA and CTV is a feasible new 3D technique to demonstrate comprehensible anatomical details for pretreatment evaluation of IVCS.
**Percutaneous Drainage of Acute Pancreatitis (AP)**

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**PURPOSE:** Acute pancreatitis (AP) is classified as (a) Mild: edematous and interstitial change, and (b) Severe: Necrotizing with pancreatic necrosis, peripancreatic tissue or both. Balthazar et al had been reported to use CT severity index (CTSI) to predict mortality of AP patient. Our purpose is to evaluate the outcome of AP patient after radiological intervention treatment by CTSI.

**MATERIALS AND METHODS:** We retrospectively review from our RIS database in a period from 2001/06 to 2011/05 of patient having CT examination under the impression of AP and is being treated with percutaneous drainage in our department. Using CTSI definition, we divided these cases into M-group (Mild/Moderate, <7) and S-group (Severe, ≥7). The hospitalized day, interval period (days) of treatment and any debridement operation were recorded. The outcome is marked as “progressive” (increasing in CTSI value on following CT), “progressive and improve” and “equal or improve”. Other complication treatment such as embolization; abscess other than pancreatic or retroperitoneal location; loss of CT follow-up or PTCD treatment are excluded from our study. Finally, total twenty-six cases are collected. They are 21 male and 5 female patients, with average age 49.7 ± 18.4 years old.

**RESULTS:** Most of the cause of AP is alcoholic (50%) and the 2nd one is due to biliary problem (23%). Idiopathic reason is 7.7%. S-group is having a between total outcome than the M-group. The interval (days) of treatment in S-group is shorter (12 days/case). The most complications are bleeding, acute renal failure, respiratory failure or pneumonia.

**CONCLUSION:** The more severity group of AP in CTSI may have a better outcome if appropriate approach or guideline is being followed.

**Radiofrequency Ablation (RFA) after Transheaptic Artery Embolization (TAE) Using Microsphere for Large Hepatocellular Carcinoma**

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**PURPOSE:** To evaluate the effectiveness of treatment for large hepatocellular carcinoma combined RFA and TAE using microsphere.

**MATERIALS AND METHODS:** Prospectively, 7 patients (3 males, 4 females), aged 43-83 (mean: 69). Total 7 tumors treated with tumor size: 4-7.5cm (mean 5.5cm). 3 of the 7 patients without previous treatment and 4 of the patient had previous TAE or RFA. Bland TAE was performed using embosphere microsphere (Biosphere Medical) 100-300 μm and 300-500 μm and gelfoam pieces. RFA was performed after TAE the same day under IV anesthesia by anesthesiologist using Cool-Tip non-expandable needle (Codivien) Follow up period from 3 to 10 months using dynamic CT or MRI.

**RESULTS:** All patients are survival until now (4-14 months mean: 11 months) with disease free 3-10 months (mean: 4.4 months) and 3 of the patient did not achieve disease free at all. Those patients without previous treatment got more disease free interval than previous treated (mean: 7:2.5 months).

**CONCLUSION:** (1) RFA after TAE using microsphere may have good disease free control for large hepatocellular carcinoma. (2) Easily detectable tumor using microsphere than lipiodol under sonography. (3) TAE using microsphere may enhance the hypoxic effect to the tumor and thermal efficiency of RFA. (4) Probably new cases are more effective than the previous treated (TAE, PEIT, or RFA), large case numbers are needed.
Prognostic Analysis of Transarterial Embolization for Hepatocellular Carcinoma with Hyperbilirubinemia

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PURPOSE: Hyperbilirubinemia is a relative contraindication of transarterial chemoembolization (TACE) in treatment of hepatocellular carcinoma (HCC). The purpose is to evaluate the outcome of TACE for HCC with high bilirubin level.

MATERIAL AND METHODS: From October 2009 to September 2011, total 92 patients with HCCs underwent 155 times of TACEs. Six patients received 9 times of TACEs while serum bilirubin level over 3mg/dl. The prognosis is reviewed.

RESULTS: Two patients are alive. One presents small HCCs. 3 times of superselective TACE were done with stable follow-up. Graduate enlargement of the HCCs in the other case, even 7 times of TACE. Three patients are expired about 6 months later since the date of TAE with serum bilirubin level over 3mg/dl. Two of the three cases present tumoral occupations of entire right liver, and received 3 and 2 times of TACE respectively. The other one with multiple HCCs underwent 3 times of TACE with poor prognosis due to poor follow-up. One patient died in one month. Huge tumor with portal vein thrombosis is noted on CT.

CONCLUSION: TACE is an important method of HCC treatment. HCC with hyperbilirubinemia can be treated in superselective TACE to prolong the survival dates. Keep in mind that TACE is harmful for huge HCC with portal vein thrombosis.

Transcatheter Arterial Embolization for Ruptured Hepatocellular Carcinoma

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OBJECTIVES: To analyze the prognostic indicators of patients with spontaneous ruptured hepatocellular carcinoma treated with transcatheter arterial embolization (TAE).

MATERIALS AND METHODS: From Jan. 2007 to Oct. 2011, a total of 69 patients (male: female = 46:23, age ranged from 27 to 89 years old, mean age of 66 years old) who had been diagnosed with spontaneous ruptured hepatocellular carcinoma managed by TAE for hemostasis were enrolled for study. TAE was carried out by using Gelfoms mixed with Lipiodol through superselection of tumor vessels until disappearance of tumor stains or extravasation of contrast medium. Hospital records, laboratory data, and imaging findings were reviewed and analyzed.

RESULTS: In our study, early mortality rate (within 30 days after rupture) was 42.0% (n = 29). Factors that were associated with early mortality rate were low hemoglobin, elevated bilirubin, raised serum creatinine at presentation, presence of main portal vein thrombosis, tumor volume over 50%, and diffuse infiltrative HCC on imaging findings. TAE without chemotherapeutic agent could also achieve good disease control and prognosis.

CONCLUSION: Transcatheter arterial embolization (TAE) is effective for hemostasis and should be considered in the initial management for patients with ruptured HCC. Poor liver function reserve, presence of main portal vein thrombosis and diffuse infiltrative HCC on imaging findings may predict poor prognosis and early mortality.
Coil migration is a rare complication after transarterial embolization. We describe a patient with iatrogenic pseudoaneurysm receiving coil embolization complicated with coil migration to bile duct with stone formation. Presently, there are only two reports describing the same condition.

An 80 year-old man suffered from epigastralgia for years. The abdomen CT revealed CBD stones with dilated bile duct. He received percutaneous transhepatic biliary drainage (PTBD) for infection control and jaundice relief. After improvement of infection, choledocholithotomy and cholecystectomy was performed. However, intermittent hemobilia was noted for weeks after the operation. An angiography was arranged which revealed the pseudoaneurysm of right hepatic artery. Subsequently, transarterial coil embolization was performed successfully. Two years later, this patient suffered from epigastralgia again and CBD stones were noted on CT scan. The surgeon performed choledocholithotomy on him and found the metallic wire in the CBD. During extracting the coil wire, mild hemobilia was noted. Then, the coil was cut off and no more hemorrhage was noted. There were multiple stones found to be attached to the coil wire.

After reviewing the recent images of the patient, we found the shape and location of coils were different from that of the initial placement. A part of coils migrated caudally. Based on this instance and the literature evidence, we believed that proximal and distal embolization was superior to the packing the pseudoaneurysm in avoiding coil migration in bile duct and subsequently, stone formation, especially in patients presenting with hemobilia implying the existing communication of bile duct and hepatic artery.

We present two cases of traumatic carotid-cavernous fistula (TCCF) (a 35 years-old male and a 58 years-old female), which had rapidly developed TCCFs. In the first case, he got TCCF one day later of the head injury, and the emergent CT discovered skull base fracture and diffuse subarachnoid hemorrhage. The endovascular therapy of this early-developed TCCF was performed 8 days later. Unfortunately, he suffered from consciousness loss and the immediate CT showed diffuse SAH and brain swelling on next day and he was AAD 3 days later. The 2nd case was a 58 years-old female who suffered from head injury due to a traffic accident. Brain CT showed ICH, SAH and skull bone fracture. 14 days later, she presented with left eyeball protrusion and red eye, TCCF was suspected and then arranged CT angiography. The CT angiography was confirmed left TCCF but persistent edema and hemorrhage in left frontotemporal lobes. The endovascular therapy was hold and was arranged one month later for diminishing brain edema and hemorrhage. The embolization was performed after 48 days of head injury, the pre-TAE angiogram showed disappearance of the TCCF and she was at OPD follow-up.

The standard treatment of carotid cavernous fistula is endovascular embolization. The rapid development of TCCF may imply extensive vascular injury, which the aggressive endovascular embolization may induce reinjury of the damaged vessel.
Endovascular Treatment of a Common Femoral Artery Pseudoaneurysm after Total Hip Arthroplasty: a case report of transarterial embolization with balloon assistance

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PURPOSE: Iatrogenic pseudoaneurysm of femoral artery is one of the rare complications of orthopedic procedures. The pseudoaneurysms may occur at popliteal arteries, iliac arteries, common and superficial femoral arteries. Ruptured pseudoaneurysm may necessitate interventions including surgical or radiological treatment. Here we present a case of femoral artery pseudoaneurysm happened after total hip-arthroplasty. We performed transarterial embolization (TAE) to the pseudoaneurysm with balloon assistance to the patient successfully.

CASE REPORT: Here we present a case of 55-year-old male with history of ankylosing spondylitis, bilateral hip osteoarthritis, received right total hip arthroplasty and was found to have a common femoral artery pseudoaneurysm near operative site. We tried transarterial embolization (TAE) with glue to the pseudoaneurysm. But post-TAE angiography shows glue defects of the pseudoaneurysm, representative of a residual pseudoaneurysm. We tried balloon occlusion for the residual pseudoaneurysm successfully.

CONCLUSION: This presented case demonstrated a technique to perform TAE for pseudoaneurysm of lower extremities. Balloon occlusion for arteries of lower extremities can be performed for adequate operation time due to long ischemia tolerance of lower extremities. Therefore a pseudoaneurysm of the lower extremities can first be treated with TAE. And a residual pseudoaneurysm can then be treated with balloon occlusion.

Successful Cryoablation for Metastatic Diaphragmatic Thymoma: a case report

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Ablating lesion adjacent to diaphragm is risky and can cause diaphragm perforation associated with abdominal organ herniation. In the case report, we report a successful cryoablation of a 58-year-old man with metastatic diaphragmatic thymoma without diaphragmatic perforation. This is the first report of tumor ablation of the lesion on diaphragm. We also demonstrate the capability of the cryoablation of treating tumor with complex irregular shape.
Small renal tumors are being more incidentally found due to the advanced use of high resolution, cross sectional imaging modalities. Besides surgery, other nephron-sparing treatments, such as radiofrequency ablation and cryoablation, are more widely been accepted as an alternative treatment option for small incidental renal tumor. Yet the long-term efficacy of these kind of local treatment needs more to be evaluated. Previous results showed more local tumor progression of renal cell carcinoma treated by RFA than those treated by cryoablation. Therefore cryoablation might be a better choice of local treatment for renal tumor and still need more to be assessed. Here we report our initial experience of CT guided percutaneous cryoablation for a patient with an incidentally found small renal tumor. The advantage and possible complications of cryoablation for renal tumor are being discussed.

Purpose: The hepatic artery is the second most common location of splanchnic artery aneurysms. We report six cases of hepatic artery aneurysm treated successfully by transcatheter arterial embolization (TAE).

Cases Report:
Patient 1: A 33-year-old man had a pseudoaneurysm in right hepatic artery after percutaneous transhepatic cholangiography and drainage procedure (PTCD).
Patient 2: A 67-year-old man had cholangitis and an aneurysm from proper hepatic artery.
Patient 3: A 77-year-old man had an aneurysmal lesion from common hepatic artery with rupture.
Patient 4: A 55-year-old man had hemobilia after PTCD. The diagnostic digital subtraction angiogram (DSA) showed a pseudoaneurysm over replaced right hepatic artery.
Patient 5: A 58-year-old man received Whipple operation for Ampulla Vater cancer. The DSA showed a pseudoaneurysm over right hepatic artery near the stump of cystic artery.
Patient 6: A 90-year-old woman received percutaneous transhepatic cholecystomy drainage. The abdominal computed tomography (CT) showed a small pseudoaneurysm over right lobe of liver.

TAE was performed with 4F catheter with deployment of Gelfoam, Gianturco steel coils (Cook, Brisbane, Australia) and N-butyl-cyano-acrylate glue alone or in combination after the diagnostic DSA. After the embolization, all patients had immediate DSA and followed with helical CT periodically.

Results: All six patients (6 of 6 lesions, 100%) had complete occlusion of the pseudoaneurysms demonstrated on DSA immediately after embolization and follow-up biphasic spiral CT although one patient had recanalization of aneurysm that required additional TAE. No major complications occurred during the procedures.

Conclusion: TAE is an effective and safe means of treating aneurysms involving hepatic artery.
Hirschsprung Disease and Contrast Enema: The Diagnostic Values of a Simplified Contrast Enema

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PURPOSE: Hirschsprung disease is a common malady in children and contrast enema is a popular diagnostic study for Hirschsprung disease. We want to know whether a simplified contrast enema can decrease the radiation time and keep an adequate diagnostic sensitivity and specificity as compared with a conventional contrast enema.

MATERIAL AND METHODS: We continuously collect 198 children who received contrast enema for suspicion of Hirschsprung disease between January 2009 and December 2010 in our hospital. Eighteen children are excluded due to incomplete study, having abdominal operation before, or not first time to receive this study. The images of contrast enema of the rest 180 children are reviewed. The procedure time is recorded in 15 cases and rectal suction biopsy is conducted in 45 cases. All the results are analyzed.

RESULTS: The correlation of the results between conventional and simplified contrast enema is markedly significant (p<0.001). The radiation time of simplified contrast enema is about 33.87% of that of conventional contrast enema.

CONCLUSION: Simplified contrast enema retains a similar diagnostic value as compared with conventional contrast enema but significantly decreases the radiation time and dosage.
Prenatal MRI of an Axillo-thoraco-abdominal Wall Lymphangioma

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PURPOSE: To present the prenatal MRI of an axillo-thoraco-abdominal wall lymphangioma at 22 weeks of gestational age.

CASE REPORT: A 33-year-old woman at 22 weeks' gestation was referred to us for evaluation of a fetal thoraco-abdominal wall cystic mass detected during prenatal ultrasound. MRI revealed a large cystic mass extending from the left upper arm, left thoracic wall, to the left abdominal wall. The parents decided to terminate the pregnancy and the diagnosis of an axillo-thoraco-abdominal wall lymphangioma was confirmed at autopsy.

DISCUSSION AND CONCLUSION: Lymphangiomas have been described extensively in the literature but only a few reports of fetal lymphangioma diagnosed using MRI. The cyst usually results from an absence or an inefficient connection between the lymphatic and venous systems. About 75% of lymphangiomas occur in the nuchal region, 20% in the axillary region, and 5% in various parts of the body including the retroperitoneum, mediastinum, mesentery, spleen, colon, bones, groin, trunk, extremities, larynx, mouth, tongue, and scrotum. Ultrasound is the primary imaging modality for prenatal evaluation of the lymphangiomas in the midtrimester of pregnancy, fetal MRI can be a helpful complementary tool to ultrasound in the imaging and differential diagnosis of this type of malformation and also evaluate the extent and the tissue characteristics.

Acquired Duodenal Diverticulitis in a Child - A Rare Cause of Intramural Duodenal Hematoma: a case report

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Intramural duodenal hematoma is a rare cause of upper gastrointestinal tract obstruction. Most common causes are blunt abdominal trauma or coagulation disorders. No prior case of acquired duodenal diverticulitis presenting with duodenal intramural hematoma causing upper gastrointestinal tract obstruction in children has been reported in the English literature. We present a case of a 4-year-old child who presented with an acute upper gastrointestinal obstruction from an acute duodenal intramural hematoma caused by an acquired duodenal diverticulitis.
Eyelid Rhabdomyosarcoma in a Neonate

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We report a newborn with an alveolar rhabdomyosarcoma of the right upper eyelid with aggressive tumor growth in a short period and soon with distant metastases in his chest wall and the liver. Serial MRI examinations of the orbits were performed as well as CT of the chest and abdomen. The lesion was treated by chemotherapy, surgery, and radiation therapy and experienced a very poor response. Patient expired six months later from multiple metastases.

CONCLUSION: Rhabdomyosarcoma can present in the orbit, eyelid, conjunctiva, and uveal tract. It is important to recognize the disease pattern and to initiate a prompt ophthalmologic evaluation and treatment.

Primary Multifocal Osseous Lymphoma: a rare case report

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Primary multifocal osseous lymphoma is a rare subset of primary bone lymphoma presenting in multifocal involvement, most commonly involved distal femur and proximal tibia. We report an 11-year-old girl presenting with severe hip pain for days. No radiographic abnormalities can be identified in the pelvic plain film. Pelvic MRI reveals multi-focal bone marrow signal changes affecting metadiaphysis of right femur as well as right iliac bone, with low signal in T1W and mild high signal in T2W study. Lymphoma is suspected and proved by open biopsy. Whole body bone scan followed in half year later shows neither newly developed lesion nor distant lymph nodes involvement. Primary multifocal osseous lymphoma is established.
Diabetic Ketoacidosis (DKA) with Moyamoya Disease: a case report

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PURPOSE: We present a case of diabetic ketoacidosis (DKA) with moyamoya disease.

CASE REPORT: A 9-year-old healthy girl in the past without medical history manifested with sudden syncope and conscious drowsy. DKA was diagnosed at the Emergency Room due to hyperglycemia (blood sugar 736mg/dl). Brain CT, MRI and conventional cerebral angiography were studied.

RESULTS: Brain CT shows a small cerebral infarct at right frontal white matter. MRI reveals cytotoxic edema with water restrictions at bilateral frontal lobes and MRA demonstrates occlusion at bilateral middle cerebral arteries. Angiograms show occlusions of bilateral middle cerebral artery and “puff-of-smoke” collaterals.

CONCLUSION: DKA with moyamoya disease is rare. Moyamoya disease should be keep in mind when the presence of pediatric stroke. Conventional cerebral angiography is necessary to diagnose moyamoya disease.

Percutanous Transperitoneal Gallbladder drainage for Cholecystitis: Is It Safe?

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PURPOSE: Evaluation of the safety and efficacy of transperitoneal techniques of percutaneous cholecystostomy drainage for cholecystitis.

MATERIAL AND METHODS: From Dec. 2010 to Nov. 2011, there were 356 successful attempts of image-guided percutaneous gallbladder drainage for cholecystitis. Only 30 (8.4%) cases (16 men and 14 women) were done with transperitoneal approach. The transperitoneal cholecystostomy is termed as direct puncture to the gall bladder without penetrating the liver. Desmographic information, laboratory data, clinical recorded and further image follow-up were reviewed. The statistic data was then compared with reviewed literature within 10 years on complication of percutaneous cholecystostomy to find out safety and efficacy of PTGBD with transperitoneal techniques.

RESULTS: The success rate of this procedure was 100%. There are no major complications such as hemorrhage or hollow organ perforation in our patients. Seven patients (23%) have dislodged or outward migration of catheter and four (13%) has bile leak. All of them received conservative treatment, except only one patient (3.3%) with bile peritonitis needed laparotomy. In recent published literature, there was an overall rate of 3 to 13%, including bile peritonitis (2.4-4.4%), malpositioned catheters with resultant bowel perforation, vasovagal reactions, and sepsis.

CONCLUSION: There was no significant difference of complication rate between the transperitoneal and transhepatic access of gallbladder drainage for cholecystitis. Transperitoneal gallbladder drainage is a safe and efficacy technique.
Hepatic Portal Venous Gas Caused by Emphysematous Pyelonephritis: a case report

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CASE REPORT: A 62 years old female had diabetes mellitus and end-stage-renal-disease under hemodialysis. She visited our emergency department with complains of general weakness for 2 days. Physical examination showed left flank knocking pain. Laboratory data revealed leukocytosis (white blood cell count: 30640/L). Abdominal plain film disclosed a huge radiolucent round shape on left abdomen which overlying gastric gas. Abdominal ultrasound showed left sub-splenic huge abscess with air content. Enhanced computed tomography proved left emphysematous pyelonephritis which also complicated with air in the hepatic portal vein, splenic vein and superior mesenteric vein. The border of the retroperitoneal gas-forming abscess closed to the splenic vein and the branch of superior mesenteric vein was also noted. Pus culture from percutaneous nephrostomy and blood culture of the patient yielded Escherichia coli. She received nephrectomy later due to uncontrolled infection. Severe destructive kidney with large retroperitoneal abscess and inflamed Gerota’s fascia with adhesion to adjacent peritoneum were found during operation. There was no significant evidence of bowel inflammation, ischemic bowel or fistula between destroyed kidney and gastrointestinal tract. She was discharged after 102-days-hospitalization.

DISCUSSION: Emphysematous pyelonephritis is a rare disease and can sometimes be diagnosed by plain film. The hepatic portal venous gas was traditionally thought due to ischemic bowel disease. It caused by emphysematous pyelonephritis is a very rare condition, especially when it combined with gas in the splenic vein and superior mesenteric vein. In normal anatomy, venous return from left kidney is not back through hepatic portal vein. According to the findings in computed tomography and laparotomy, we believed that the gas produced by gas-forming Escherichia coli in the left kidney went through the adjacent peritoneum and then invaded into the splenic vein and superior mesenteric vein, which finally caused hepatic portal venous gas.

PROBING NEURAL STRUCTURE USING DIFFUSION SPECTRUM IMAGING AND TEMPORAL DIFFUSION SPECTROSCOPY

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PURPOSE: We sought to apply oscillating gradient spin echo diffusion spectrum imaging (OGSE DSI) to identify minuscule neuroarchitecture in the brain. For comparison, diffusion tensor images (DTI) of the rat brain were acquired using the OGSE and pulsed gradient spin echo (PGSE) sequences.

MATERIALS AND METHODS: Male Wistar rats (300-350g) were used for ex vivo MRI. Imaging was performed on a Varian 9.4T scanner equipped with a gradient system of maximum gradient strength = 40 G/cm and rise time of 135 μs. Images of OGSE DSI were acquired with an oscillating gradient spin echo sequence with frequency = 34.3 Hz. The diffusion-encoding scheme constituted 123 diffusion-encoding directions with effective b values changing from 0 to 25,975 s/mm². OGSE DSI and OGSE DTI were reconstructed from DSI dataset, and PGSE DTI was calculated from DTI dataset. To quantify the diffusion anisotropy of probability density function, generalized fractional anisotropy (GFA), isoradius indices were used for DSI and fractional anisotropy (FA), apparent diffusion coefficient (ADC) indices were used for DTI.

RESULTS: The largest fiber bundles like corpus callosum, internal capsule -- except fimbria -- were not seen in DSI with oscillating gradient while all were visible in both OGSE DTI and PGSE DTI. This may be due to difference in fiber size/density or the way GFA was calculated. The structures in hippocampus were particularly enhanced in oscillating gradient DSI or DTI. The ADC of hippocampus in OGSE DTI (4.66 x 10⁻⁴ mm²/s) was higher than it in PGSE DTI (1.49 x 10⁻⁴ mm²/s). It suggested larger dimension than OGSE diffusion distance, while high anisotropy could still be seen by OGSE DSI that may be related to fiber organization of different cellular layers.

CONCLUSIONS: We have demonstrated that DSI with oscillating gradient revealed novel tissue contrast in the rat hippocampus. Combining both diffusion spectrum imaging and temporal diffusion spectroscopy techniques allows investigation of derangement involving both cellular and fibrous structures of the hippocampus. This may help to differentiate minor changes in neural plasticity and neurodegeneration.
Longitudinal MR Image Analysis of Rat Eosinophilic Meningitis Caused by Angiostrongylus cantonensis

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PURPOSE: The purpose of this study was to determine the lesion localization, pathological changes and angiostrongyliasis characterization of rat brain infected with larvae of Angiostrongylus cantonensis (A.c) by magnetic resonance imaging (MRI) techniques.

MATERIALS AND METHODS: Third-stage larvae of A.c were collected from infected Achata fulica snails. A total of fourteen male Wistar rats were used. Seven of them were orally inoculated with 100 larvae, and the other seven were orally inoculated with 300 larvae. MR scans were performed before and after infection of A.c. The experiment was performed on a 1.5T MRI system (Sonata, Siemens MAGNETOM, Germany). Multi-slice turbo spin echo (TSE) and fluid attenuation inversion recovery (FLAIR) sequences were performed to obtain T2W images. R2 mapping and contrast-enhanced T1W images were also used.

RESULTS: Abnormal findings on MR images were observed in each rat infected with different numbers of A.c larvae. However, each group of the infected rats with different degrees was found to have variable pathological changes in the brain tissue. In the infection of 100 A. cantonensis larvae, ventricles size increased from 0.88% to 2.17% (r = 0.8507) and subarachnoid increased from 1.83% to 9.74% (r = 0.9713) in T2W images of the rat infected after 3 to 34 days. Signal intensities of subarachnoid increased 1.51 times (r = 0.8961) in FLAIR images. The mean R2 values (R2=1/T2) decreased from 8.57s⁻¹ to 7.54s⁻¹ (r = 0.9408) in R2 mapping. Ventricles and subarachnoid size increased from 36 to 91 voxels (r = 0.9004) in contrast-enhanced T1W images. In the infection of 300 A. cantonensis larvae, ventricles size increased from 0.76% to 2.29% (r = 0.9247) and subarachnoid increased from 1.58% to 9.69% (r = 0.9306) in T2W images of the rat infected in the same period. Signal intensities of subarachnoid increased 1.19 times (r = 0.6775) in FLAIR images. The mean R2 values decreased from 8.76s⁻¹ to 7.58s⁻¹ (r = 0.8170) in R2 mapping. Ventricles and subarachnoid size increased from 33 to 99 voxels (r = 0.9170) in R2 mapping. Subarachnoid size increased from 2.49 to 7.14 (r = 0.9364) in contrast-enhanced T1W images.

CONCLUSIONS: Our MRI results showed pathological changes in the rat brains infected with 300 A. canto larvae and 100 A. canto larvae were similarly, but their survival curves were different. MRI was sensitive in showing tissue change and edema, and provided higher tissue contrast and superior sensitivity in the detection of lesions. Therefore, MRI was suggested to be a non-invasive technique in localizing and characterizing lesions during the acute phase of angiostrongyliasis due to A.c.
Along-tract Characterization of Developing Rabbit Brain Using Diffusion Tensor Tractography

**Purpose:** The goal of this study was to characterize the changes of quantitative diffusion indices along white matter tracts in the developing rabbit brains. Along-tract method analyzes the quantitative diffusion indices associated with these virtual dissections in a way that is parameterized along the curving axes of the tract spines, instead of the more typical method of averaging this variation into a single mean estimate for each tract.

**Materials and Methods:** Whole brain images were acquired from five healthy New Zealand rabbits with ages from 4 to 40 weeks using 1.5T MRI scanner (Siemens SONATA, Germany). Diffusion tensor imaging (DTI) tractography, regional and along-tract diffusion indices were analyzed. For tractography, three tracts, hippocampus, corpus callosum, and olfactory tract, were selected for further analysis. Fractional anisotropy (FA), mean diffusivity (MD), axial diffusivity (AD), and radial diffusivity (RD) in the ROIs and along tracts were then calculated. The changes of these diffusion indices across the ages were also compared and discussed.

**Results:** DTI tractography of the important white matter tracts, such as hippocampus, corpus callosum, and olfactory tract, showed refinement in regional tract architecture with maturation. There was some minor interanimal tract variability, but there was remarkable similarity between the tracts in all animals. The regional white matter anisotropy increased with age, and all diffusion diffusivities decreased with age. The changes of diffusion indices implied the more restrictive diffusion during mature period. Along-tract diffusion anisotropy revealed spatial localized change of these white matter tracts during mature period.

**Conclusions:** Our results showed that both regional and along-tract diffusion indices revealed the important white matter tracts change during mature period. In vivo DTI tractography is a potential tool for neuroscience investigations and can reveal effects, such as fiber tract pruning during development, which may be important targets for in vivo human studies.

Brain CT Image Quality Improvement Using Adaptive Iterative Dose Reduction (AIDR) on 320-Detector CT

**Purpose:** To evaluate the image quality of brain computed tomography (CT) using Adaptive Iterative Dose Reduction (AIDR) reconstruction algorithm, compared with conventional Filtered Back Projection (FBP).

**Material and Methods:** The retrospective study enrolled 123 CT examinations of the brain. All examinations were performed in the sequential mode using a 640-slice volume MDCT and all images were reconstructed with AIDR and with FBP reconstruction algorithm. Mean attenuation, image noise, and Signal-to-Noise Ratio (SNR) at left frontal white matter, pons, cerebrospinal fluid (CSF), left eyeball and fat were compared between FBP and AIDR images. Image noise and SNR were analyzed using a paired t-test.

**Results:** In all examinations, quantitative evaluation showed that image noise was significantly lower with AIDR than with FBP, with a mean reduction of 8.7%. The mean attenuations at CSF were significantly lower with AIDR than with FBP and there were no significant differences at left frontal white matter, pons, left eyeball and fat between FBP and AIDR reconstructions. ISNR was significantly greater with AIDR than with FBP, with a mean increase of 8.9%.

**Conclusion:** Compared to traditional FBP reconstruction techniques, AIDR significantly improves image quality and has the potential to decrease radiation dose.
Meta-Analysis of the Neural Correlates of Working Memory Tasks in Sleep Apnea

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PURPOSE: Over the last 2 decades, a lot of neuroimaging studies had assessed the impact on the brain functions in sleep apnea. The authors reviewed the literature on use of fMRI in sleep apnea imaging studies to identify specific functional changes, compared with healthy subjects. The authors looked for consistently reported results of functional correlates in sleep apnea.

MATERIAL AND METHODS: The authors used PUBMED to retrieve articles published from January 2000 to November 2011. The authors included all fMRI research evaluating patients with sleep apnea during 2-back task of working memory by the Signed Differential Mapping (SDM) method to analyze significant differences reported in all fMRI studies of sleep apnea patients and compared the findings of studies to index neural correlates.

RESULTS: People with sleep apnea had functional changes show in left superior and middle frontal and precentral gyri, as well as in left precuneus and left cerebellar culmen.

CONCLUSION: The significant neural correlates in sleep apnea patients occur in left frontal and parietal regions and cerebellum, which may be related to the neuropsychological dysfunctions seen in this patient population.

18F-FDG 正子造影在慢性脊髓損傷患者腦部再塑性的研究

PURPOSE: Spinal cord injury (SCI) results in interruption of motor, sensory or autonomic function. Nevertheless, the neuronal activity outcome of the plastic process is not well understood. The purpose of this study is to delineate the metabolic changes in the regions of brain plasticity for patients with chronic SCI using 18F-FDG PET.

METHODS: Fifteen right handed male patients with chronic complete spinal cord injury, eight tetraplegia (age 36.0 ± 13.4, range 24-65 years) and 7 paraplegia (age 43.7 ± 6.9, range 35-55 years) at 14.1 ± 9.4 years and 17.6 ± 8.0 years after their injuries were consecutively recruited in this study. Twenty age-matched male healthy volunteers (age 41.9 ± 10.8, range 20-64 years) without history of previous neurologic or psychiatric illnesses were also included as controls. Brain 18F-FDG PET was performed for each patient and control subject. Statistical parametric mapping (SPM99, Wellcome Department of Cognitive Neurology, Institute of Neurology, University College London) was used to compare between the 2 groups between patients and healthy control group, and tetraplegic patients and paraplegic patients.

RESULTS: The SPM analytic results showed hypometabolism at left superior prefrontal cortex; hypermetabolism at bilateral corona radiata, genu and posterior limb of bilateral internal capsules, and cerebellar vermis for patients with paraplegia. The tetraplegic patients showed more hypermetabolism at cerebellar vermis and bilateral cerebellar hemisphere than paraplegic patients.

CONCLUSION: Our study demonstrates that these cerebral glucose metabolic changes may be the effects of brain plasticity after SCI.
Utilizing Wild Bootstrap to Evaluate Effect of Uncertainty Orientation for Two Crossing Fibers on a Clinical Study

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Purpose: In this study, we utilize wild bootstrap resampling methods to investigate the effect of fiber orientation distribution (FOD) due to noise-induced variability on reconstructing FOD’s by constrained spherical deconvolution (CSD) and Q-ball imaging (QBI).

Material and Methods: We use a set of diffusion spectrum imaging (DSI), which is human brain dataset to be interpolated into high angular resolution diffusion imaging (HARDI). This diffusion gradient scheme is covering spherical sets (cover120) on fully-spherical gradient scheme. For the wild bootstrap and bootknife resampling procedure, a series of 50 voxels were performed on each scheme whose each resample was run 500 times to calculate the deviation angle. The each repeat the deviation angle is between the estimated fiber orientation and the mean estimated fiber orientation. In all cases, both CSD (lmax 12) and QBI (lmax 8) were used to compute the FOD and ODF, respectively. The resampling schemes used a 4 order SH model as a noisy data. Peaks were then extracted using a quasi Newton optimization algorithm. The wild bootstrap was based on the interpolated HARDI acquisition. For the bootknife, one of the gradient orientations was randomly omitted, and the remaining directions used for the reconstruction.

Results: For CSD analysis two resampling schemes on cover120 data set, the wild bootstrap whose deviation angles is 1.945(±0.940), meanwhile, the bootknife whose deviation angle is 3.215(±1.541). For QBI analysis two resampling schemes on cover120 data set, the wild bootstrap whose deviation angles is 3.520(±1.701), meanwhile, the bootknife whose deviation angle is 6.178(±3.228).

Conclusion: Regardless the wild bootstrap or the bootknife on QBI analysis whose deviation angles is approximately two times larger than those of CSD analysis.

Acute CO Intoxication: A Study of Diffusion Tensor Imaging Parameter as a Surrogate Marker for Evaluation of Delayed Outcome Prediction

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Purpose: To evaluate if the fractional anisotrophy (FA) derived from diffusion tensor imaging can be used as a surrogate marker for prediction of delayed leukoencephalopathy after acute CO intoxication.

Method and Materials: Ten adult patients with CO poisoning who had two MR imaging examinations obtained at acute and subacute stages were divided into two groups; group 1, patients without delayed white matter changes, and group 2, patients with delayed white matter hyperintensity changes. Acute stage MR imaging evaluation was performed hours to days after the acute CO exposure and delayed MRI examination were performed months after injury. Whole brain DTI data was acquired in all subjects in a 1.5T MR system. Whole brain voxel-based analysis of acute DTI data was performed between the two groups to delineate the difference.

Results: There was no signal intensity change of the cerebral white matter on T2-weighted MR imaging in both groups. However, Voxel-based analysis of fractional anisotrophy (FA) maps showed multiple low FA clustered voxels in groups 2 patient, distributed in corticospinal tract (CST), left centrum semiovale, left/right inferior fronto-occipital fasciculus and thalamus (P < 0.01).

Conclusion: Our results suggest that acute white matter changes seen in DTI but not in T2-weighted MR imaging may predict poor outcome.
Long Term Neuro-Psychological Sequelae in HIV-Negative Tuberculous Meningitis: A Cine MRI Study

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BACKGROUND AND PURPOSE: Tuberculous meningitis (TBM) is the most severe form of tuberculous infection, still complicated with neurological deficits even with aggressive treatment. Cognitive dysfunction and hydrocephalus are the well-known late sequelae of chronic TBM, but the relationship between them is not well studied yet. In this study we evaluate the relationship between cognitive dysfunction and hydrocephalus by cine MRI in TBM.

MATERIALS AND METHODS: There were 19 patients with TBM (15 males and 4 females; mean age 51.84 years old; from 21 to 78). 37 age- and sex- matched healthy volunteers were enrolled. All subjects underwent complete neurologic examination, neuropsychological test and MRI study during follow-up. The cine phase-contrast MRI technique was applied to all subjects to assess the dynamic CSF flow in the aqueduct by the following five parameters: peak positive velocity (PPV), peak negative velocity (PNV), average positive flow (APF), average negative flow (ANF), and mean average flow (AF). Correlations among the cine MRI parameters, initial clinical presentation and presented neuropsychological rating score were assessed.

RESULTS: The neuro-psychological scores are worse in TBM patients than in normal controls. In cine MRI, the AF (p=0.011), APF (p=0.002), and ANF (p=0.016) in TBM group was significant higher than normal controls, suggesting hydrocephalus. The higher CSF flow parameters were associated with declined neuropsychological rating score. The worse initial clinical presentations were also associated with poorer long-term cognitive function performance. There was no significant correlation between initial clinical profiles and CSF flow parameters.

CONCLUSION: Neuropsychological dysfunction is a multifactor-related late complication in TBM. In addition to initial disease severity, chronic hydrocephalus might play an important role in long-term cognitive function performance. Using cine MRI for acquisition of CSF flow could help us to explore the relationship with the disease which may cause hydrocephalus and the neuro-psychologic sequelae.

Improving Multispectral Brain MRI Segmentation by a Supervised Hybrid Classifier

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INTRODUCTION: Multispectral MRI data have been commonly used for brain quantitative volumetric measurement. However, there is a lack of effective techniques that can be used to perform quantification of normal brain tissue and brain pathologies simultaneously because of different MR characteristics from normal and pathological components. In this paper, we attempted to implement a hybrid classifier derived from iterative Fisher’s linear discriminant analysis (IFLDA) coupled with the independent component analysis (ICA) and SVM to effectively segment multi-slice MRI brain data by using only one set of training samples.

MATERIALS AND METHODS: Synthetic data from the BrainWeb Simulated Brain Database and real normal brain MR data of twenty healthy volunteers were used to conduct an objective assessment on accuracy and reproducibility of the proposed method. Tanimoto index was used to evaluate quantification results of brain volume measurements of synthetic data. The intra- and inter-operator variability was analyzed to evaluate reproducibility of quantification results of clinical brain data.

RESULTS: The results showed an improvement of the mean Tanimoto indexes of GM/WM/CSF segmentation in the synthetic brain data. As for clinical MR data experiments, the hybrid classifier performed as well as does that using the slice-by-slice method in quantification of GM/WM/CSF volume, and was much superior in consistency of intra- and interoperator measurements.

CONCLUSION: The proposed hybrid classifier has several advantages. The uppermost benefit is to avoid operator interferences from selecting training samples and improve the reproducibility. This supervised hybrid classifier would be explicitly applicable in clinical applications to segmentation of brain MRI.
Functional Network Connectivity of Action Networks by BOLD-based fMRI: and effect of physiological interference

**RESULTS:**

320 detector-row CT scanner used for brain perfusion and CT angiography (CTA) underwent with volume scan mode of Toshiba Aquilion ONE. Effective doses of three scan ranges (100, 140, and 160 mm) refer to different head sizes. The organ doses of lens with bismuth shield and tilted gantry were measured. The effective doses derived from ICRP 103 guideline of brain perfusion CT (without bismuth shield and tilted gantry) ranged from 11.5 to 13.2 mSv for stroke protocol and 6.5 to 8.6 mSv for brain tumor protocol. The lens dose reduction with tilted gantry was 41.3%. The lens dose reduction with bismuth shield was 44.3% compared with those without tilted gantry and bismuth shield.

**CONCLUSION:**

The brain perfusion CT examination can be used to diagnose patients with suspected stroke or brain tumor. Phantom measurements indicate that brain perfusion CT underwent with volume scan mode can reduce scan time. It has potential to reduce patient dose. Use of a bismuth shield resulted in a 41.5% decrease of lens dose. The 320 detector-row CT scanner can complete a brain perfusion CT scan including non-contrast and CTA in one procedure and improve the scanning efficiency.
Susceptibility-Weighted Imaging in Predicting Ischemic Stroke Evolution: with Clinical NIHSS and Final Infarct Area on follow-up MRI

**Purpose:** The concept of ischemic penumbra is widely used in predicting stroke evolution and guiding therapy. Our recent experience indicated that susceptibility-weighted imaging (SWI) has a potential ability to reflect increased oxygen extraction of the penumbra area by presence of prominent hypointense vessels. The aim of this study is to evaluate the SWI in prediction of final infarct area and clinical outcome of acute stroke patient groups.

**Materials and Methods:** Seventeen acute stroke patients in the territory of middle cerebral artery were prospectively studied with MRI study including DWI, T2W, SWI, with follow up images in 7 days. Clinical NIHSS score was performed in acute stage < 24 hours and on the day follow-up MRI performed. Two experienced neuroradiologists interpreted the infarct territories on DWI, T2W and hypointense vessels on SWI and semi-quantified by Alberta Stroke Program Early CT Score (ASPECTS). Infarct growth was semi-quantified by modified ASPECTS, from 10 (no growth in 10 areas of ASPECTS) to 0 (growth in each area of 10 areas).

**Results:** Patients with more prominent hypointense vessels on the initial SWI had larger obvious infarct growth area on the follow-up MRI. A good correlation (r = 0.7589) was shown between 1st SWI ASPECTS and infarct growth score. Patients with more prominent hypointense vessels on the initial SWI also tended to have a progressively worse clinical outcome, with a fair correlation (r = -0.5785) between 1st SWI ASPECTS and NIHSS score difference.

**Conclusion:** SWI can be feasible to predict stroke evolution with good correlation to final infarct area and clinical outcome, thereby potentially providing helpful tool guiding thrombolytic therapy.

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How to Approach the Dural-Based Lesion?

**Purpose / Aim:**
1. To review the normal imaging anatomy of the scalp and meninges.
2. To understand the different imaging modalities capabilities in diagnosis of dural-based lesions.
3. To use a practical systemic approach for the evaluation of dural-based lesions.

**Content Organization:**

**Summary:** The major teaching points of this exhibit are: (a) to review the anatomy of scalp and meninges facilitating further approach to dural-based lesion (b) to understand many pathologic conditions can lead to dural-based appearances (c) to teach the radiologists be familiar with these key imaging findings for further differential diagnosis in a systemic approaching way.
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Radiologic Mimics of Subarachnoid Hemorrhage

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Purpose: To review the radiologic mimics of subarachnoid hemorrhage (SAH).

Methods: We reviewed 481 cases of hyperdensity over basal cistern or subarachnoid space shown on CT study between September 2004 and May 2011. As reviewed the clinical history and presentation, laboratory data, CSF analysis, CT or MR angiography or conventional angiography findings, we excluded true SAH and collected some entities that mimic SAH, also called pseudo-SAH.

Results: By excluding true SAH, 18 cases were recruited in this study, including contrast extravasation (1), diffuse brain edema (8), meningitis (6), intracranial hypotension (1), status epilepticus (1), and intrathecal myelography (1). We will discuss the imaging findings and related clinical value of these pseudo-SAH cases.

Conclusions: Identification of pseudo-SAH should be contemplated in a patient without signs of aneurysmal rupture or head trauma. All radiologists should be familiar of these potential mimics of SAH.

AIDS Associated Cerebral Aneurysmal Arteriopathy in a Young Female: a case report

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Clinical History: A 20 year-old female presented to our emergency department (ER) due to acute-onset left hemiparesis. She was diagnosed with acquired immunodeficiency syndrome (AIDS) six-months earlier before this episode. She denied any systemic disease and reported her heterosexual activity began at the time when she was 14 years old. The initial CD4 count was 4 cells/mm3 and viral load was 10425 copies/ml. acute stroke was impressed at our ER. Brain computer tomography (CT) and (magnetic resonance imaging) MRI without contrast enhancement showed acute infarcts in right basal ganglion and right-sided periventricular white matter, and a fusiform aneurysm of right MCA with hyperdense mural thrombus. CT-angiography demonstrated more fusiform aneurysms of left ICA, right middle cerebral artery, bilateral ACA and left temporal artery consistent with AIDS associated cerebral aneurysmal arteriopathy. Besides, there were co-incidental infections with non-tuberculous mycobacterial pulmonary infection, oral candidiasis and cytomegalovirus retinitis during hospitalization.

Discussion: AIDS associated cerebral aneurysmal arteriopathy has been identified in children with human immunodeficiency virus (HIV) since the 1980s, but only in the past several years have cases of diffuse fusiform intracranial aneurysms been reported in HIV-positive adults. HIV infection has been associated with arteriopathy of small, medium, and large cerebral arteries, both in isolation and in the presence of cerebral aneurysms and infarcts. However, the etiology remains unclear and optimal therapy is unknown.

Conclusion: Some studies suggest that HIV infection may be associated with damage to the wall of the large cerebral arteries, leading to aneurysm formation. These aneurysms can thrombosed or rupture. Magnetic resonance imaging and CT-angiography may be a useful tool in identifying the incidence of HIV-related arteriopathy and in monitoring the course of arteriopathy in individual patients.

THE 61ST ANNUAL MEETING OF THE RSROC
March 24-25 2012
Reduced Corpus Callosum and Cingulum Bundle White Matter Integrity Is Related to Decreased Sustained Attention and Working Memory in mTBI Subjects: a diffusion tensor imaging study

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PURPOSE: The purpose of this study was to determine whether mTBI subjects differed from normal controls on white matter integrity using DTI. We further sought to determine whether there was any relationship between white matter integrity and neuropsychological test in mTBI subjects.

MATERIALS AND METHODS: DTI images of 37 mTBI patients within 3 month of their injury and 10 healthy control subjects were collected on a 3-Tesla GE Discovery 750 scanner. DTI data were obtained with the following parameters: spin-echo echo planar imaging; b-value, 1000 s/mm²; repetition time (TR), 8000 ms; echo time (ET), 83 ms; 25 non-collinear directions and one no diffusion weighting (B0) image; matrix=96x96; 70 slices; and voxel size 2.5 x 2.5 x 2.5 mm. The DTI studio was used to process and analyze DTI data. Region of interest (ROI) analyses were conducted on the 11 regions of corpus callosum, and 10 regions of cingulum. FA was calculated for each ROI. 2-back working memory test is also collected.

RESULTS: Quantitative regional DTI
There was a significant group difference in right side rostral cingulum in < 30 days mTBI subjects compared to controls (p = 0.016). Relationship between behavioral measures and DTI
Within < 30 day mTBI subjects there is significant negative correlation between 2-back working memory test and FA in left splenium of corpus callosum (r = 0.4283, p = 0.047). Within > 30 day mTBI subjects there is significant positive correlation between 2-back working memory test and FA in right subgenual cingulum bundle (r = 0.6083, p = 0.045).

CONCLUSION: These findings suggest that reduced integrity of corpus callosum and cingulum bundle white matter in mTBI is possible related to working memory.
Cerebrospinal Fluid Flow Measurement at Aqueduct Using Phase Contrast MR Imaging in Diagnosing Idiopathic Normal Pressure Hydrocephalus

**Purpose:** The purpose of this prospective study was to identify the ability of cerebrospinal fluid flow study using phase contrast MR imaging to replace the invasive methods currently used to establish the diagnosis of idiopathic normal pressure hydrocephalus (iNPH).

**Materials and Methods:** Between July 2010 and November 2011, 30 patients with clinical symptoms fitting the Hakim triad and a dilated ventricular system on CT underwent a cerebrospinal tap test. All patients also had a phase contrast MRI to determine the CSF flow rate in the aqueduct. The study was performed on a 3T MR imaging scanner (Philips, Achieva, the Netherlands) by using a phase-contrast cine MR imaging pulse sequence (TR, 13 ms; TE, 8.2 ms; NEX, 3; matrix, 224X224 pixels; section thickness, 4 mm; FOV, 85 X 85mm). A cine acquisition with sensitivity to velocity in the section-select direction was obtained on an oblique axial plane of a section perpendicular to the aqueduct (at the inferior colliculus) just above the fourth ventricle. The acquired raw data were interpolated to produce 35 frames equally spaced in the cardiac cycle by means of finger plethysmography with retrospective cardiac gating. In all examinations, the velocity-encoding (VENC) value ranged between 20 and 60 cm/s.

**Results:** In patients screened for clinical symptoms and ventriculomegaly on CT imaging, an aqueduct-CSF flow rate greater than 0.4 ml/s was found to be statistically specific for a diagnosis of iNPH.

**Conclusions:** The measurement of the CSF flow rate in the aqueduct by using the phase contrast MRI technique is a highly specific pre-selective method for diagnosing iNPH.

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Paradoxical MR Findings of Patients with High-grade Gliomas on Bevacizumab Treatment

**Purpose:** To present paradoxical MR findings and discrepant clinical presentations of patients with high-grade gliomas, who underwent treatment of bevacizumab (Avastin), an anti-vascular endothelial growth factor (VEGF) monoclonal antibody.

**Methods:** From July 2008 to November 2011, ten patients with high-grade glioma were treated in our institute with second-line adjuvant treatment of bevacizumab. Nine out of ten patients initially underwent standard treatment protocol included craniotomy for tumor debulking, followed by concurrent brain irradiation and temozolomide chemotherapy, but craniotomy was not done for the rest one with brain stem glioma. There were 7 patients with glioblastoma multiforme, 1 with brain stem glioma, 1 with grade IV malignant oligoastrocytoma and 1 with grade III anaplastic olgioastrocytoma, all but one with supratentorial location. Their ages range from 24 to 62 years of age, mean 51.6. The duration of treatment was between 2 and 10 months.

**Results:** Initial clinical improvement was encountered in 8 patients while MR images showed regression for all. Degrading of enhancement and peritumoral edema are most common MR presentations. Among 8 patients, 7 presented clinical deterioration far delay than MR evidences of progression. However, two patients without clinical benefits suffered from intracerebral hemorrhage and gastrointestinal hemorrhage respectively. Cessation of bevacizumab developed rapid tumor progression in 5 out of 8 patients in two months.

**Conclusions:** Bevacizumab seems to degrade MR enhancement and peritumoral edema to allow more bulky recurrent tumor and delay of clinical deterioration. Rebound tumor progression is a common finding.

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The 61st Annual Meeting of the RSROC

March 24-25, 2012
A 58-year-old woman was admitted to our hospital because of adhesive ileus. She received resection of a segment of small bowel with anastomosis and lysis of adhesion. Vertigo off and on developed 12 days after surgery. Brain MRI revealed hyperintense lesions in tectum of midbrain and dorsal medulla on T2-weighted images. Metronidazole-induced encephalopathy was suspected. Symptom gradually improved after drug discontinuation. Follow-up brain MRI obtained 1.5 months later revealed complete resolution of the brainstem lesions.

Horizontal gaze palsy with progressive scoliosis (HGPPS) is a rare congenital disorder caused by mutation in the ROBO3 gene. It is characterized by absence of conjugate horizontal eye movements and progressive scoliosis developing in childhood and adolescence. We present a one-year-old girl with clinical and MRI findings typical of HGPPS. MRI of the brain shows a deep midline pontine cleft, pons hypoplasia, tented-shaped fourth ventricle, butterfly configuration of the medulla, and prominent scoliosis of spine.
Intracranial mycotic aneurysm constitutes 2.5% to 6.5% of all intracranial aneurysm. It is a rare complication causing from extravascular origin, reported in English literature. Herein, we present a 40 years old Taiwanese man who had alcoholic liver cirrhosis before. He was diagnosed as intracranial mycotic aneurysm rupture with subarachnoid hemorrhage (SAH), causing from left bacterial orbital cellulitis without systemic bacteremia. The present case alert clinician possible development of mycotic aneurysm from local infection, such as orbital cellulitis or sinusitis, in relative immunocompromise patient.

Osmotic myelinolysis may occur after rapid correction of hyponatremia. The rapid rise in sodium level results in an osmotic endothelial injury and opening of the blood–brain barrier. A current hypothesis proposes that the endothelial injury leads to release of myelinotoxic factors from the damaged cells, in turn leading to demyelination. Since edema or related myelinotoxic factors are principally derived from the highly vascular gray matter, the adjacent heavily myelinated white matter would be preferentially affected. This explains the MRI findings of our case in which a striking picture of demyelination involving areas of extensive admixture of gray and white matter, in particular, the subcortical U-fiber and the white matter around the deep nucleus is presented.

We present a case of extensive osmotic demyelination in which areas of extensive gray-white matter junction is particularly involved. This case supports and is explained by a current hypothesis of the pathogenesis of osmotic demyelinolysis.
**Purpose:** To present a rare case of sellar xanthogranuloma. The clinical presentation, imaging finding, pathologic features, prognosis and treatment will be described.

**Case Report:** A 49 year-old woman suffered from headache with progressively blurred vision for one year. The visual field (VF) test showed total VF defect in OD and temporal VF defect in OS. The computer tomography (CT) scan was performed and showed a 4.5*3.5cm large cystic mass at sellar and suprasellar region with some aginal calcific rim. She was admitted for MRI survey and further management.

**Results:** Magnetic resonance imaging (MRI) showed the sella-suprasellar mass with homogeneous hyperintensity on T1-weighted and T2-weighted imaging, marginal enhancement and peripheral rim-like hypointensity, and affecting the optic chiasma. The patient underwent a right orbital-zygomatic craniotomy and partial resection of the tumor. The histopathology confirmed one lesion was a xanthogranuloma, and the postoperative radiotherapy was prescribed. Partial remission of the residual tumor and improvement of the visual acuity were noted through four years of follow-up observation.

**Conclusion:** The sellar xanthogranuloma is rare and other be misjudged as craniopharyngioma, Rathke's cyst or pituitary hemorrhagic adenoma. The World Health Organization (WHO) accepted xanthogranuloma as a specific brain tumor classification in 2000 from the classical craniopharyngioma. The MRI may be helpful in differentiation sellar xanthogranuloma from others.

**Objective and Importance:** Dural sinus stenosis can lead to elevated intracranial pressure due to venous congestion and rarely can be complicated with secondary dural arteriovenous fistula (AVF).

**Clinical Presentation:** We report a case of intracranial venous congestion in a 60-year-old woman treated by endovascular recanalization with balloon angioplasty and stenting of bilateral occluded dural sinuses. The patient presented with status epileptics and coma when transferred to our hospital. Non-enhanced computed tomography (CT) showed multiple cortical/subcortical junction calcifications. Magnetic resonance imaging (MRI) showed venous congestion with multifocal venous infarction, cerebral edema, dural AVF, stenosis of right sigmoid sinus and left transverse sinus. Digital signature algorithm (DSA) showed venous stenosis and occlusion with venous hypertension presenting retrograde flow from transverse sinus to superior sagittal sinus and secondary dural AVF.

**Intervention:** A transvenous approach was used to recanalize and perform balloon angioplasty of the right sigmoid sinus and left transverse sinus with stenting of right sigmoid sinus, resulting in subsequent clinical improvement. Dural AVF was not treated because that was secondary lesion resulting from venous hypertension. Seizure stopped after intervention and Glasgow coma scale got improved gradually.

**Conclusion:** This is a report of mechanical recanalization, balloon angioplasty, and stent deployment in the dural sinus to provide sustained venous outflow for the treatment of venous hypertension with retrograde venous drainage and secondary dural AVF.
The CT Findings of Praradoxical Herniation: a case report

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INTRODUCTION: To demonstrate the CT findings of paradoxical herniation, an uncommon complication of decompressive craniectomy.

CASE REPORT: A 60 year-old man had history of left anterior communicating artery aneurysm rupture with subarachnoid hemorrhage, intracranial hemorrhage, and intraventricular hemorrhage, s/p aneurysm clipping, bilateral craniectomy, and ventriculoperitoneal shunting 3 months ago in other hospital. He was send to our emergency room for bilateral sunken skin flaps. On arriving, the coma scale is E1M2Vt. Head CT without contrast enhancement shows depressive skin flaps in bilateral fronto-temporo-arietal regions with positive mass effect in brain parenchyma, causing herniation of the brain away from the craniec¬tomy defect and midbrain compression. Paradoxical herniation is considered. He then underwent cranioplasty.

CONCLUSION: Paradoxical herniation occurs when atmospheric and gravitation forces overwhelm intracranial pressures. The relative low intracranial pressure states lead to the brain sucked down. Treatment is needed to increase intracranial pressure, stop any CSF leakage, and restore the continuity of the calvaria.

Magnetic Resonance Imaging Abnormalities after Nonconvulsive Status Epilepticus

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PURPOSE: Nonconvulsive status epilepticus (NCSE) may mimic stroke in imaging presentation. This article aimed to describe the MRI abnormalities of patients with NCSE.

CASE REPORT: We demonstrated the MRI findings of two cases presenting with symptoms suggestive of NCSE, included MR perfusion, MRS, and serial followed MRI in one of the patients.

RESULT: Case 1 was a 58-year-old man with NCSE proven by EEG. MRI presented diffuse cortical swelling with water restriction in the right cerebral hemisphere and hyperintense on T2WI in right hippocampal formation and bilateral thalami. MR perfusion images revealed hyperperfusion at cortex of right cerebral hemisphere. MRS showed decreased NAA and negative lactate peak. Case 2, a 61-year-old woman, also presented NCSE. MRI showed bright up signal on DWI and T2WI at right thalamus, mesial temporal lobe, and cortex of right cerebral hemisphere diffusely.

CONCLUSION: Signal changes of the cerebral cortex and thalami detected by MRI are consequences of epileptic activity and suggest pathophysiological links between ictal brain activity, haemodynamic changes and early parenchymal abnormalities.
Ruptured Cerebellar Venous Pseudoaneurysm Due to Dural Carotid-Cavernous Fistula

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PURPOSE: To report a case of rare presentation of dural carotid-cavernous fistula (CCF) with acute cerebellar hemorrhage due to ruptured venous pseudoaneurysm.

CASE REPORT: A 68 years old female was well before but suffered from sudden onset of neck pain and headache when eating dinner. Initial brain CT revealed left cerebellar hemorrhage and posterior fossa subarachnoid hemorrhage. A saccular aneurysm is noted in left cerebellum on CT angiography but not connecting with any arterial structure. Venous aneurysm is considered. Conventional angiography showed left dural CCF with venous drainage to left posterior fossa and one venous pseudoaneurysm was detected as the bleeding source. The other venous drainage to right cavernous sinus then right sylvian vein is noted. The feeding arteries of CCF from multiple bilateral external carotid artery branches are noted. Due to only intracranial venous drainage of the fistula and cerebellar hemorrhage, rapid obliteration of the fistula is mandatory. Open surgery and direct needle puncture of left cavernous sinus with NBCA embolization is performed but not complete. Finally surgical ablation of the left cavernous sinus stopped the fistula.

RESULT: Post-surgical angiogram revealed no earlier opacification of left cavernous sinus and left cerebellar venous pseudoaneurysm. The patient's conscious recovered day by day and follow up brain CT scan showed complete resolution of the cerebellar hematoma.

CONCLUSION: Cerebellar venous hemorrhage is a rare presentation of CCF. Usual venous drainage of CCF with obvious symptom is ophthalmic vein drainage. Only intracranial venous drainage of the fistula without usual extracranial venous drainage lead to difficult diagnosis and more hazard of intracranial hemorrhage due to venous hypertension.

Paraneoplastic Limbic Encephalitis Associated with an Ovarian Teratoma in a Female

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PURPOSE: Paraneoplastic limbic encephalitis (PLE) is a rare disorder which affects the mesial temporal lobe and limbic system structures. A subtype of this rare disease has been associated with ovarian teratomas. The patient initially presents with a viral or flu-like illness which progresses into bizarre behavior, psychiatric symptoms and seizures. Early removal of the ovarian teratoma and immunotherapy make effort on the treatment of the disease.

CASE REPORT: A previously healthy 30-year-old woman initially presented to an outside hospital with symptoms of confusion, seizures, hallucination, and agitation. The family stated that her only complaint was a flu-like illness few days prior to admission. Lumbar puncture was done and disclosed negative findings of CSF analysis. Brain MRI revealed right hippocampus swelling. Due to suspicion of virus encephalitis, empiric antibiotic of acyclovir and immunosuppressant of dexamethasone were started. Her symptoms deteriorated thus she was transferred to our hospital.

RESULT: Lumbar puncture was repeated and still disclosed negative findings. A CSF sample for detection of anti-NMDA receptor antibody was done. CT of pelvis revealed left adnexal teratoma. Laparoscopic left oophorectomy was performed and mature cystic teratoma was confirmed by pathology. Anti-NMDA receptor antibody was positive in CSF. Serial plasmapheresis was started. Finally, she could recognize her family and obey simple orders. She was discharged and kept regular follow up. Modified Rankin scale of two points was reported on the latest OPD record.

CONCLUSION: Being aware of the link between paraneoplastic limbic encephalitis and ovarian teratoma is important for the treatment.
**Imaging of Congenital and Acquired Hearing Loss: Pictorial Review**

**BACKGROUND / OBJECTIVE:**
1. To make an educational review of normal ear anatomy, including middle and inner ear structures and cranial nerves at the vicinity with reference to CT and MR imaging.
2. To illustrate a spectrum of various causes of congenital and acquired hearing loss on the images.

**METHODS:**
1. A detailed pictorial depiction of normal anatomy with schematic drawing.
2. Imaging features of various causes of congenital and acquired hearing loss.

**RESULTS:**
We will present illustrative cases as followed:
1. **Congenital:** Cochlear nerve deficiency, Mondini deformity, Common cavity deformity, Large vestibular aqueduct/sac syndrome, Microtia with absence of external ear, lateral vestibular aqueduct dysplasia, and prenatal infection
2. **Acquired:** Cochlear otosclerosis, cranial nerve VIII neuroma, facial nerve schwannoma, glomus jugulotympanicum, cholesteatomawith auto evacuation

**CONCLUSION:** This comprehensive review will provide key anatomical information of normal temporal bone, and characteristics of several important pathological conditions of hearing loss on both CT and MR images.

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**Evaluation of Disk Displacement of Temporomandibular Joint and Joint Pain with Dynamic Magnetic Resonance Imaging**

**PURPOSE:** The relationship between temporomandibular joint (TMJ) pain and magnetic resonance imaging (MRI) finding of articular disk displacement is debated. The purpose of this study is to investigate the correlation between the TMJ pain and anterior disk displacement (ADD) using dynamic MRI.

**MATERIAL AND METHODS:** Review of MRI studies on 130 TMJs in 65 patients with unilateral TMJ pain was done. The contralateral asymptomatic joints were served as control group. All of the patients received static MR images in oblique sagittal and coronal planes as well as dynamic studies in oblique sagittal plane for bilateral TMJs. The disk-condyle relationships were divided into three subtypes (normal disk position, ADD with reduction and ADD without reduction) based on the dynamic MRI findings. Fisher’s exact test was used to determine whether TMJ pain was linked to ADD.

**RESULTS:** The result showed that TMJ pain was significantly related to ADD (with and without reduction) compared to the normal disk position group (P = .0001). The subtype of ADD without reduction was significantly correlated to TMJ pain compared to the subtype of ADD with reduction (P = .0156).

**CONCLUSION:** These data suggest that a displaced disk, particularly the without reduction subtype, is an important pain source.
An Increased FDG Uptake in the Midline Roof of Nasopharynx of Adult Patients

INTRODUCTION: Focally increased uptake of 18F-FDG (FDG) in the midline roof of the nasopharynx resulting from a benign or malignant lesion is not uncommonly found in positron emission tomography (PET) images. The aim of this study was to evaluate whether the utility of FDG uptake in various regions of Waldeyer’s ring along with fused computed tomographic (CT), PET/CT, and images might improve the differentiating ability.

METHODS: The data generated from the FDG PET/CT images of 4846 subjects in our cancer-screening program were analyzed. Increased uptake in the midline roof of the nasopharynx was observed in 66 (1.4%) subjects presenting with benign lesions, including 27 asymptomatic subjects without and 39 symptomatic subjects with symptoms of upper airway discomfort. In addition, 30 normal controls and 25 patients with newly diagnosed nasopharyngeal carcinoma (NPC) were recruited for this study. Visual uptake, measurement of the lesions’ standard uptake value (SUV), and any abnormalities on PET/CT were obtained for evaluation. The receiver operating characteristic curve (ROC) and area under the curve (AUC) were applied to evaluate the discriminating power.

RESULTS: Increased FDG uptake (SUV; mean ± SD) in the midline roof of the nasopharynx was found in benign (4.16 ± 1.92) and malignant lesions (6.65 ± 2.81) with a significant statistical difference (p < 0.001). However, associated increased uptake in the palatine tonsil, lingual tonsil, soft palate and salivary glands were exclusively found in both asymptomatic and symptomatic subjects. The midline roof of the nasopharynx uptake and palatine tonsil uptake (MR/P) ratio in benign lesions (0.92 ± 0.42) was significantly (p < 0.001) lower than that of malignant lesions (1.76 ± 0.93). Higher incidences of asymmetrical FDG uptake in the lateral pharyngeal recess, cervical lymph node uptake, and asymmetrical wall thickening of the lateral pharyngeal recess on CT scan were observed in patients with NPC. When an SUV of ± 4.61 and an MR/P ratio of ± 1.14 were used as cutoff points, the combination axis of midline roof foci of the nasopharynx, symmetrical uptake in the lateral pharyngeal recess and normal or symmetrical wall thickening, and detectable neck lymph node uptake, the AUC of PET/CT for benign lesions was 0.95 ± 0.022 (95% CI, 0.91–0.99) with a sensitivity of 95% and specificity of 85.5%.

CONCLUSIONS: The intensity and patterns of FDG uptake in various regions of Waldeyer’s ring along with CT scan findings provide a feasible modality to differentiate benign from malignant nasopharyngeal midline roof lesions.

CT Images of Bilateral Transient Retropharyngeal Internal Carotid Arteries: a case report

PURPOSE: To demonstrate a rare case of bilateral transient retropharyngeal internal carotid arteries (ICAs) with a series of computer tomography (CT).

CASE PRESENTATION: A 66 year-old male had a history of squamous cell carcinoma (SCC) of the soft palate, receiving the wide excision and bilateral tonsillectomy in 2004. Then, he suffered from nasopharyngeal carcinoma (NPC) in 2005 and then underwent radiotherapy. Bilateral internal carotid arteries were at bilateral carotid spaces at the first CT study in 2004. However, bilateral transient retropharyngeal ICAs were found twice in a series of follow-up CT images. The internal carotid artery is described as a straight course from the carotid bifurcation to the level of skull base without any branch between these levels. Transposition of the ICA, bulging to the posterior pharyngeal space, is not a common anomaly. Few literatures reveal retropharyngeal ICAs with CT image and no one depicts the “mobile” phenomenon of ICA. In our case, we found out two-time transposition of bilateral ICAs to the retropharyngeal spaces and then they returned to the carotid spaces in the following CT images. Most literatures postulate this etiology as the embryological development and/or a secondary result of atherosclerosis. Tumors, lymphadenopathies and neck surgeries may also displace ICA medially. However, the definite etiology of ICA transposition remains unknown.

CONCLUSION: The retropharyngeal ICA is not a common vascular anomaly. Bilateral transient retropharyngeal ICAs have not yet been documented. We show a series of CT image to demonstrate transient bilateral retropharyngeal ICAs. The etiology still needs more elucidation.
Bilateral Trigeminal Arteries with Unilateral Trigeminal Artery: Cavernous Sinus Fistula

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A 59-year-old man presented with left pulsatile tinnitus and left orbital swelling for half a year. He has been misdiagnosed as indirect left carotid-cavernous fistula and received Gama-knife therapy at another hospital; however, symptom did not relieve. Half a year later, he consulted our hospital. Digital subtraction angiogram demonstrated bilateral Saltzman-type II primitive trigeminal arteries (PTAs) and left trigeminal artery-cavernous sinus fistula. After proximal segment of the left PTA and the fistula were both embolized with detachable coils, the annoying symptoms subsided. The following three years was uneventful. Unilateral PTA has been reported to have an incidence of 0.34% on MR angiography while bilateral PTAs are extremely rare and just presented by case reports. There has been no report of bilateral PTAs with a spontaneous fistula from one PTA to the ipsilateral cavernous sinus. Herein, we report such a rare curiosity.

Clinically Significant Incidental Finding of Lumbar Spine MRI during Routine for Low Back Pain

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PURPOSE: MRI is widely used in assessing patients with low back pain. Some clinically significant findings are sometimes missed at initial report because the lesions are outside the region of the initial clinically interest. We tried to find the extraspinal incidental finding with clinical significance.

MATERIALS AND METHODS: The study population included the patient with low back pain and clinically suspected spinal stenosis. All patients underwent routine non-enhanced lumbar spine MRI in 2010-2011. In the patients who received abdominal CT within one year, we compared the MRI and the CT to find if any incidental finding.

RESULT: The clinically significant incidental findings included renal tumor (renal cell carcinoma, lymphoma), adrenal tumor, liver tumor, aortic aneurysm, paraaortic lymphadenopathy, colon cancer, huge uterine myoma and hydronephrosis. The total incidence of these incidental finding is about 0.7 %. The MRI characteristics of such findings are briefly described.

CONCLUSION: The incidental finding of routine lumbar MRI study is not rare. These findings may be more significant than the spinal problems and can have significant impact on patient management. The images needs to be zoomed out to ensure that the entire field of view is reviewed and the coronal images may offer more information and clarify the abnormality suspected on other sequences.
Intraosseous schwannomas are rare and account for less than 0.2% of primary bone tumors. Though most commonly seen in the mandible, they have rarely been reported in the vertebrae. Most schwannomas on spinal radiography present as space-occupying lesions without bony destruction. However, intraosseous schwannoma tend to show invasion and osteolytic expansion of the vertebral body. Such tumors have to be differentiated from other osseous, destructive lesions, such as giant cell tumor, aneurysmal bone cyst, osteoblastoma, and metastases. The presence of neural foramen widening and vertebral body scalloping can be helpful, differentiating features. We report two cases of intraosseous schwannoma that were diagnosed using magnetic resonance imaging. One 19-year-old man presented with cervical intraosseous schwannoma involving C4-6 vertebrae. Another 68-year-old man presented with intraosseous schwannoma involving left sacral ala. Osteolytic expansile bony lesions were recognized in both of these two cases.

Conus medullaris arteriovenous malformation (CMAVM) is a new category of spinal AVM. The purpose of this study was to describe the etiology, clinical presentation and treatment of conus medullaris arteriovenous malformation (CMAVM), a new category of spinal AVM. We reported a 37 year-old female patient who had progressive right foot weakness for 5 years and became palsy with drop foot in recent 2 years. Spinal digital subtraction angiography reveal CMAVM with a glomus nidus at the T12/L1 level which consist of multiple direct arteriovenous shuntings from right L1, L4 and left T12, L1 radiculomedullary arteries to the perimedullary venous system and forming a huge, distortion draining vein. The distended venous varies compressed the patient’s right L5 and S1 nerve result in her radiculopathy. The location of the nidus and the direct arteriovenous shunting do not fit into the previous categories, and thus classified as the conus medullaris AVM. The location of the nidus and the direct arteriovenous shunting do not fit into the previous categories, and thus classified as the conus medullaris AVM. Our patient is classified as macroarteriovenous (MAVF) due to multiple arteriovenous shuntings and a large draining vein. Tracing back her genealogical tree, no other relative was diagnosed with HHT, however, we can not totally excluded the entity because a new mutation may have occurred in an affected patient without a family history of HHT. MAVF has different etiology from other spinal AVM which are usually congenital. Up until now, there were only few cases of conus medullaris AVM reported in the literature. It can manifest with venous hypertension, compression, or hemorrhage symptomatically, however, unlike other spinal arteriovenous lesions, they frequently produce radiculopathy and myelopathy at the same time. Magnetic resonance imaging (MRI) provides the detection of the abnormal vasculature within the spinal cord and digital subtraction angiography (DSA) can further confirm the diagnosis by providing the location and the detail connection among the vessels. Treatment options include embolization, surgery, and embolization followed by surgery. Interdisciplinary neurosurgical and neuroradiological cooperation make most spinal vascular malformation diagnosed at early stage and treated with favorable result.
Comparison of Radiological Measures for Diagnosing Flatfoot

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BACKGROUND: In the Taiwanese military, flatfoot is indicated by a calcaneal-fifth metatarsal angle (arch angle) $\geq 165^\circ$. However, the arch angle is not always easily defined.

PURPOSE: To assess correlations between the arch angle and other radiographic measures and thus identify an alternative radiographic measure for diagnosing flatfoot.

MATERIAL AND METHODS: 87 male Taiwanese military recruits were studied, median age 22.0 years, interquartile range 20.0 - 23.0 years. Lateral, weight-bearing radiographs were taken. Five radiographic measurements, including the calcaneal-fifth metatarsal angle (arch angle), medial arch angle (MAA), and calcaneal pitch angle (CP), talus angle (TA) and talar-first metatarsal angle (TFM) were made. Correlations between the arch angle and all other measures were determined. A cut-off value for predicting flatfoot (arch angle $\geq 165^\circ$) was determined for each measure using the Youden index and receiver operating characteristic (ROC) curves were generated for each measure to assess diagnostic accuracy.

RESULTS: All measures were significantly correlated with arch angle ($P<0.05$); however, the strongest correlation was for CP ($\rho = -0.905$, $P<0.001$). CP was associated with the highest area under the ROC (0.988 vs 0.711-0.912 for the other measures). Further, CP (cut-off < 12.3°) had the highest sensitivity (92.0%), positive predictive value (76.7%), and negative predictive value (96.5%). TFM (>9.5°) had the highest specificity (90.3% vs 88.75 for CP < 12.3°).

CONCLUSION: CP is inversely correlated with arch angle in Taiwanese male military recruits. CP < 12.3° is a significant predictor of flatfoot. Assessment of CP may be used as an alternative means of diagnosing flatfoot when the arch angle is not easily defined.

The Radiographic and Magnetic Resonance Imaging Presentations of Wrist Tuberculous Tenosynovitis

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To evaluated the radiographic and magnetic resonance imaging (MRI) presentations in wrist tuberculous (TB) tenosynovitis.

MATERIAL AND METHODS: We retrospectively collected 8 patients (5 males and 3 females, aged 35-82 with mean age of 65) with wrist TB tenosynovitis between October 2005 and October 2011, underwent plain radiographic and MRI examinations and subsequent operation with pathological proof. The MRI machine used was Philips Achieva 1.5 tesla. 7 patients received intravenous gadoliniu m injection for enhancement study. The radiographic features were checked about obliteration of pronator quadrates and scaphoid fat stripes, soft issue swelling, osteopenia, bony erosion, calcifications and periosteal reactions. The chest films were checked about concomitant pulmonary TB. The MRI features were checked about involvement of flexor and extensor tendons, length of involvement, granulation tissue, rice bodies, abscess, synovitis and osteomyelitis, and type of TB tenosynovitis.

RESULTS: 5 patients had right wrist involvement and 3 left. On radiography, 8 patients revealed obliteration of pronator quadratus fat stripe and 7 scaphoid fat stripe, 7/8 with osteopenia, 4/8 with bony erosions and 1/7 with calcifications and periosteal reactions. Only 1/8 with evidence of pulmonary TB on chest films. The length of involvement on sagittal MR measured about 9.7 cm in average. 7 revealed flexor tendon and 6 extensor tendon involvement. All patients revealed granulations and rice bodies and abscess formation. 6 patients with wrist synovitis and 5 patients with osteomyelitis. 6 patients revealed serofibrinous type and 2 patients fungoid type. 6 patients revealed residual or recurrent disease after operation and 2 patients lost on follow on.

CONCLUSION: TB tenosynovitis of wrist was a chronic process with extensive involvement of flexor and extensor tendons, with granulations and rice bodies and abscess formation, sometimes with synovitis and osteomyelitis of wrist on MRI. Most patients revealed serofibrinous type of disease. Obliteration of pronator quadrates and scaphoid fat stripes and osteopenia usually can be found radiographically. Only rarely patients has concomitant pulmonary TB. Post-operative recurrence is common.
Characterization of Gelatin/Hyaluronic Acid/Chondroitin Sulfate Sponge for Cartilage Tissue Engineering by MRI

INTRODUCTION:

Altered perfusion in subchondral bone results in changes of fluid flow pressure and oxygen gradient, which could lead to bone remodeling, degeneration of cartilages and even OA. The purpose of this study is to investigate perfusion changes of subchondral bone in patellofemoral joint of rats with experimental OA model.

METHODS:

Eighteen Sprague Dawley rats were enrolled and randomly separated into three groups. Group 1 was the control group. Group 2 was the experimental group whose right knee was performed with anterior cruciate ligament (ACL) transection for induction of cartilage degeneration. At 0, 4th, 13th and 16th week after ACL transection, all the right knees of the rats were imaged in a supine position in a 4.7T MR system (Bruker, Ettlingen, Germany). The images were acquired with a surface coil using T1-weighted fast gradient echo sequence. Brix model was performed to calculate the perfusion parameters.

RESULTS:

Reduced washout rate of the contrast agent was shown both in the patellar and femoral subchondral bone of OA rats (P < 0.05). The perfusion parameters differed significantly between OA rats and control rats. The perfusion parameters of OA rats were lower than those of control rats.

DISCUSSION:

To our knowledge, this is the first time to analyze perfusion changes in cartilage tissue, which may provide potential for early detection of OA.

CONCLUSION:

MRI can provide potential for early detection of OA.
Accessory Sacroiliac Joints

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PURPOSE: Using computed tomography images for the diagnosis of accessory sacroiliac joints mimicking focal erosive sacroilitis on plain radiographs.

CASE REPORT: 4 patients with the suspicious erosive sacroiliitis under Ferguson view plain radiographs received computed tomography of the pelvis; oblique coronal reconstructed images were created for the demonstration of anatomical relationship of the sacroiliac joints.

RESULTS: Accessory sacroiliac joints with degenerative change were showed on pelvic oblique coronal reconstructed computed tomography images, which can help in differentiating from other sacroiliac arthropathies

Conclusion: Computed tomography image is helpful to make the correct diagnosis and avoid mis-diagnosis of accessory sacroiliac joints, which mimicking focal erosive sacroilitis on plain radiographs.

Pigmented Villonodular Synovitis of The Lumbar Spine: a case report

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BACKGROUND: Pigmented villonodular synovitis (PVNS) arising from spinal facets is rare. Large lesions obscure the fact origin and simulate an aggressive intraosseous neoplasm. The treatment of choice is usually a synovectomy. Local recurrence is common.

CASE PRESENTATION: A 39-year-old man suffered from low-back pain and right leg numbness for a few months. Physical examination revealed full and symmetric muscle power. A sensory nerve conduction velocity test showed mild lumbar radiculopathy on the right side. No remission after rehabilitation and anti-inflammatory treatment was noted. MRI of the lumbar spine showed a low-signal-intensity soft-tissue mass (as expected with iron) arising from the right articular facet of L2-3, with extension into the neural foramen and spinal canal. After gadolinium administration, the lesion depicted nonhomogeneous obvious enhancement. The patient then received radical excision of the mass lesion and laminectomy. Histopathology revealed mononuclear cells with reniform nuclei and eccentric eosinophilic cytoplasm, admixed with multinucleated giant cells and histiocytes, compatible with diffuse-type giant cell tumor (PVNS). Proliferative synovial tissue with hemosiderin deposition was also seen. Three months later, MRI showed an enlargement of the low-signal-intensity area (“blooming”) that is caused by magnetic susceptibility artifact from hemosiderin deposits within the recurrent mass, which signifies pathognomonic of PVNS at MR imaging.
Biphosphonate-Related Atypical Femoral Fracture: two case reports

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PURPOSE: Biphosphonate (BP) has been utilized to prevent complication of osteoporosis for many years. Recently, atypical fractures under long term treatment with bisphosphonates have been reported, although no causal connection has been known. We present two cases of atypical fracture with use of bisphosphonates in my hospital.

CASE REPORT: The first case is a 72-year-old female patient with history of BP use for 10 years since Aug, 2000. The plain film revealed focal lateral cortical thickening over right subtrochanter since 2003 and over left since 2011. The other is a 61-year-old male had left subtrochanter fracture in Dec. 2011. Tracing her history, she has used BP for 1.5 years. At first, she also had focal lateral cortical thickening over left subtrochanter. Unfortunately, she had left transverse subtrochanter fracture in Nov, 2011.

RESULTS: The subtrochanter fracture has been usually due to high-energy trauma since the past. In the group of the people with long-term use of BP, the atypical fracture was noted. The mechanism of so-called atypical femoral fracture is still unknown. The hypothesis of bone turnover is broadly accepted temporarily. The radiographic feature has the features of clear thickening of the lateral cortex or a separate fragment in the atypical fracture. We probably need to sympathize the importance of the atypical fracture, especially in those with lateral breaking rather than with complete fracture or without complication.

CONCLUSION: In the group with long-term use of BP, the check of bilateral femurs may be worthy. The early presentation of cortical thickening or separate fragment is a red flag sign, and helps the radiologist and clinician for early prevention of complete atypical femoral fracture. If the BP were held or not, it would take more evidence.

Primary Malignant Fibrous Histiocytoma from Femur: a case report

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While malignant fibrous histiocytoma arising from soft tissue is not uncommon, it only rarely occurs as a primary tumor in bone. We report a case of primary pleomorphic malignant fibrous histiocytoma presented with left knee pain for 6 months. This 31-year-old female was referred to our institute for osteolytic destructive bone lesion at left distal femur shown by X-ray without periosteal reaction. MRI was performed revealing a bone tumor of left distal femur with character and enhancement pattern not typical for osteosarcoma, and sono-guided biopsy specimen showed malignant tumor. Total knee replacement was performed and pathology for this wide-excision bone specimen showed pleomorphic malignant fibrous histiocytoma. The patient also had multiple lung metastases on chest CT at admission. She then received series of chemotherapy after operation. In conclusion, bone malignant fibrous histiocytoma should be in the differential diagnoses when atypical radiologic findings of a bone tumor is encountered.
Imaging Features of an Intraosseous Arteriovenous Malformation in the Tibia: a case report and review of literature

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Primary intraosseous arteriovenous malformations (AVM) are very rare. We report a case of primary intraosseous AVM in the tibia. A careful retrospective inspection of the preoperative lower extremity in T1- and T2-weighted magnetic resonance imaging (MRI) of our patient found characteristic morphologic features specific to vascular bone tumors, including subtle linear and nodular hypointense areas, regarded as vascular channels within the lesion. This report indicates that familiarity with the characteristics of MRI and radiographic images of intraosseous AVMs can facilitate the diagnosis, prevent unnecessary biopsy with potentially large hemorrhage, and guide subsequent treatment by transcatheter embolization or surgical resection.

Tuberculous Osteomyelitis of Symphysis Pubis Presents with Right Medial Thigh Mass: a case report

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PURPOSE: To present a rare case of tuberculous symphysis pubis presented with right medial thigh mass.

CASE REPORT: A 76-year-old male patient visited our OPD with complain of a mass with mild tenderness in right upper medial thigh recently. The femoral hernia was suspected by the surgeon and sonography was arranged for him. Sonography showed a cystic mass with a little echogenic debris in right upper medial thigh and upward extended to right rectus abdominis muscle. Then the patient was admitted for further study. The CT scan of pelvis showed osteolytic lesions in symphysis pubis with cystic masses extending to right adductor muscles and right rectus abdominis muscle, a little calcified debris in the cystic mass. The symphysis pubis osteomyelitis with abscesses is impressed and R/O tuberculous arthritis due to relative non-toxic symptoms and large cystic part. The surgical drainage and sequestrectomy are performed. The specimens are sent for lab and pathological exam. The result showed positive for tuberculosis smear and culture and negative for bacterial culture and malignancy. The diagnosis of tuberculosis osteomyelitis with cold abscess is made.

CONCLUSION: The tuberculosis osteomyelitis of symphysis pubis with cold abscess is rare in developed country. To combine clinical symptoms and imaging finding may make preoperative diagnosis possible.
Magnetic Resonance Imaging of Rhabdomyolysis: Muscle Necrosis versus Ischemia

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Rhabdomyolysis is a clinical and biochemical syndrome with definitive diagnosis made by laboratory evaluation. With the evolving of magnetic resonance imaging (MRI), the specific presentation of rhabdomyolysis in imaging can be used as a tool in differentiating various etiologies of myopathies and, also the modality of choice to evaluate the distribution and extent of injury of affected muscles. Two distinct imaging types of rhabdomyolysis can be distinguished in the initial of diagnosis, i.e. type 1, homogeneous signal changes and enhancement in the affected muscles, and type 2, homogeneous or heterogeneous signal changes and rim enhancement, and might presence of stipple sign in the affected muscle on contrast-enhanced images. However, to our best knowledge, no literature dealt with the imaging-histological correlation that indicated the affected muscles were reversible (ischemia) or irreversible (necrosis) was reported. We would present a case of rhabdomyolysis showing typical type 1 and type 2 signal changes on the initial MRI, and complete remission of signal changes in type 1 lesion (ischemia), and persistence of type 2 lesion (necrosis) on follow-up MRI after 3 months.

Primary Lymphoma of Bone after Successful Treatment Mimicking Paget’s Disease on Radiography: a case report

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Primary lymphoma of bone (PLB) is a rare disease, accounting for fewer than 5% of malignant bone tumors. It has good response to chemotherapy and radiotherapy, or combination of both. The radiographic appearances of PLB before treatment could be an osteolytic lesion with permeative or moth-eaten pattern of bony destruction and aggressive periosteal reaction. After treatment, reduction of tumor volume with new bone formation and bone remodeling may ensue. However, the newly formed bone would be structured with thickened cortex and coarse trabeculation gradually, similar to those of Paget’s disease. We would present a case of primary lymphoma of bone after successful chemotherapy with radiographic appearances mimicking Paget’s disease.
Ultrasonographic Assessment of Painful Shoulders after Arthroscopic Repair of the Rotator Cuff

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PURPOSES: To describe the ultrasonographic (US) findings of painful shoulders that had received arthroscopic repair of the rotator cuff.

METHODS: US was carried out in 56 symptomatic shoulders that had received arthroscopic repair of the rotator cuff in 56 patients (30 female and 26 male; aged from 45 to 65 years, mean age = 53.7 years). Thirty-two shoulders were proved by arthroscopy and the rest shoulders by being correlated with MRI, MR-arthrography and clinical follow up.

RESULTS: US accurately diagnosed the subacromiosubdeltoid (SASD) bursitis and glenohumeral (GH) synovitis in all shoulders and, detected all 8 massive (> 3 cm in diameter), 12 medium (1-3 cm in diameter), and 7 of 12 small (≤ 1 cm in diameter) recurrent rotator cuff tears. Eighteen of 24 intact rotator cuffs were confirmed by US. Three delaminated tear and 4 medial dislocation of the long head biceps tendon were correctly diagnosed as well. In one shoulder, an intraarticular suture pin fragment was detected.

CONCLUSIONS: US are an effective imaging tool for evaluating a symptomatic shoulder that had received arthroscopic repair of the rotator cuff.

Innovative Composition for Treating Cartilage Defects in Pig Model: MRI T2 Mapping Correlates with Histology

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PURPOSE: The goal of cartilage repair is to regenerate hyaline cartilage by transplanting tissues or cells. Quantitative T2-map MRI of knee cartilage is sensitive to the organization of collagen fibers in cartilage. The present invention relates to a novel composition of treating an articular cartilage defect, with assessment by T2-map MRI and histology.

MATERIALS AND METHODS: A total of 16 pigs (32 experimental legs) were studied. In each group, a cartilage defect was created in the weight-bearing portion of the medial femoral condyle of both legs. In group A (n = 8), platelet-rich fibrin (PRF) and cartilage fragment were implanted; in group B (n = 8), only autologous PRF was implanted; in group C (n = 8), only autologous cartilage fragments were implanted; group D (n = 8) had no implantation. Each group has two knees with cartilage defects. The blood was drawn from the pigs, collected in a container, and then centrifuged. After centrifugation, the jelly-like PRF was obtained in the middle part of the centrifuge tube. MRI was performed 6 months after surgery, and the animal was then sacrificed.

RESULTS: On MRI, the regenerated cartilage in group A had higher T2 value than that of groups B and C, and had no difference from normal cartilage (A, P = 0.69). MRI T2-value in B and C (P < 0.01) were significantly different from normal cartilage.

CONCLUSION: We conclude that novel composition of PRF and cartilage Fragments can facilitate the healing process of injured articular cartilage, and T2-map MRI can be a powerful tool to monitor cartilage regeneration.
Sonographic Features Predictive of Benign Thyroid Nodules: Important of Avoiding Unnecessary Ultrasound-Guided Fine Needle Aspiration Biopsy

**PURPOSE:** We aimed to develop a feature-oriented approach to characterize benign thyroid nodules that do not require ultrasound-guided fine needle aspiration (US-guided FNA).

**MATERIALS AND METHODS:** We finally reviewed 374 patients (298 women and 76 men) having complete medical records and US-guided FNA. The nodular content (solid or cystic); echogenicity (hyperechoic, isoechoic, hypoechoic) relative to strap muscle; calcification (micro, coarse, or absent); nodular margin (well-defined or ill-defined); vascularity (increased or decreased) relative to the normal part of the thyroid tissue; and lymphadenopathy (neck node with calcification or short-axis > 10 mm) were evaluated. Finally, all US features were classified into 3 category: 1) Benign nodules that did not require US-guided FNA but follow-up 6 months to 12 months later was required; 2) Indeterminate, which can be follow-up 6 months later or US-guided FNA; 3) Atypical nodules or suspected carcinoma, which required US-guided FNA.

**RESULTS:** Of the 374 nodules, 354 (95%) were benign and 20 (5%) malignant. There were 260 thyroid nodules (69.5%) that proved benign on cytology. The following US features were classified as category 1: without calcification, well-defined margins, without increase vascularity and no lymphadenopathy. There were 60 thyroid nodules (16%) classified as category 2. Indeterminate. The remaining 54 thyroid nodules (14.4%) with US features of calcification, blurred margins, increase vascularity, lymphadenopathy were classified as category 3.

**CONCLUSION:** The US features of no calcification, no increased vascularity, well-defined margin, and no lymph node enlargement are highly predictive of benign nodules, and thereby, aspiration biopsy can be avoided in clinical practice.
Recognizing the Isolated Splenic Peliosis: a case report

INTRODUCTION: Peliosis is the cystic deformity of vascular structure within parenchymatous organs including the liver, spleen, bone marrow, lymph nodes, lung, parathyroid glands and kidneys. Splenic peliosis often occurs in conjunction with hepatic peliosis, while isolated splenic peliosis is extremely rare with few documented cases.

CASE REPORT: Heterogeneous splenic mass was found in a 60-year-old female patient with thymus carcinoma during routine follow up. Abdominal ultrasonography (US) and computed tomography (CT) both revealed a hypervascular mass with progressive size enlargement. Total splenectomy was performed and pathologic analysis confirmed the diagnosis of splenic peliosis.

CONCLUSION: Splenic peliosis is benign in nature with no malignant potential. However, its image appearance may mimic tumor growth, and requires vigorous investigation due to different treatment strategies adopted for benign and malignant entity. Also, spontaneous or minor trauma related rupture leading to life-threatening peritoneal hemorrhage prompts the early recognition of the disease. Therefore, splenic peliosis is an important differential diagnosis to keep in mind when suspected during image study.

Metallosis: a case report

CASE PRESENTATION: This is a 49-year-old female who received bilateral total hip arthroplasties more than 8 years. She suffered from left hip pain with lower limb weakness and the symptoms were getting worse. There was no trauma history in recent months. At the same time, fever and general malaise were also noted. She visited our ER and whole abdominal CT was arranged to exclude intra-abdominal abscess. CT findings showed a 6.4cm non-enhancing lesion with heterogeneous density and peripheral high density with some internal high density septations anterior medial to the left hip. Abscess was not likely. For further evaluated this lesion. Pelvis MRI was performed and pathologically found that many black pigments engulfed by histiocytes in a densely fibrotic background. Metallosis due to articular prosthesis was diagnosed.

DISCUSSION: Metallosis is a rare complication of total hip arthroplasty. It is defined as an infiltration of peri-prosthetic soft tissue and bone by metallic debris resulting from the wear of arthroplasty. Diagnosis is normally made on clinical suspicion supplemented by radiographic evidence and surgery. There is few studies emphasis imaging findings of metallosis. In this article, we reported a case with metallosis with complete image studies and pathology proven.
Disseminated Klebsiella Pneumoniae Infection in DM Patient

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A 60-year-old woman with poor-controlled type II diabetes mellitus presented to the emergency department because of fever for three days. Abdominal pain was told. Abdominal sonography revealed an 8cm lobulated hypoechoic lesion with internal septum and cystic change at S6 of liver. Abdominal CT disclosed a 7.8x5.8cm honeycomb lesion with septation and minimal rim-enhancement at S6. Chest radiograph showed radiculonodular pattern of lungs. Chest CT revealed multiple enhanced nodular lesion and fracture of T6 with paraspinal abscess formation. Right red eye and headache were noted. Brain CT showed multiple brain nodules with rim-enhancement. Circumferential thickening of the scleral margin with enhancement of right eyeball was also found. showed. Klebsiella pneumoniae was cultured from her blood. The final diagnosis was disseminated Klebsiella pneumoniae infection with liver abscess, pneumonia, spinal osteomyelitis, endophthalmitis, and multiple brain microabscess. The infection was controlled after administration of antibiotics. We share this case for the diversity of the presentation of K. pneumoniae infection.

Splenic Sclerosing Angiomatoid Nodular Transformation: a case report

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Splenic vascular neoplasm includes a lot of entity such as hemangioma, lymphangioma, hamartoma, hemangioendothelioma and angiosarcoma. Sclerosing angiomatoid nodular transformation (SANT) of spleen has been a new, rare and recently defined distinct pathological vascular disorder of the spleen by Martel et al. in 2004. The SANT is characterized by vascular space lined by endothelial cells and interspersed ovoid cells, and circumscribed by granulomatoid tissues. SANT was reported to cause no symptom in the patients and generally incidentally found. Imaging studies often reveal splenic nodules with internal calcified foci and centripedal delayed contrast enhancement. Its prognosis was reported to be excellent after splenectomy and no tendency for recurrence.