Hybrid imaging with $^{18}$F-FDG PET/CT has revolutionized the practice of imaging in oncology patients. The clinical utility of FDG PET/CT in pediatric oncology is most well-established in the evaluation of malignant lymphomas, which comprise about 15% of childhood cancers in Western populations. In Hong Kong, the incidence is lower with these tumors comprising about 8.5% of cancers in children, non-Hodgkin lymphoma (NHL) being about 3 times more common than Hodgkin lymphoma (HL) (HKPHOSG 2013 data). Of the NHL subtypes, Burkitt lymphoma, lymphoblastic lymphoma, anaplastic large cell lymphoma and diffuse large B-cell lymphoma are the most common. These are aggressive subtypes that are typically $^{18}$F-FDG avid. In a meta-analysis, it was found that sensitivities and specificities for initial staging of pediatric lymphomas are 96%–99% and 95%–100%, respectively (1). Compared to conventional staging methods, FDG PET/CT provides higher diagnostic accuracy in lesion detection (96.7% vs. 85.2%) and has been found to change disease stage in 15–20% of patients (2–5). Moreover, recent studies have suggested that bone marrow biopsy that has been used in routine staging may be omitted in HL due to the superior sensitivity of FDG PET (6, 7). In treatment response assessment, FDG-PET/CT has been incorporated into the 2007 International Working Group guidelines for response assessment of HL and aggressive NHL (8). Compared to conventional morphologic imaging using CT or MRI which lacks specificity in the characterization of residual masses that often remain after treatment, FDG-PET allows better discrimination between viable tissue and fibrotic residual masses by showing the altered metabolism. It is of high sensitivity and negative predictive value (9), and this has been found useful in selecting HL patients for omission of consolidation radiotherapy (10) in a cohort with early stage disease. Furthermore, in a pediatric cohort of intermediate risk HL patients, early response assessment was useful in tailoring treatment (11). However, positive predictive values, especially for interim response assessment scans have been found relatively poorer in children compared to adults (12, 13).

In the evaluation of bone sarcomas; osteosarcoma and Ewing's sarcoma, FDG PET/CT has been found useful in guiding biopsy, and in staging, it was found superior to conventional imaging, including $^{99m}$Tc bone scans, in detection of lymph node and bone metastases (14–16). Moreover, change in standardized maximum uptake value after neoadjuvant chemotherapy was prognostic in prediction of response (17). For rhabdomyosarcomas, it was found that FDG PET was accurate for staging in 89% of patients compared to 54% with conventional imaging (18), and in response assessment, FDG PET/CT correctly identified tumor response in 92% of patients after 3 cycles of chemotherapy, compared with 84% with conventional modalities (19). For neuroblastomas, FDG PET/CT has not been found superior to $^{123}$I-MIBG scintigraphy generally, and thus, FDG PET/CT is indicated only in the event of discrepant or inconclusive findings on $^{123}$I-MIBG scintigraphy, and in tumors that fail to/weakly accumulate $^{123}$I-MIBG (20).

There is no doubt that PET/CT will find an increasing role in the imaging of pediatric tumors. In view of the relatively high radiation dose imparted by PET/CT, the indications should always be rigorously justified and the scan protocols well optimized.

References


MC 01 PD-02 14:20  
Evaluation of utility of PET/CT versus CECT in baseline, interim and posttreatment assessment of pediatric Hodgkin lymphoma

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PURPOSE: To evaluate the role of PET/CT in baseline and interim evaluation of Hodgkin lymphoma. To evaluate the treatment implications of additional findings detected on PET/CT scans on baseline/interim/end of treatment assessment.

MATERIALS AND METHODS: Twenty six newly diagnosed patients of Hodgkin Lymphoma were enrolled into the study. Baseline staging was done in all twenty six patients. Interim assessment was done in twenty patients and end of treatment response assessment was done in fifteen patients. At all the three time points CECT and PET/CT was done in single setting. Ann Arbor staging was done separately for CECT and PET/CT and upstaging/downstaging and change in treatment was noted. Interim and end of treatment response assessment was done separately for CECT and PET/CT using Cheson criteria and its concordance and discordance was noted.

RESULTS: PET/CT upstaged eleven patients (11/26, 42.30%, p = 0.02 ), four patients were upstaged from Stage II to stage III, one patient from Stage II to Stage IV and six patients from stage III to stage IV. No patient was downstaged by PET/CT. Out of eleven upstaged patients change in treatment was noted in seven patients (7/26, 26.9 %). At interim assessment out of twenty patients, there was concordance between CECT and PET/CT in fourteen patients (14/20, 70%, p = 0.06). At final assessment out of fifteen patients, there was concordance between CECT and F18- FDG PET/CT in thirteen patients (13/15, 86.6%, p = 0.5).

CONCLUSION: PET/CT can detect additional lymph nodes in significant number of patients but all of these do not lead to change in stage. The role of PET-CT in Hodgkin lymphoma at baseline and end of treatment response assessment is well established. Our study emphasizes that an interim PET-CT can alter the treatment plan, however a larger study is needed to be done to validate the same.

Figure 4 (a-d): PD on CECT and PR on PET/CT at interim assessment.

Figure 1 (a-f): Upstaging due to marrow involvement.
MC 01 PD-03  14:30
Radiologic evaluation of carmustine (BCNU) pneumonitis in children
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PURPOSE: To describe radiologic findings of drug-induced pneumonitis following carmustine (BCNU)-based preparative regimens for autologous peripheral blood stem cell transplantation (aPBSCT) in children.

MATERIALS AND METHODS: From 2010 through 2014 in our institution, among 35 patients who received carmustine-based preparative regimens for aPBSCT, 9 patients (6 boys and 3 girls; 3–17 years; mean 10 years; 7 lymphoma and 2 leukemia patients) presented respiratory symptoms and radiologic abnormalities. They had no evidence of infection, cardiogenic edema, and other explainable causes. The chief complaints were fever (n = 8, 89%), dyspnea (n = 4, 44%), and cough (n = 2, 22%). The symptoms developed at 40th day on average (range 34–51 days) after receiving carmustine-based preparative regimens. Chest radiographs and CT scans performed under the impression of infection at the first of respiratory symptoms were reviewed by 2 pediatric radiologists who reached consensus in analyzing the presence and distribution of ground-glass opacity (GGO), consolidation, septal thickening and other various patterns of interstitial pneumonitis, and pleural effusion.

RESULTS: Radiographic findings were bilateral patchy GGO (n = 9, 100%) combined with consolidation (n = 3, 33%) and septal thickening (n = 6, 67%). Pleural effusion were noted in 5 patients (56%). CT findings were patchy GGO (n = 9, 100%), localized consolidations (n = 4, 44%) and septal thickening (n = 7, 78%). The distribution of lesions were bilateral (n = 9, 100%) and lower lobar predominant (n = 6, 67%). There was no central/peripheral, or anterior/posterior predilection. Pleural effusion was seen in 6 patients (67%) at CT scans and was bilateral in all.

CONCLUSION: Bilateral patchy GGO combined with or without consolidation, septal thickening and bilateral pleural effusion were common radiologic findings in drug-induced pneumonitis following carmustine-based preparative regimens. It should be differentiated from pulmonary infection which is critical and frequently encountered in oncologic patients.

MC 01 PD-04  14:40
Characterization of diffusion-weighted MR imaging of thymus in childhood-thoracic cancer survivors
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PURPOSE: To clarify diffusion-weighted (DW) MRI findings of normal or hyperplastic thymus in survivors of childhood thoracic malignancy.

MATERIALS AND METHODS: A total of 77 consecutive MRI studies with DW imaging in 25 children (13 boys, 12 girls; 1–15 years) performed during follow-up after completion of thoracic cancer treatment were retrospectively reviewed. Normal or hyperplastic thymus were confirmed by clinical and imaging follow-up for at least 6 months. DW MRI was performed at b values of 0 and 800 s/mm² and ADC value was obtained. MRI was evaluated qualitatively by means of visual assessment and quantitatively by means of ADC measurements.

RESULTS: Normal (40/77, 52%) or hyperplastic (33/77, 43%) thymus were present in 95% (73/77) studies and 96% (24/25) patients. Restricted diffusion (RD) in the thymus was identified in 38% (28/73) studies, more frequently in the hyperplastic thymus (55% vs. 25%, p = 0.005). The majority of the cases demonstrated focal RD pattern (89%, 25/28). The mean age did not show a significant difference between RD and unrestricted diffusion (URD) of the thymus (p = 1.000). The thymus with RD showed significantly lower ADC values, compared to that with URD (1.46 ± 0.38 mm²/s vs. 2.73 ± 0.36 mm²/s, p < 0.001).

CONCLUSION: RD with low ADC value in the normal or hyperplastic thymus was identified in 38% MR studies of survivors of childhood thoracic malignancy. Knowledge of the incidence and pattern of RD in normal or hyperplastic thymus can reduce or obviate invasive diagnostic procedure in childhood-cancer survivors.
Computed tomography has significantly altered the radiologic evaluation of disease processes in children. This talk focuses on:

- Benefits and challenges of multidetector CT for children, covering the technical considerations of pediatric MDCT including guidelines for contrast administration and low dose scanning parameters for pediatric patients.
- Understanding of CT’s role in investigating childhood diseases and accurate diagnoses in virtually every body site --- from its indications and limitations to its most promising clinical applications.
Determination of age-specific conversion factors for effective dose: chest and abdomen-pelvis CT at Korean children

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PURPOSE: To determine age-specific conversion factors for effective doses in Korean pediatrics.

MATERIALS AND METHODS: Among CT taken from February 2009 to May 2015, 20 chest and 20 abdomen-pelvis CT examinations with normal findings were chosen from each of the four different age groups (0–12 months, 1–5 years, 6–10 years and 11–15 years). Finally, 160 cases of pediatric chest and abdomen-pelvis CT with normal findings comprised our study. The Monte Carlo calculations were performed by using the commercialized dosimetry tool (ImpactMC). CT image-based Monte Carlo simulation was performed and organ doses were measured by drawing ROIs in the corresponding organs on the simulated dose distribution images. Tissue Weighting Factors in ICRP Publication 103 were used to calculate effective doses from organ doses. Conversion factors at different tube voltages were calculated in each age group by dividing the effective dose by the dose length product (DLP). The mean conversion factor was considered as the representative value for each age group.

RESULTS: Conversion factors for chest CT ranges between 0.0179 and 0.0548. Conversion factors for abdomen-pelvis CT ranges from 0.0186 to 0.0592. Conversion factors at different tube voltages were calculated in each age group by dividing the effective dose by the dose length product (DLP). The mean conversion factor was generally higher than the previously reported values.

CONCLUSION: From Monte Carlo simulation using CT images, conversion factors of chest and abdomen-pelvis CT in Korean children were calculated according to the tube voltage and age.
scoring system for qualitative comparison.

**RESULTS:** The maximal SNR values in all arteries were observed at 50 keV (Monoplus), and 70 keV (Mono), while 40, 50, 60 keV images showed no significant difference respectively. The maximal arterial CNR values were observed at 40 keV (Monoplus), and 60 keV (Mono). The SNR, and CNR of ‘Monoplus’ was significantly higher than that of ‘Mono’ and polychromatic CT. Scores for overall image quality, visibility of common hepatic artery, and streaking artifacts were better in ‘Monoplus’ than ‘Mono’ and polychromatic CT, however showed no significant difference.

**CONCLUSION:** The advanced virtual monoenergetic reconstruction of contrast-enhanced dual-energy CT angiography of the abdomen at 40 keV (optimal energy levels) maximize image quality compared with scans obtained with conventional monoenergetic and polychromatic CT.

**MC 01 PD-08**

**Pediatric liver CT at 70 kVp in comparison with standard scanning at 80–100 kVp: preserved image quality and decreased radiation dose**

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**PURPOSE:** To assess the image quality and radiation dose of pediatric liver CT acquired at 70 kVp during the hepatic arterial phase in comparison with standard scanning at 80–100 kVp.

**MATERIALS AND METHODS:** From April 2015 to September 2015, 19 cases of pediatric liver CT were performed in 15 children (mean age, 50.5 months; mean BMI, 20.9) with a fixed tube potential of 70 kVp and a reference tube current of 700 mAs during the hepatic arterial phase (AP) (group A) and the portal venous phase was obtained with the standard protocol using the automatic tube voltage selection and current modulation (reference tube voltage, 120 kV; reference tube current, 150 mAs). 25 cases of liver CT in 18 children (mean age, 39.3 months; mean BMI, 20.6) where both the AP and PP were obtained with the same standard protocol were included for comparison (group B). For quantitative analysis, noise, signal to noise ratio (SNR) and contrast to noise ratio (CNR) were calculated. Subjective overall image quality, noise, visibility of main hepatic arteries and streaking artifacts were evaluated using a 3- or 5-point scoring system for qualitative comparison. Radiation dose reduction (%) of 70 kVp scanning was calculated on the basis of the volume CT dose index (CTDvol) during the AP divided by the CTDvol during the PP.

**RESULTS:** Group A showed significantly higher noise and lower SNRs at the paraspinal muscle, liver than group B. Liver-to-muscle and aorta-to-liver CNRs were similar in both groups (group A vs. group B, 1.62 vs. 1.61 and 13.86 vs. 13.30 ± 0.97, respectively, all ps > 0.05). Scores for overall image quality, visibility of main hepatic arteries and artifacts showed no significant difference between two groups (overall image quality score, 3.78 vs. 4.12; visibility of main hepatic arteries, 4.33 vs. 4.56; artifacts, 1.94 vs. 2.00; all ps > 0.05), while subjective noise was significantly more in group A (3.05 vs. 3.92, p = 0.002). The average percentage radiation dose reduction with 70 kVp scanning was 25%.

**CONCLUSION:** Low kilovoltage arterial phase liver CT at 70 kVp provided comparable image quality and reduced radiation dose by 25%, compared with the standard protocol at 80–100 kVp.

**CLINICAL IMPLICATION:** The use of 70 kVp in the arterial phase liver CT can be an effective strategy for reducing radiation dose in children, while maintaining image quality.

**MC 01 PD-09**

**Factors determining radiation dose in pediatric chest CT: arm position and presence of device as independent factors**

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**PURPOSE:** To evaluate factors associated with the higher SSDE in pediatric chest CT.

**MATERIALS AND METHODS:** From November 2013 to May 2015, 315 pediatric chest CT scans were obtained in one CT scanner and classified into five groups according to age (< 3 years, n = 65; 3–5 years, n = 54; 6–10 years, n = 58; 11–15 years, n = 81; > 15 years, n = 57). In each age group, chest CT scan were divided into two subgroups (group A, greater than 75th percentile of the size-specific dose estimates (SSDE) for each age group, n = 77; group B, less than 75th percentile, n = 238). All CT scans were performed with the same protocol using automatic tube voltage and current selection techniques (reference kV of 120 and reference mAs of 100). Sex ratio, age, tube current, weight, height, body mass index (BMI), anteroposterior (AP) body diameter, lateral diameter were compared between group A and B. In addition, arm angles on scout coronal image and coronal reformatted image, presence of medical devices in the scan field and degree of off-centering within the CT gantry were also compared.

**RESULTS:** Group A showed significantly higher tube current, weight, BMI, and longer AP/lateral diameters (p < 0.001, p = 0.005, p < 0.001, p = 0.004, p = 0.006,
respectively), compared with group B. Narrower arm angles on scout coronal image and coronal reformatted image (p < 0.001, p < 0.001, respectively) and the presence of medical devices in the scanning filed (p = 0.018) were significantly associated with higher SSDE. There are no significant differences between two groups regarding sex ratio, age, height and degree of off-centering. In multivariate analysis, narrower arm angles and presence of device as well as higher BMI were independently associated with higher SSDE.

CONCLUSION: Arms down by the sides and presence of medical device as well as higher BMI were independent factors associated with the higher radiation dose in pediatric chest CT.

MC 01 PD-10 15:50
CT based small airway and emphysema volume measurements and correlation with pulmonary function test in children with post-infectious bronchiolitis obliterans
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PURPOSE: To investigate the utility of computed tomography (CT) based quantitative small airway and emphysema volume measurements for estimating pulmonary function in children with post-infectious bronchiolitis obliterans (PIBO).

MATERIALS AND METHODS: This retrospective study included 18 chest CT scans and pulmonary function tests (PFT) of 13 children diagnosed with PIBO. The quantitative analysis of segmental and subsegmental bronchi was performed on each chest CT scan measuring following parameters; wall thickness (WT), wall area (WA), lumen average diameter (LAD), lumen area (LA), WA/LA ratio, airway average diameter (AAD), and airway area (AA). The emphysema volume (EV), which was defined as the volume of area showing lower attenuation than the mean attenuation of normal and air trapping areas, was also measured in each lobe. The ratio of emphysema volume to total lung volume (emphysema ratio, ER) was then calculated. The PFT values included forced vital capacity (FVC), forced expiratory volume in one second (FEV1) and FEV1/FVC. Comparison analyses between CT based parameters and PFT results were made with Pearson correlation.

RESULTS: The patients were aged between 4 – 17 years with the mean of 9.9 ± 4.6 years. A total of 297 segmental bronchi and 235 subsegmental bronchi were analyzed. Among the measured airway parameters, WA, AAD and AA showed significant negative correlation with FEV1 in bilateral pulmonary lobes. Especially in the left lower lobe (LLL), WA, LAD, LA, AAD, and AA showed strong negative correlation with both FEV1 and FEV1/FVC. The volume measurement showed that both EV and ER had significant negative correlations with FEV1 and FEV1/FVC, especially in LLL. In particular, EV showed stronger correlation than ER in both lungs.

CONCLUSION: Quantitative small airway measurement and emphysema volume assessment on chest CT can demonstrate lung function in pediatric PIBO patients, whose PFT may be uneasy to perform due to limited compliance. Our results suggest the airway and emphysema parameters measured in LLL may represent the severity of disease and functional impairment in these children, in spite of regional inhomogeneity of PIBO.

MC 01 PD-11 16:00
Feasibility of low iodine containing iodixanol 270 contrast media for cardiac CT angiography using a peak tube voltage of 80 kV in neonates and infants
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BACKGROUND: Contrast media (CM) of different concentrations are widely used for pediatric cardiac computed tomography angiography (CCTA). However, lower concentration < 300 mgI/ml CM is not routinely used in CTA due to concerns of suboptimal enhancement of cardiac structures and smaller vessels.

PURPOSE: The aim of the present study was to evaluate the feasibility of using iso-osmolar CM containing a low iodine dose for CCTA in neonates and infants.

MATERIALS AND METHODS: The iodixanol 270 group consisted of 79 CT scans and the iopromide 370 group of 62 CT scans in patients less than one old year. Radiation dose, volume of contrast media, and total iodine dose were retrospectively reviewed. Regarding objective measurements, enhancement and image noise of the ascending aorta (AA), main pulmonary artery (MPA), descending aorta (DA), and left ventricle (LV) were analyzed and contrast-to-noise ratios (CNRs) of the AA and LV were calculated. Regarding subjective measurement, a four-point scale system was devised to evaluate degrees of contrast enhancement, image noise, motion artifact, and overall image quality of each image set. Reader performance for correctly differentiating iodixanol 270 and iopromide 370 by visual assessment was evaluated.

RESULTS: No significant intergroup differences were found between radiation doses or volumes of contrast media. However, iodine doses differed in the two
groups (2.1 ± 0.94 g in the iodixanol 270 group and 2.94 ± 1.3 g in iopromide 370 group, p < 0.001). Group objective and subjective measurements were non-significantly different. Overall sensitivity, specificity, positive predictive value, and negative predictive value for correctly differentiating iodixanol 270 and iopromide 370 by visual assessment were 44.3%, 57.3%, 57.8%, and 43.8%. Overall area under the curve was 0.51.

**CONCLUSION:** The application of iodixanol 270 was found to be feasible for performing pediatric CCTA at 80 kVp in neonates and infants. Objective measurements of contrast enhancement and subjective image quality assessments were not statistically different in the iodixanol 270 and iopromide 370 groups.
CT is a relatively high radiation dose imaging modality that contributes to half the effective dose of all radiological examinations (1). Due to the increased radiation sensitivity of growing organs and bones, and longer expected life spans, infants and children are at a higher risk for the development of cancer per unit of radiation dose, estimated to be 2–3 times higher than the general population (2). Hence, a more cautious approach to the use of ionizing radiation is recommended in children than in adults. The principles of radiological protection in Medicine, developed by the ICRP, are the principles of Justification and Optimization of protection (3).

All CT scans for every individual patient should be justified by doing more good than harm, and by contributing to the patient's treatment. The appropriateness of alternative techniques that do not use ionizing radiation, such as ultrasonography and magnetic resonance imaging (MRI) should always be considered. For example, ultrasonography should be the first-line consideration for imaging the abdomen and pelvis in pediatric patients as their small size and slim body habitus allows the use of high-resolution probes which provide good visualization of abdominal and pelvic structures. For detailed information of the musculoskeletal system and central nervous system, MRI is often the modality of choice due to its superior contrast resolution. Justification of follow-up CT scans should be as rigorous as the first examination, and alternative modalities may suffice. Also, the repeated scanning of identical areas, e.g. the use of multiphase CT scans, should be justified for every phase.

The basic aim of optimization of radiological protection is to adjust imaging parameters and institute protective measures in such a way that the required image is obtained with the lowest possible radiation dose, and net benefit is maximized i.e. the ALARA (as low as reasonably achievable) principle. Special consideration should be given to dose reduction measures when purchasing a new CT scanner for pediatric use as part of the optimization process. Expert advice should be sought from a medical physicist not only for procurement, commissioning and quality control tests, but also in optimization of protocols. Both image quality and study quality should be optimized. For the purpose of minimizing radiation dose exposure, noisier images, if sufficient for radiological diagnosis, should be accepted. More image noise maybe acceptable in skeletal or lung parenchyma than in brain and abdominal organs, due in part to the higher contrast differences in the former. The acceptable scan quality may also be determined by the clinical indication of the study. To assist in the optimization process, the concept of diagnostic reference levels (DRL) is applied. For CT, the radiation dose quantity used for DRL is volume CT dose index (CTDvol) and dose-length product (DLP). In children, due to the variation in patient size and weight, even within the same age band, it is now recommended that appropriate weight bands are used in establishing pediatric DRLs (4). In future, DRLs based on patient dimensions maybe used, e.g. size-specific dose estimate (SSDE).

Finally, the delivery of clear, balanced and accurate communication of risk-benefit of CT to our referrers, patients and parents is imperative.

References

MC 01 PD-13  16:50
Advanced virtual monoenergetic reconstruction of dual-energy unenhanced brain CT in children: comparison with conventional monoenergetic images and conventional polychromatic CT
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PURPOSE: To determine most effective advanced virtual monochromatic imaging (VMI) energy level for maximizing brain parenchymal image quality in dual-energy unenhanced brain computed tomography (CT) of children and to assess improvement with this technique compared with conventional monochromatic reconstruction and polychromatic scanning.

MATERIALS AND METHODS: Institutional Review Board approval was obtained with no informed consent required for this retrospective analysis. Twenty-three consecutive dual-energy unenhanced brain CT scans (7 boys and 16 girls; mean age, 7.8 years; range, 9 months to 18 years) acquired in a dual-source dual-energy CT scanner were retrospectively reconstructed at 13 VMI energy levels from 40 to 100 keV in 5-keV increments using both conventional (Mono) and advanced monochromatic reconstruction (Mono+) techniques. The following six quality indexes were analyzed: gray matter (GM) noise and signal-to-noise ratio (SNR), white matter (WM) noise and SNR, GM-WM contrast-to-noise ratio (CNR) and posterior fossa artifact index (PFAI). The VMI series with best CNR were chosen from each monochromatic reconstruction technique and were compared with 28 consecutive scans obtained with same scanner in 80 or 120-kVp single-energy mode.

RESULTS: The maximal GM SNR, WM SNR, and GM-WM CNR values were observed at 60 keV and minimal PFAI at 70 keV using Mono+. The maximal GM SNR and WM SNR values were observed at 70 keV, maximal GM-WM CNR at 65 keV, minimal PFAI at 75 keV using conventional VMI. The CNR of 60 keV Mono+ was significantly better than that of conventional 65 keV Mono and polychromatic CT (Mono+ GM SNR = 4.74, WM SNR = 3.36, Mono GM SNR = 4.86, WM SNR = 3.47, Polychromatic CT GM SNR = 4.39, WM SNR = 2.95). The PFAI of 70 keV Mono+ was significantly lower than that of conventional 75 keV and conventional polychromatic CT (p < 0.01). Quality index improvement ratios (corrected for radiation dose) ranged from 8% to 40%.

CONCLUSION: The advanced virtual monochromatic reconstruction of dual-energy unenhanced brain CT scans at 60 keV (optimal energy levels) maximize image quality compared with scans obtained with conventional monoenergetic and polychromatic CT.

MC 01 PD-14  17:00
Unenhanced brain CT in children: comparison of wide-volume, one-shot volume and helical scan modes in 320-slice multidetector CT
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PURPOSE: To compare the image quality and radiation dose of three scan modes (wide-volume, one-shot volume and helical scan modes) in 320-row multidetector CT for pediatric brain imaging.

MATERIALS AND METHODS: Institutional Review Board approval was obtained with no informed consent required for this retrospective analysis. Fifty seven children (36 boys and 21 girls; mean age, 6.6 years; range, 2 months to 15 years) who underwent unenhanced brain CT using one of three scan modes (wide-volume, n = 19; one-shot volume, n = 20; helical scan, n = 20) were included in this study. The same tube potential and effective tube current-time product according to the patient’s age (group A, 0–24 months; group B, 25 months-15 years) were applied to three scan modes. For qualitative analysis, we evaluated overall image quality, image noise, gray matter (GM) white matter (WM) differentiation and streak artifacts in the posterior fossa using a 5-point grading system. For quantitative analysis, noise, signal-to-noise ratio (SNR) and contrast-to-noise ratio (CNR) between the GM and WM were calculated. As a measure of radiation dose, CT dose index per unit volume (CTDIvol) and dose-length product (DLP) were compared among three scan modes.

RESULTS: Qualitatively, the wide-volume scan showed significantly better overall image quality and less artifacts in the posterior fossa, compared with the one-shot volume scan (p = 0.042 and 0.007, respectively). The wide-volume scan was associated with less image noise and posterior fossa artifacts compared with the helical...
scan (p = 0.005 and 0.003, respectively). The GM-WM differentiation was not significantly different among three scan modes (p = 0.194). Regarding the quantitative analysis, the wide-volume and one-shot volume scans showed significantly less noise and higher GM and WM SNR than the helical scan (all ps < 0.05). The CNR was significantly higher in the wide-volume scan followed by the one-shot volume and helical scans (p = 0.004). The CTDIvol was significantly lower in the one-shot volume scan. The DLP was significantly lower in the wide-volume and one-shot volume scans compared with the helical scan.

**CONCLUSION:** As for unenhanced brain CT in children, both wide-volume and one-shot volume scans reduced radiation exposure compared with the helical scan, while the wide-volume scan showed better image quality with less posterior fossa artifacts than the one shot volume scan.

**MC 01 PD-15  17:10**

*Initial phantom study to determine the appropriate blending percentage of ASIR-V for pediatric head CT*

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**PURPOSE:** To determine the appropriate blending percentage of a novel advanced iterative reconstruction (IR) method called as “adaptive statistical IR V ” (ASIR-V) by analyzing the image noise, contrast-to-noise ratio (CNR), and spatial resolution with different pediatric head CT protocols according to age groups.

**MATERIALS AND METHODS:** We performed CT scans at 9 different tube currents (40, 50, 60, 70, 80, 90, 100, 110, and 120 mA) and fixed tube voltage (120 kVp) using American Association of Physicists in Medicine (AAPM) CT performance phantom. Scanned images were subsequently reconstructed with both filtered back projection (FBP) and ASIR-V. Ten different blending percentages of ASIR-V were performed from 10% to 100%, 10% interval. The image noise, CNR, and spatial resolutions of images reconstructed with ASIR-V were compared with that of FBP images in three different pediatric head CT protocols according to patients’ age (under 3 years; 80 mA, 3–12 years; 100 mA, 13–18 years; 120 mA).

**RESULTS:** As the percentage of ASIR-V increased, noise decreased and CNR increased. Spatial resolution was constant regardless of ASIR-V blending percentage. For under 3 years pediatric head CT protocol, 50 mA protocol with 30% ASIR-V blending or 40 mA protocol with 40% ASIR-V blending resulted in an optimal quality. For 3 years-12 years pediatric head CT protocol, 60 mA protocol with 30% of ASIR-V blending or 50 mA protocol with 40% of ASIR-V blending was comparable to FBP images. For 13 years-18 years pediatric head CT protocol, 70 mA protocol with 30% of ASIR-V blending or 60 mA protocol with 40% of ASIR-V blending showed acceptable image quality compared to FBP images. Reduced tube-current product was achieved from 37.5% to 50%.

**CONCLUSION:** Blending the 30% or 40% ASIR-V to 37.5% to 50% reduced tube-current product can maximize radiation dose reduction and preserve adequate image quality for pediatric head CT evaluation.

**MC 01 PD-16  17:20**

*Ultrasound elastography of neonate brain: preliminary study*

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**PURPOSE:** Ultrasound elastography can show tissue elasticity. Our aim was to determine the US elasticity of brain in neonates.

**MATERIALS AND METHODS:** Strain elastography was obtained in 21 neonates without brain abnormality (M:F = 10:11; mean gestational age, 34 weeks; range, 28–40
Differences in DN-to-pons and GP-to-thalamus SI ratios
SI ratio was calculated by dividing the mean signal intensity of the DN by the mean SI of the pons. GP-to-thalamus ratio was calculated by dividing the mean signal intensity of the globus pallidus (GP) to those of other structures on unenhanced T1-weighted images significantly increased after serial administration of linear GBCA gadodiamide but not by the macrocyclic GBCA gadoterate meglumine in children.

RESULTS: Ventricle and subdural space showed elastography score of 1 in all patients. Elastography score of other regions were as follows (median, 1st quartile–3rd quartile); periventricular WM (4.0, 3.0–4.0), caudate (4.3, 3.7–4.7); subcortical WM (4.0, 4.0–4.0), and cortical GM (3.0, 2.3–3.3). Caudate was significantly harder than periventricular WM (p = 0.004) and cortical GM (p < 0.001). Cortical GM was significantly softer than periventricular WM (p < 0.001) and subcortical WM (p < 0.001). Periventricular WM was significantly softer than subcortical WM (p = 0.009). Elastography score of caudate showed negative relationship with GA (γ = -0.433, p = 0.050) and birth weight (γ = -0.472, p = 0.031). Inter-observer variability was moderate to almost perfect (k = 0.53–0.89).

MC 01 PD-17 17:30
Gadolinium deposition in globus pallidus and dentate nucleus on unenhanced T1-weighted image in the children: comparison between gadodiamide and gadoterate meglumine
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PURPOSE: To identify changes in signal intensity (SI) ratios of the dentate nucleus (DN) and the globus pallidus (GP) to those of other structures on unenhanced T1-weighted MR images in children and compare between linear or macrocyclic gadolinium-based contrast agents (GBCAs).

MATERIALS AND METHODS: By reviewing 31,422 cases of MR examination performed in a tertiary children’s hospital between 2006 and 2013, 18 children (mean age, 9.2 ± 3.6; age range, 2–14 years) who underwent at least four consecutive MR examinations with the exclusive use of linear GBCA (gadodiamide, group A, n = 8) or macrocyclic GBCA (gadoterate meglumine, group B, n = 10) were found. DN-to-pons SI ratio was calculated by dividing the mean signal intensity of the DN by the mean SI of the pons. GP-to-thalamus SI ratio was calculated by dividing the mean signal intensity of the GP by the mean SI of the thalamus. Differences in DN-to-pons and GP-to-thalamus SI ratios between the first and last MR imaging examinations were calculated. One-sample test and Mann-Whitney test were used to evaluate the difference in SI ratios for both groups.

RESULTS: In group A, the SI ratio increased significantly between the first and last MR examinations (mean difference in SI ratio, DN-to-pons, 0.0486 ± 0.0471, p = 0.022; GP-to-thalamus, 0.0967 ± 0.0877, p = 0.017). In group B, the DN-to-pons SI ratio showed no significant difference between the first and last MR examinations (-0.0070 ± 0.0243, p = 0.384), while the GP-to-thalamus SI ratio decreased (-0.0383 ± 0.0365, p = 0.009). Differences in SI ratios were significantly larger in group A than in group B (DN-to-pons, p = 0.002; GP-to-thalamus p = 0.003). The interval between the first and the last MR examinations and number of MR scans did not differ between two groups (p = 0.083, 0.068).

CONCLUSION: The signal intensities of the DN and GP on enhanced T1-weighted images significantly increased after serial administration of linear GBCA gadodiamide but not by the macrocyclic GBCA gadoterate meglumine in children.

MC 01 PD-18 17:40
Phase-sensitive T1 inversion recovery sequence in assessing brain MRI of neonates at term-equivalent age: could it replace T1-weighted spin-echo imaging?
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PURPOSE: To compare the phase-sensitive T1 inversion recovery (T1IR) sequence with the conventional T1-weighted spin echo sequence (T1SE) in brain MRI of neonates at term equivalent age.

MATERIALS AND METHODS: From July 2015 to march 2016, twenty five consecutive neonates (M:F = 10:15; mean postmenstrual age, 39 months) underwent brain MRI at term equivalent age with both axial T1IR and T1SE sequences. For quantitative analysis, relative contrasts between the gray and white matter (GM-WM) and between the myelinated posterior limb of the internal capsule and basal ganglia (IC-BG) were calculated on each sequence. For qualitative assessment, GM-WM differentiation, visualization of the myelinated internal capsule, pulsation artifact, lesion conspicuity and overall image quality were evaluated on each sequence using the five-point scoring system.

RESULTS: T1IR showed significantly higher relative contrast values compared with T1SE (GM-WM contrast, 0.11 vs. 0.16; IC-BG contrast, 0.05 vs. 0.11, all ps < 0.001). Scores for GM-WM differentiation and
visualization of the internal capsule were significantly higher in T1IR than T1SE (T1IR vs. T1SE, 3.58 vs. 2.50; 3.16 vs. 2.42, respectively, p < 0.001). Pulsation artifact was significantly decreased on T1IR than T1SE (3.66 vs. 2.98, p < 0.001). The lesion conspicuity scores showed no significant difference between two sequences (3.23 vs. 2.77, p = 0.055). Overall image quality of T1IR was significantly better than T1SE (3.62 vs. 2.64, p < 0.001). The acquisition times of the two sequences were not significantly different (p = 0.230).

CONCLUSION: The phase-sensitive T1 inversion recovery sequence yielded superior image quality that was statistically significant in almost all aspects of comparison than the conventional T1-weighted spin echo sequence. Therefore, T1IR sequence can be a good alternative to T1SE in brain MRI of neonates at term equivalent age.

**SS 12 PD-02**  16:10
**Ossifications of the triradiate cartilage and posterior acetabulum**
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**PURPOSE:** Our purpose of this study is to assess patterns of skeletal maturation of the triradiate cartilage (TRC) and the posterior acetabular wall (PA) which can be easily assessed on body CT.

**MATERIALS AND METHODS:** Pediatric abdomen, pelvis and hip CT scans could show the status of the bony acetabulum and so all these studies were retrieved from our PACS system over the past 12 years. There were a total of 1446 CT examinations and 122 were excluded for any conditions that may affect pelvic bone growth. As a result, a total of 1324 CT examinations were included for this retrospective study. There were 710 CT scans available in boys and 614 CT in girls. The status of the skeletal maturation of the TRC and PA were evaluated by consensus of two observers (S.H.K. & H-K. Y.). The TRC was divided into four grades according to degree of ossification for each right or left side (grade 0, 1, 2, 3). The PA was divided into three grades for each side (grade 0, 1, 2). Each descriptive data were compared between boys and girls. Pearson’s correlation was used for the statistical analysis.

**RESULTS:** In boys, the ossification centers of TRC first appeared at the center of three flanges (grade 1) at the age of 11 years and grew into three flanges (grade 2) in 12 years, and completed bony fusion (grade 3) in 14 years old. Regarding PA, the ossification began to appear (grade 1) at 12 years of age and completed fusion (grade 2) in 13 years. In girls, TRC maturation was exactly two years earlier than boys revealing grade 1 at the age of nine years, grade 2 in 10 years, and grade 3 in 12 years. Also for PA, grade 1 was seen in 10 years and grade 2 in 11.5 years. The TRC fused within 1 year after closure of PA. There was no asymmetry...
between right and left side for both TRC and PA. The concordance rate was excellent ($r = 0.978$) between the grades of TRC and PA by means of Pearson's correlation.

**CONCLUSION:** In boys, TRC began to ossify in 10 years of age and closed completely in 14 years: PA started to ossify in 11 years of age and completed fusion in 13 years. In girls, the ages of ossification center appearing and complete fusion for both TRC and PA were exactly two years earlier than boys. Knowledge of skeletal maturation of the TRC and PA is very important for assessing children with any disease conditions and for interpreting body CT scans in order not to confuse normal ossification process for pelvic fractures.

**SS 12 PD-03** 16:20

**Cerebral vasoconstriction in the eight adolescent patients**

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**PURPOSE:** Cerebral vasoconstriction is uncommon in the adolescent period. About 10 cases have been reported till now. In this study, we will report the clinic-radiological features of eight adolescent patients with cerebral vasoconstriction.

**MATERIALS AND METHODS:** From January 2013 to December 2015, eight adolescent patients (M:F = 7:1; 12–18 years old; median age, 15) were admitted due to a headache, and cerebral vasoconstriction was present on over one imaging modalities (CTA [n = 4], MRA [n = 1], CTA/MRA or DSA [n = 3]). We evaluated the characteristics and predisposing factors of a headache, clinical course, and prognosis. We evaluated the imaging features of vasoconstriction.

**RESULTS:** In 6 patients, headache occurred acutely (within 7 days before admission). In 2 patients, onset was unclear. Only one patient presented with a thunderclap headache. In the others, the nature of a headache was non-specific. In seven patients, presumed predisposing factors were present; weight training exercise (n = 4), excessive running (n = 1), falling into river (n = 1), emotional distress (n = 1). CTA or MRA showed multifocal arterial contour change typically such as short-segment stenosis and dilatation. In 2 patients, arteries of posterior circulation were involved. In the others, multiple arteries of anterior and posterior circulation were involved. There was no SAH, intracerebral hemorrhage or infarction. In 3 patients, cerebral vasoconstriction was resolved or improved on follow-up imaging (7 days–42 days). In the others, follow-up imaging was not performed. In all patients, the headache was well controlled by analgesics (n = 8), oral calcium channel blocker (n = 3), or propranolol (n = 2). In all patients, headache resolved completely.

**CONCLUSION:** In our series, cerebral vasoconstriction of adolescent patients occurred predominantly in the male. Contrarily to adults, the headache was nonspecific in most patients. The Imaging feature was similar to that of reversible cerebral vasoconstriction in adults. The clinical course was favorable and there were no neurological sequelae.

**SS 12 PD-04** 16:30

**Shear wave elastography for the evaluation of testicular elasticity in children with undescended testes**

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**PURPOSE:** To compare the shear wave velocities (SWVs) between normal and undescended testes (UDTs) in young children using shear wave elastography (SWE).

**MATERIALS AND METHODS:** We retrospectively reviewed testicular SWE images which were obtained during testicular sonography of children between March 2015 and February 2016. Testicular SWVs were measured three repeated times in both sides using high frequency linear transducer of supersonic shear imaging. Testicular SWVs between normal and UDTs in children younger than 60 months were compared using clustered regression test with age adjustment.

**RESULTS:** From 23 children (mean, 14.9 ± 15 months; range, 0–60 months) with UDTs (8 in right side, 11 in left, and 4 in bilateral), 24 UDTs were included in the UDT group after excluding three non-visualized testes during exam. From other 23 children (mean, 13.8 ± 14.5 months; range, 0–53 months) without UDTs, 46 testes were included in the normal group. Mean SWV of the normal group was 4.0 ± 0.7 kPa (range 2.3–6.2 kPa), and that of the UDT group was 4.5 ± 2.7 kPa (range 1.4–11.4 kPa). The mean SWVs were not significantly different between two groups (p = 0.453).

**CONCLUSION:** The mean SWV of normal testes of young children was 4.0 ± 0.7 kPa. The SWVs of UDTs were not significantly different from that of normal testes in the children.
Correlation and reliability of UTD classification and SFU grading system

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PURPOSE: The new grading system for postnatal urinary tract dilatation (UTD), ‘UTD classification system’ was proposed in 2014. To correlate and evaluate the reliability of two ultrasonography grading system; Society for Fetal Urology (SFU) grading and UTD classification system.

MATERIALS AND METHODS: Total 180 kidneys in 90 pediatric patients were assessed by two faculties and two residents using the two grading systems twice. The SFU system was graded 0 to 4 and the UTD classification system was graded normal or P1 to P3. Whether the anterior-posterior renal pelvic diameter (APRPD) value in UTD classification system was critical for grading was investigated. SFU grading system was re-categorized by the UTD classification system recommendation (SFU-1) and by this study (SFU-2). Cohen’s kappa statistic was used to estimate agreement between the two grading systems and intra- and inter-observer agreement.

RESULTS: Mean APRPD in each UTD grade normal, P1, P2, and P3 were 1.94 ± 1.92 mm, 6.04 ± 3.48, 8.97 ± 5.22, and 12.50 ± 6.69 mm, respectively. Among 105 UTD P1 to P3 kidneys, only one kidney in UTD P2 was determined by APRPD. Cohen’s kappa value was significantly higher between SFU-2 and UTD classification system compared to that using SFU-1 (p < 0.001), since many SFU grade 1 were classified as normal by UTD classification system. In intra-observer agreement analysis, there was no significant difference between the two grading systems among faculty the radiologists or the residents showing substantial to almost perfect agreement (ĸ 0.64-0.88) in SFU grading system and moderate to almost perfect agreement (ĸ 0.48-0.92) in UTD classification system (p > 0.05). The overall inter-observer agreement for the both kidneys were significantly higher with the UTD classification system than with the SFU grading system in the first assessment (95% CI: right kidney, −0.069 – −0.062; left kidney. −0.048 – −0.043).

CONCLUSION: The APRPD values suggested by UTD classification system was of little significance for grading. Many SFU grade 1 were normal by UTD classification system, suggesting the need for modification of proposed conversion between the two systems. Both systems are reliable with good intra- and inter-observer agreement, but the inter-observer agreement was higher with the UTD classification system in the first assessment.

Diagnostic performance of ultrasound features in patients with biliary atresia: a systematic review and meta-analysis

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PURPOSE: To evaluate the diagnostic performance of ultrasound (US) features for biliary atresia in patients with infantile cholestasis.

MATERIALS AND METHODS: The Ovid-MEDLINE and EMBASE databases were searched for studies of the diagnostic performance of US features for biliary atresia in patients with infantile cholestasis. A meta-analysis was performed to evaluate the diagnostic performance of the triangular cord sign and other US features in patients with biliary atresia.

RESULTS: Seventeen eligible studies with 1444 patients were included. The triangular cord sign had a high accuracy in diagnosing biliary atresia: the meta-analytic summary sensitivity and specificity were 85% (95% CI: 77–90%) and 97% (95% CI: 94–99%), respectively. The area under the HSROC curve was 0.97. Meta-regression analysis revealed that cutoff thickness of the triangular cord sign (3 or 4 mm) was a significant factor affecting study heterogeneity. The proportions of non-identification of the GB ranged from 0% to 53%. Abnormal GB morphology, nonvisualization of the common bile duct, and presence of hepatic subcapsular flow showed relatively high sensitivity and specificity.

CONCLUSION: The triangular cord sign, abnormal GB morphology, nonvisualization of the CBD, and presence of hepatic subcapsular flow have high diagnostic performance for the diagnosis of biliary atresia.
Early US findings of biliary atresia in infants younger than 30 days
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PURPOSE: To investigate the US findings for the diagnosis of biliary atresia (BA) in infants younger than 30 days compared to infants older than 30 days.

MATERIALS AND METHODS: From 2000 to 2015, we retrospectively reviewed preoperative US findings of BA in 12 infants younger than 30 days (median age, 11 ± 10 days) and 62 infants older than 30 days (median age, 71 ± 22 days). Images were reviewed focusing on triangular cord sign, morphology of gallbladder, hepatic artery (HA) diameter, and the presence of the signs for portal hypertension.

RESULTS: Triangular cord sign was seen in only 2 infants (17%) younger than 30 days, whereas 35 infants (56%) older than 30 days (p = 0.020). The wall irregularity of gallbladder was commonly seen in both groups (91% vs. 75%, p = 0.433). The length of the gallbladder was not significantly different between two groups (1.5 mm ± 0.7 vs. 1.7 mm ± 0.7, p = 0.514). The HA diameter was significantly smaller in infants younger than 30 days (1.2 mm ± 0.4) than in infants older than 30 days (2.0 mm ± 0.5) (p < 0.001). Splenomegaly was less common in 17% infants younger than 30 days than in 84% BA infants older than 30 days (p < 0.001).

CONCLUSION: The typical US findings for the diagnosis of BA, including triangular cord sign and HA enlargement, and signs for portal hypertension are uncommon in infants with BA younger than 30 days.

Clinical feasibility of cervical lymph node elastography by acoustic radiation force impulse imaging (ARFI) in pediatric Kikuchi disease
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PURPOSE: To evaluate feasibility of elastography in Kikuchi disease by using the acoustic radiation force impulse (ARFI) imaging.

MATERIALS AND METHODS: Between May 2013 and April 2016, 77 patients underwent cervical lymph node (LN) biopsy for evaluation of the Kikuchi disease. Among them, ARFI imaging was performed in 50 patients. 38 patients had histologically proved Kikuchi disease (mean age, 12.9 years; range, 6–18 years) and eight patients had proved reactive hyperplasia (mean age, 10.9 years; range, 4–17 years). Four patient diagnosed other diseases (three in normal LN, one in EBV infection). We retrospectively reviewed shear wave velocity (SWV) of the LN in affected side and contralateral side, SWV of sternocleidomastoid (SCM) muscles in both sides. SWV and ratio of SWV of LN/SCM in Kikuchi disease were compared with contralateral side. Receiver-operating
curve analysis was performed to estimate diagnosis accuracy of ARFI imaging. SWV of the LN in Kikuchi disease was compared with SWV of the LN in reactive hyperplasia. In addition, location and size of affected LN, echogenicity of perinodal fat, presence of hypoechoic rim, and vascularity of LN were evaluated.

RESULTS: The SWV of the LN in Kikuchi disease was significantly higher than that of the contralateral lymph nodes (2.04 m/s vs. 1.69 m/s; p < 0.001). There was no statistically difference in the ratio of SWV of LN/SCM between the affected LN and contralateral LN (median 1.41 vs. median 1.00; p = 0.956). The area under the curve (AUC) was 0.757 (95% confidence interval, 0.660–0.838). SWV cut-off value of 1.86 m/s best distinguished between Kikuchi and contralateral lymph nodes with sensitivity of 73.1% and specificity of 76.1%. There was no intergroup difference in the SWV of the LN in Kikuchi disease and reactive hyperplasia. Lymph nodes were mainly located at left neck (63.0%, 25; Kikuchi disease, 4; reactive hyperplasia). Mean size of LN was 1.92 ± 0.731 cm in Kikuchi disease and 2.10 ± 1.053 cm in reactive hyperplasia. All LNs show increased echogenicity of perinodal fat. Hypoechoic rim was seen in 97.4% of Kikuchi disease (37 of 38) and 87.5% of reactive hyperplasia (7 of 8). In 12 of 32 (37.5%) Kikuchi disease was shown increased vascularity of LN.

CONCLUSION: Application of ARFI imaging in Kikuchi disease in pediatric patients was feasible and can aid in differentiation of normal and Kikuchi disease. SWV of LN in Kikuchi disease was significantly higher than normal contralateral LN.

SS 12 PD-10 17:30
Assessing hepatic steatosis and fibrosis in pediatric non-alcoholic fatty liver disease using MRI and transient elastography
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PURPOSE: Non-alcoholic fatty liver disease (NAFLD) has a wide spectrum from simple steatosis to non-alcoholic steatohepatitis, which can cause hepatic fibrosis and cirrhosis. The present study was performed to evaluate MRI and transient elastography (TE) for assessing hepatic steatosis and elasticity in children with NAFLD.

MATERIALS AND METHODS: We retrospectively reviewed the records of children with NAFLD who underwent hepatic MRI including MR elastography (MRE) and TE from January 2015 to May 2016. Hepatic fat fraction (%) and T2* value (msec) were measured using multi-echo gradient echo sequence on MRI and hepatic steatosis was estimated by the Controlled Attenuation Parameter (CAP, dB/m) on TE. Liver elasticity was also estimated on both MRE (kPa) and TE (kPa). The results were analyzed using Pearson's correlation.

RESULTS: A total of 38 children (M:F = 30:8) were included with the mean age of 13.0 ± 2.7 years and the mean body mass index (BMI) was 26.9 ± 4.4 kg/m². Hepatic elasticity on MRE (mean, 2.7 ± 0.8 kPa) showed positive correlation with that on TE (mean, 7.3 ± 2.3 kPa) (p = 0.636, p < 0.001). However, hepatic fat fraction on MRI (mean 23.2 ± 10.3%) was not significantly correlated with CAP (p = 0.083, p = 0.635). MR fat fraction was inversely correlated with MR elasticity (ρ = −0.452, p = 0.004) and T2* (ρ = −0.480, p = 0.004).

CONCLUSION: Hepatic elasticity can be estimated non-invasively by TE or MRE in children with NAFLD. However, hepatic fat quantification using CAP was not correlated with MR fat fraction. Caution and further study is needed for the inverse correlation between hepatic steatosis and elasticity on MRI.