

RADSC ACP

Academic Day 2023

Abstracts (Research Oral Presentation)

RESEARCH ORAL PRESENTATIONS

1) Presenter: Ms Celine Tan Ying Yi

Principal Radiographer (Clinical), Radiography Department, SGH

Anatomical Tilt Lateral Wrist X-Ray - Not Always 22 Degrees

Theme: *Quantitative Imaging*

Authors: *Tan Weiling, Ong Ying Sin, Ng Ying Qian Chloe, Kwok Kia Yan, Tan Ying Yi Celine, Sng Li Hoon*

Background:

Open Reduction and Internal Fixation (ORIF) with volar locking plates are commonly used to manage distal radial fractures. The anatomical tilt lateral (ATL) wrist X-ray is often required for evaluation of intra-articular screw penetration due to the screw position. This study aims to evaluate the correlation between the tube angulation given by performing radiographers for the ATL projection and the post-examination measurement of radial inclination (RI) on the Posterior Anterior (PA) wrist image.

Methods:

A retrospective review was performed for 36 patients. A standardised method developed by Kreder¹ was used to measure the RI on the PA wrist image. All ATL images sent into Picture Archiving and Communications System (PACS) have the tube angulation applied annotated on the image. Pearson's correlation was used to analyse the co-relationship between the RI and the tube angle applied for ATL projection.

Results:

The average angle of RI measured by the four observers was 19. Normality of 0.385 was established. A positive correlation ($p=0.792$) between the RI and the tube angle applied for ATL was found.

Conclusion:

Our study found a strong positive correlation between the tube angulation applied by performing radiographers for the ATL projection and the post-examination RI measured on the PA wrist image by the independent reviewers. This suggests that radiographers can use the measured RI to apply the tube angulation when performing the ATL wrist X-ray, instead of estimating the tube angulation to be applied.

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Abstracts (Research Oral Presentation)

2) Presenter: Dr Cherie Ng Wei Qi

Senior Resident, SingHealth Nuclear Medicine Senior Residency Programme

Efficacy of Short Course Combined BRAF and MEK Inhibition Therapy in Redifferentiation of Radioiodine-Refractory Thyroid Cancer

Theme: *Other (Thyroid Cancer Theranostics)*

Authors: *Cherie Wei Qi Ng, Wei Ming Chua, Stephanie Peiling Yang, Kelvin Siu Hoong Loke*

Background:

Redifferentiation therapy has shown promise in restoring radioiodine uptake in radioiodine-refractory thyroid carcinoma (RR-TC). We assess the safety and efficacy of short course dabrafenib and trametinib in radioiodine re-sensitisation in RR-TC.

Methods:

Patients with unresectable RR-TC harbouring MAPK signalling pathway mutations were enrolled. Radioiodine uptake was assessed using I-124 PET-CT at baseline and two weeks after dabrafenib and trametinib combination therapy. Therapeutic I-131 was given if target lesional dosimetry was predicted to be $\geq 2000\text{cGy}$. Otherwise, redifferentiation therapy was continued for another two weeks before repeat I-124 PET-CT to reassess iodide uptake restoration. Primary outcome was successful redifferentiation rate. Secondary outcomes were overall survival (OS), progression-free survival (PFS), RECIST 1.1 best tumour response, thyroglobulin tumour marker response and safety.

Results:

Nine patients were recruited till date. Six patients (66.7%) achieved successful redifferentiation (three within two weeks and three after four weeks of combination therapy) and received radioiodine. At the time of writing, five of these patients have been evaluated for best tumour response and thyroglobulin response. Three had partial tumour response (60%) and two had stable disease (40%). All five patients thyroglobulin response. OS and PFS are still under investigation. Treatment-related adverse events were seen in eight out of nine patients. All had grade 1/2 adverse events, while two (22.2%) had grade 3 adverse events.

Conclusion:

Dabrafenib and trametinib combination achieved redifferentiation in two-thirds of patients and was safe. Shorter course of redifferentiation therapy is possible with 50% of successful redifferentiation requiring only two-week course, compared the more frequently used four-week course.

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Abstracts (Research Oral Presentation)

3) Presenter: Mr Aaron Tee Yoong Heng

Medical Student, Lee Kong Chian School of Medicine, NTU

Prospective Study of Imaging Predictors of Response to Conventional Balloon Angioplasty

Theme: *Quantitative Imaging*

Authors: *Kun Da Zhuang, Bien Soo Tan, Aaron Tee Yoong Heng*

Background:

Conventional balloon angioplasty (CBA) is an established therapy for arteriovenous fistula stenosis in patients on haemodialysis. Resistance to CBA (with > 30% residual stenosis after CBA) occurs in approximately 15% of patients and predicts poor long-term patency after CBA. Imaging of the stenosis with ultrasound and angiography is routinely obtained during CBA but has not been studied for prediction of resistance to CBA. This study aims to correlate imaging findings with resistance to CBA.

Methods:

This prospective study included 71 patients who underwent CBA for AVF stenosis in Singapore General Hospital. Prior to treatment, the stenotic lesions were assessed using ultrasonography (inner luminal diameter at stenosis, external diameter at stenosis, external diameter at normal vessel segment) and angiographic quantitative vessel analysis (QVA) (% stenosis, minimal luminal diameter, reference vessel diameter, lesion length, lesion symmetry). After treatment, angiography was used to determine residual luminal stenosis. Logistic and linear regression were used to study the relationship between imaging parameters and residual stenosis after CBA.

Results:

There was correlation between severity of residual stenosis with % stenosis measured on QVA ($p < 0.02$). No correlation was found between the other imaging parameters with severity of residual stenosis.

Conclusion:

Only % stenosis measured on QVA predicted post-CBA residual stenosis, which is an indicator of immediate response to CBA. Follow-up of outcomes will be performed to determine if there is any association between imaging parameters and longer-term post-intervention patency.

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Abstracts (Research Oral Presentation)

4) Presenter: Mr Jiang Yunjun

Student, School of Computer Science and Engineering, NTU

Deep Learning Model for Intracranial Hemorrhage Classification

Theme: *Applied AI*

Authors: *Jiang Yunjun, Tan Jun Xian, Septian Hartono, Ngiam Li Ting, Eldrian Koh, Benjamin Hong, Edward Tan, Sarat Kumar Sanamandra, Chan Ling Ling*

Background:

Intracranial hemorrhage (ICH) is a critical medical condition requiring swift and accurate diagnosis for effective treatment. In this project, we propose a deep learning framework that combines the strengths of ResNeXt and Long Short-Term Memory (LSTM) networks to enhance the classification accuracy of intracranial hemorrhages from head CT scans.

Methods:

The model was trained and validated with Kaggle RSNA Intracranial Hemorrhage Detection Challenge 2019 with total number of 8,563 ICH positive cases (79 EDH, 1,292 IPH, 824 IVH, 1,244 SAH and 1,687 SDH) and 12,437 negative cases for training and 319 ICH positive cases (10 EDH, 191 IPH, 126 IVH, 144 SAH and 143 SDH) and 425 negative cases for validation. The dataset undergoes preprocessing and augmentation to ensure consistency and optimal input for the deep learning model.

Model was trained on in-house GPU workstation at SGH MR Imaging Research Lab at Academia.

Results:

The model achieved 97.9% sensitivity, 98.8% specificity and F1 score of 0.981 for binary classification validation performance. Subtype classification F1 score ranged from 0.892 for SAH to 0.953 for IPH.

Conclusion:

The proposed model leverages on ResNeXt architecture's feature extraction capabilities, allowing it to learn intricate spatial features from the individual slices. These features are then fed into an LSTM network that captures dependencies between slices within the same scan, thereby encoding the evolution of hemorrhagic regions. By fusing both within-slice and between-slice information, the model aims to provide a comprehensive understanding of the hemorrhage progression.

The proposed model is currently being fine-tuned and tested with local institutional dataset.

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Abstracts (Research Oral Presentation)

5) Presenter: Ms Shaniszah Bte Jamaruddin

Principal Radiographer (Clinical), Radiography Department, SGH

Can Quantitative Pixel Analysis Intensity of Liver Images Improve the Identification of Cirrhosis On B-mode Abdominal Ultrasound? - A Pilot Study

Theme: *Quantitative Imaging*

Authors: *Shaniszah Binte Jamaruddin, Azizah Mohamed Afif, Nur Zakiah Binte Sidek, Wu Shuo-yun, Fong Kah Keng Jeffrey*

Background:

Liver cirrhosis caused by chronic hepatitis infection leads to 0.9% mortality in Singapore population. This study aims to establish a threshold of pixel intensity analysis (PIA) for detection of cirrhosis on B-mode abdominal ultrasound, using histology as the gold standard. The PIA values correlated with liver clinical biomarkers.

Methods:

Patients with liver biopsy and abdominal ultrasound imaging performed in Singapore General Hospital between January to June 2016 were reviewed. Results of the liver biopsy were retrieved to confirm presence of cirrhosis. Average of three PIA measurements were taken by a single operator. Optimum threshold of PIA analysis was obtained using area under receiver operator characteristic curve (AUROC). Intra-operator variability was assessed by Intraclass correlation (ICC). Correlation of biomarkers was performed by Pearson's correlation.

Results:

In this pilot study, 14 patients consisting of 5 males and 9 females with mean age of 74.1 ± 11.0 years were included. Cirrhotic patients had higher PIA scores than the non-cirrhosis group (76.8 ± 8.1 vs 61.3 ± 6.7 , $p=0.006$). Optimum threshold of liver PIA values to rule in cirrhosis was more than 66.2 (100% sensitivity, 78% specificity) with AUROC 0.97. Optimum threshold for the PIA ratio of liver over spleen to rule in cirrhosis was more than 1.49 (100% sensitivity, 78% specificity) with AUROC 0.86. The intra-observer variability of PIA measurements was 0.74. There was moderate correlation of PIA values with the GGT liver biomarkers at 0.67 ($p=0.02$).

Conclusion:

B-mode liver ultrasound PIA values can be a useful parameter to detect liver cirrhosis with high sensitivity.

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Academic Day 2023

Abstracts (Education Oral Presentation)

EDUCATION ORAL PRESENTATIONS

1) Presenter: Ms Lam Li Yi Maxine

Radiographer, Radiography Department, CGH

Radiographers Continuous Professional Education

Theme: *Other (Continuous Professional Development)*

Authors: *Sim Fang Yang, Lam Li Yi Maxine, Chong Choon Ming Sam, Kerene Ong Mei Ling*

Background:

While Radiographers Continuous Professional Education (CPE) is essential for knowledge and skills enhancement, image quality improvement, patient safety compliance, personal and career development, Radiographers face several challenges to participate in CPE.

1. Time Constraints: Demanding imaging workload to allocate time for CPE activities
2. Limited Resources: Access to courses, conferences, and workshop. Availability of venue.
3. Financial Constraints: Cost incurred for registration fees, travel expenses, accommodation
4. Lack of Motivation

In view of the challenges and the coming requirement for Radiographer to attain CPE points to renew their Practicing Certificate with Allied Health Professional Council, in May 2022, CGH Radiography CPE team has developed an in-house CPE program that supports a variety of learning activities using Zoom or Teams Meeting for the Radiographers to participate. The team has also designed a learning CPE log for the radiographer to maintain and track their learning.

Methods:

Radiographers who attended CPE activities were asked to complete an online learning survey at the end of the activities. The survey consists of 4 questions related to a 4-point Likert scale and 1 open-ended questions. Analysis of the survey questions were performed using Microsoft Excel version 97-2003.

Results:

The learning surveys from 10 learning activities were reviewed. The learners who responded rated at least "Good/Meet expectation" for questions if "The presenter delivered the materials in a clear and structured manner" and if "The presenter is well-organised and prepared". The learners also agreed that the presentation was informative and relevant to their work, and they have gained knowledge that will help them in providing patient care.

Conclusion:

The initial findings from our learning survey demonstrated that our flexible CPE learning can potentially support Radiographers continuous growth within our profession.

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Academic Day 2023

Abstracts (Education Oral Presentation)

2) Presenter: Ms Rafidah Binti Abu Bakar

Senior Principal Radiographer (Clinical), Radiography Department, SGH

Leveraging Technology to Enhance SingHealth Radiographers' Competency Assessment in the Radiography Department, Singapore General Hospital: From Conception to Implementation

Theme: *Technology-enhanced Learning*

Authors: *Rafidah Binti Abu Bakar, Nur Atiqah Binte Ishak, Andik Irwan Amirullah, Aw Lian Ping*

Background:

The SingHealth Radiographers' Career Development Path (CDP) and Competency Framework was established in 2017. The framework mandates radiographers to undergo a competency assessment (CA) to reflect on their performance. The Radiography Department, Singapore General Hospital utilised technology to streamline the CA process to create an online personal folder (PF) for each radiographer. The folder serves as a centralised platform to record and track competencies, facilitate goal setting, and provide seamless access within the department.

Summary of Innovation:

Aims

1. Establish an online PF for radiographers to maintain CA records.
2. Review past CA documents, facilitating progress tracking and goal setting for professional development.
3. Provide convenient access to PF anytime and anywhere within the department.
4. Ensure the integrity of CA documents by restricting editing once the documents are finalised.

Mapping the process

Collaborating with IT experts and administrators, an online PF was developed to house the radiographers' CA documents. Leveraging the Division of Radiological Sciences SharePoint, radiographers gained the flexibility to conduct CA at various work areas within the department with shared intranet computers while changes in staff movement were updated.

Testing the process

Instructions for accessing and utilising the PF were pilot tested by radiographer volunteers. Feedback from the trials was incorporated to ensure user-friendliness and hassle-free uploading of new CA documents.

Implementing and monitoring the process

Following the successful validation, the process was implemented. Radiographers readily embraced the new platform, displaying adaptability in utilising the online system.

Conclusion:

By leveraging SharePoint and transitioning from traditional hardcopy documents, the Radiography Department at SGH has revolutionised the CA process. This platform securely stored over 1000 CA documents, fostering continuous professional development and enhancing the overall CA system for radiographers.

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Abstracts (Education Oral Presentation)

3) Presenter: Ms Cheng Qianhui

Senior Executive, Department of Neuroradiology, NNI

Simulation Based Training to Manage Adverse Events Related to Contrast Media: Work in Progress

Theme: *Technology-enhanced Learning*

Authors: *Cheng Qianhui, Vincent Chan Ern Yao, Oh Hui Ping, Yu Wai-Yung*

Background:

The team saw an opportunity to develop simulation-based training to improve the emergency preparedness of radiology staff including radiologists, radiographers, and nurses in handling a myriad of contrast-related adverse events during medical imaging procedures.

Studies have shown low levels of preparedness in radiology departments. The challenge we observed was that there are limited opportunities for hands-on training as severe contrast-related adverse events are rare, experience and competence among healthcare professionals vary.

Summary of Innovation:

The simulated environment mimics the interprofessional collaborative nature of work required in the management of contrast-related adverse events and will allow learners and multiplayers to practice and gain competence for such rare events. This innovation also builds awareness of role clarification amongst healthcare professionals and enhances collaborative learning within simulated case scenarios for problem solving. Artificial intelligence (AI) driven characters and emergent scenarios will also be incorporated to inject realism and enhance fidelity to the simulation.

The team has won the Innovplus 2023 prototyping funding of up to \$200,000 to develop this innovative prototype and will be ready in Q3 2024.

Conclusion:

The solution bridges the theoretical knowledge gap and real hands-on on-the-job training by providing the learner with a virtual environment to practice and gain competence in managing these rare contrast-related adverse events, improving the healthcare workers' emergency preparedness, and enhancing confidence. This innovation is also scalable to other specialties that use contrast media, such as cardiology and vascular medicine.

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Abstracts (Education Oral Presentation)

4) Presenter: Dr Yuan Jing

Resident, SingHealth Diagnostic Radiology Residency Programme

Enhancing Wellness in Radiology Residency: The Impact of a Mindfulness-Based Workshop

Theme: *Other (Wellness)*

Authors: *Tang Yee Peng, Yuan Jing, Lim Hui Shan Cheryl, Cynthia Assimta Peter, Vidya Subrahmanya Upadhyaya*

Background:

Radiology residency training can be stressful, potentially resulting in burnout among trainees. While the curriculum emphasizes academic and professional skill development, the physical, emotional, and overall health of residents can suffer if not proactively managed. To address this issue, our residency program recently held a wellness workshop for first-year radiology residents. This poster aims to provide an overview of the workshop's content and delivery, as well as its potential impact on the well-being of the participating residents.

Methods:

The workshop was conducted in-person in November 2022 and lasted a total of approximately 4.5 hours. A total of 18 year-1 radiology residents and five radiologists with different levels of seniority participated in the workshop. The content was delivered through a combination of interactive and didactic sessions, such as self-reflection, mindfulness exercises, and an open question and answer (Q&A) session with a group of panelists. To measure the effectiveness of the workshop, participants completed the validated 15-question Five-Facet Mindfulness Questionnaire (FFMQ) both before the workshop and two months after its completion.

Results:

All of the participants (n=23) found the entire workshop, including its content and duration, to be helpful, with 70% indicating that they would be interested in attending future workshops. The Q&A session was the most well-received aspect of the workshop. However, when the participants' pre- and post-workshop FFMQ scores were compared, there was no statistically significant difference in their absolute scores.

Conclusion:

Studies so far have demonstrated that mindfulness-based interventions can significantly improve the psychological well-being of healthcare professionals. The FFMQ results in our workshop may have been statistically insignificant due to the small sample size and short follow-up period. Nonetheless, this initiative and positive reception underscore the need for wellness interventions in residency training. The workshop served as a positive starting point for assisting residents in cultivating emotional and mental health, which are crucial components of becoming a resilient physician. Future studies with larger sample sizes and longer follow-up periods are needed to assess the effectiveness of mindfulness-based interventions in radiology residency training.

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Abstracts (Education Oral Presentation)

5) Presenter: Ms Li Qun

Assistant Nurse Clinician, Department of Diagnostic & Interventional Imaging, KKH

Improving the Code Blue Emergency Response in Department of Diagnostic & Interventional Imaging (DDII)

Theme: *Learner Assessment and Evaluation*

Authors: *Pamela Teo, Li Qun, Liu Siju, Tay Yong Heng, Ho Hee Shen, Toh Han Wei Luke Michael*

Background:

Our quality improvement (QI) project aims to improve the overall competency among DDII staff in response to Code Blue emergency activation project by Nov 2022.

A case scenario was conducted in 2021 and the comprehensive survey findings showed that DDII staff are only 74% competent in response to the Code Blue emergency situation.

In addition, staffs were not familiar with the locations of the required emergency equipment.

Methods:

Members created a Gantt chart to illustrate the entire project timeline.

Five whys methods were used by members uncovering the root cause of the issues.

Pre- and Post- refresher course survey questionnaires methods were given to all staff; which include the following aspects:

- Emergency activation;
- Location;
- Workflow;
- Clinical situation;
- Patient assessment.

Pre- refresher course survey questionnaire were presented to DDII staff between February and March 2022. After that, a short refresher course was presented to all DDII staff, including the patient specialist associates (PSA), the staff nurses (SN), the sonographers and the radiographers.

Another similar post refresher course survey questionnaire were administered 3 months or more after staff had attended the refresher session.

Results:

The results for the pre- and post- competency survey questionnaires were collated and tabulated in several charts. Results showed an overall improved competency from 74% to 86% among DDII staff in response to Code Blue emergency activation.

Conclusion:

Our project has reflected an overall improved competency among DDII staff in response to Code Blue emergency activation.

RADSC ACP Academic Day 2023

Abstracts (Research Poster)

RESEARCH POSTERS

1) Ms Cherie Lee Pei Yee

Principal Radiographer (Clinical), Radiography Department, SGH

Ambient Light Intensity Affecting Ultrasound Operator Detection of Liver Lesions in Cine-clips

Theme: *Other (Clinical)*

Authors: *Cherie Lee Pei Yee, Angela Anthony, Azizah Bte Mohd Afif*

Background:

Ambient light (AL) is an important factor to improve ultrasound pathology detection. However, there are no established room AL levels recommended during an ultrasound examination. We aim to examine optimal AL for the detection of liver lesions in procedure room with anonymised pre-recorded cine-clips.

Methods:

Eight ultrasound operators with 5 to 14 years of professional experience were prospectively recruited to evaluate 51 randomised cine-clips replayed from one ultrasound machine. Operators reviewed all cine-clips and responded to two questions per cine-clip regarding their detection performance under 3 AL settings: 3, 15 and 25 lux, at one lighting per visit. A repeat visit under each AL was necessary for intra-operator variability. Each operator completed six visits in total, with at least a 2-day washout period. The operators' performance was analysed with SPSS and intraclass coefficient at 95% CI, $p < 0.05$, and compared against prior imaging reference standards (CT/MRI) confirming presence of lesion. A 2 x 2 contingency table was utilized to evaluate for accuracy, sensitivity, and specificity. Descriptive analysis was applied on the Likert-ranked data on the ease of lesion detection. Absence of lesion was determined by serial ultrasound.

Results:

AL with highest degree of operator performance accuracy (86-100%), sensitivity (79-100%) and specificity (94-100%), was found to be at 25 lux. PPV and NPV were up to 100%, with both intra- and interrater reliability excellent at 0.85-1.0 (0.79-0.98) and 0.98 (0.97, 0.99) respectively, with AL at 25 lux.

Conclusion:

This study proved that AL intensity affects detection of liver lesions by ultrasound operator on cine-clips.

Implications to practice

Identifying optimal AL levels can influence future ultrasound room construct to best facilitate detection of pathology.

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Academic Day 2023

Abstracts (Research Poster)

2) Ms Jolene Ooi Wei Ling

Head, Radiography Department, CGH

International Variations of Breast Screening Programs in Developed Countries: A Comparative Policy Analysis

Theme: *Population Health*

Authors: *Jolene Ooi Wei Ling, Shi Haiyuan*

Background:

Breast screening policies are among the population health initiatives driven by governments for early breast cancer detection to increase chances of survival and improve overall survival rates. Cross-national policy analysis enables cross-cultural insights and recommendations for policy reform to effective screening programs that yield lasting health and economic benefits.

Methods:

A review of academic literature, grey literature, and government websites was conducted to examine the breast screening policies of three developed countries: Singapore, the United Kingdom, and the United States. The analysis utilized the Walt and Gilson's policy triangle framework, which focuses on policy context, contents, actors involved, and processes of development, implementation, and evaluation.

Results:

Each country has a distinct breast screening program characterized by specific eligibility criteria, screening frequency, and funding mechanisms. Policy formulation is influenced by the country's healthcare financing system and population demographics. The policy-making process is shaped by the involvement of various interest holders and their respective goals. Evaluation measures, such as uptake rates and breast cancer mortality rates, serve as indicators for assessing policy efficacy. We identified common features in breast screening programs, such as patient empowerment, discussions of risks and harms, and a focus on managing high-risk women. At the same time, differences were also observed in screening recommendations and courses of action, influenced by healthcare systems and cultural factors.

Conclusion:

The comparative policy analysis offers insights and recommendations which may help improve breast cancer screening processes in first-world nations.

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Academic Day 2023

Abstracts (Research Poster)

3) Ms Jacqueline Quek Jie Li

Radiographer, Radiography Department, CGH

Overcoming Breath-Hold Difficulties with GRASP VIBE For Contrast-Enhanced MRI Liver and Pancreas

Theme: *Other (Quality Improvement)*

Authors: *Sim Fang Yang, Chiang Piek Chim, Jacqueline Quek, Lam Li Yi Maxine*

Background:

MRI of the liver and pancreas with contrast typically includes a dynamic Volumetric Interpolated Breath-hold Exam (VIBE) series as part of the routine protocol. Patients are conventionally required to hold their breath for 18-22 seconds for these sequences. When patients are unable to comply with breathing instructions, it leads to suboptimal image quality or conversion to a non-contrast scan, which limits the diagnostic value of the scan.

To tackle the suboptimal image quality caused by patients' difficulties in breath-holding, Golden-angle Radial Sparse Parallel (GRASP) VIBE was introduced. GRASP VIBE is an imaging technique that exhibits a reduced sensitivity to motion artifacts. It enables the retrospective reconstruction of multiple contrast-enhanced phases even when the patient is breathing naturally.

Methods:

GRASP VIBE was introduced for patients who were unable to comply with breathing instructions. A radiologist specialising in abdominal scans reviewed images produced with the protocol and assessed them to be of diagnostic quality. Training was provided to MRI radiographers in order to utilize GRASP VIBE for appropriate patients.

The number of scans with suboptimal sequences, cancelled scans and number of scans with aborted contrast media administration were collated over a six-month period before and after implementation.

Results:

After implementation, the rate of scans with suboptimal sequences was reduced by approximately 42%; number of cancellations was reduced by 75%, and rate of scans with aborted contrast media administration was reduced by 90%.

Conclusion:

GRASP VIBE was proven as effective in reducing the occurrence of suboptimal images, minimizing the number of case cancellations and interruptions in contrast administration during scans caused by patients' breath-holding problems.

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Academic Day 2023

Abstracts (Research Poster)

4) Ms Chong Mei Choo

Principal Radiographer, Radiography Department, CGH

CT Pulmonary Angiography: Lower Injection Flow Rate and Dosage of Contrast Media

Theme: *Quantitative Imaging*

Authors: *Chong Mei Choo, Lee Wan Chin, Ngui Yee Ping*

Background:

High injection flow rate of Contrast Media (CM) administration are recommended for optimal pulmonary artery opacification. However, this may be difficult to achieve for elderly or cancer patients who have poor peripheral venous access. In addition, the use of a high volume CM is associated with increased risk of Contrast Induced Nephropathy (CIN). The purpose of this study is to investigate the feasibility of reducing injection flow rate, contrast dosage and radiation dose to improve clinical outcomes without compromising the image quality.

Methods:

Retrospective collection of data from 151 patients with clinical suspicion of PE who underwent CT pulmonary angiogram (PA). Qualitative image assessment was performed by 2 independent radiologists, using a 5-point close-ended questionnaire, with score of 1 indicating poor and non-diagnostic, and score of 5 as excellent image quality. Both radiologists were blinded to CTPA scanning protocols and clinical information.

Two independent readers quantitatively measured the attenuation of multiple pulmonary arteries in HU. Measurement of the vessel enhancement was performed on seven locations. HU with more than 200 to be considered as diagnostic.

Results:

Lower contrast dosage and injection rate protocol was able to achieve comparable enhancement when compared against the standard protocol, across all pulmonary arteries. The dose was reduced by 20%.

Conclusion:

Lower contrast injection flow rate and contrast volume in CT pulmonary angiogram is achievable without compromising the image quality. Optimum image quality is still achievable even with 20% radiation dose reduction.

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Academic Day 2023

Abstracts (Research Poster)

5) Mr Tiong Wei Song

Principal Radiographer, Radiography Department, CGH

A Survey of Initial Patient Diagnostic Reference Levels (DRLs) for Common Orthopaedic Procedures Using Intra-Operative Mini C-Arm Fluoroscopy at Changi General Hospital

Theme: *Other (Radiation Safety)*

Authors: *Tiong Wei Song, Jolene Ooi Wei Ling*

Background:

Diagnostic Reference Levels (DRLs), recommended by the International Commission of Radiological Protection (ICRP), are valuable tools for optimizing patient radiation protection, emphasizing the 'as low as reasonably achievable' (ALARA) principle. They were introduced with the objective of providing reference levels for radiation doses under defined conditions, with adherence to DRLs signifying good clinical practice. Currently, no national DRLs have been established for fluoroscopy-guided procedures using mini C-arm technology in Singapore. This study aims to establish DRLs for orthopaedic procedures using intra-operative mini C-arm fluoroscopy at Changi General Hospital and compare these findings with published international data.

Methods:

Dose-Area Product (DAP) of all patients who underwent fluoroscopic-guided orthopaedic procedures using intra-operative mini C-arm between August 2022 and July 2023 were retrospectively retrieved from the Radiological Information System (RIS). For each procedure, the 75th percentiles of DAP were derived. Published international DRL data were collated and compared with the 75th percentiles of local institutional dosage parameters.

Results:

The DAP data was recorded for 199 upper limb surgeries and 142 lower limb surgeries. For our data set, the third quartile DAP values were lowest for surgeries to the forearm (109 mGycm²), and highest for elbow (591 mGycm²). The DAP value for hand/finger was 135mGycm², ankle/foot was 203mGycm² and wrist was 273mGycm².

Conclusion:

This is the first study in Singapore that reports the radiation doses of fluoroscopy-guided procedures using intra-operative C-arm expressed as DRL quantities. DRL values from these selected studies are noticeably higher than the values reported in literature, contributed by several factors such as complexity of the procedures and competency of procedurists. This warrant future investigation of the higher-than-normal dose limits. In conclusion, the proposed DRLs serve as indicators of optimum range of values for a specified medical imaging protocol radiation exposure for the institution.

RADSC ACP Academic Day 2023

Abstracts (Research Poster)

6) Mr Ng Jia Jun

Principal Radiographer, Department of Radiology, SKH

Establishment of CT Diagnostic Reference Levels (DRLs) for a Singapore Healthcare Cluster

Theme: *Other (Computed Tomography Diagnostic Reference Levels)*

Authors: *Laurentcia Arlany, Toh Hong Guan, Babar Nazir, Tay Yong Heng, Cyrus Poon Jun Xian, Lee Li Na, Fum Kok Sheong, Lee Yee Teng, Siti Mariah Bte Idrus, Marielle Valerie Fortier, Tham Wei Ping, Chew Lee Lian, Edwin Chong Ker Hau, Chong Le Roy*

Background:

The use of computed tomography (CT) in healthcare institutions has increased rapidly in recent years. The Singapore Health Services (SingHealth) cluster of healthcare institutions has taken the first step in establishing a local cluster-wide CT Diagnostic Reference Levels (DRL) in Singapore. CT dose data from each institution were collected through two primary dosimetry metrics: volume CT dose index (CTDIvol measured in mGy) and dose-length product (DLP measured in mGy.cm).

Methods:

Data from 19 CT scanners in seven institutions under one of Singapore healthcare cluster were retrospectively collected and analysed. The five common adult CT examinations analysed were CT Brain (non-contrast enhanced), CT Chest (IV contrast enhanced), CT Kidney-Ureter-Bladder (CT KUB, noncontrast enhanced), CT Pulmonary Angiogram (CT PA, IV contrast enhanced) and CT Abdomen Pelvis (CT AP, IV contrast enhanced, single phase). Median CTDIvol and DLP values for the five CT examinations from each institution were derived, with the cluster DRLs determined as the 75th percentile of the distribution of the institution median dose values.

Results:

A total of 2413 dose data points were collected over a six-month period from June to November 2020. The cluster CT DRLs for the five CT examinations were determined to be 47 mGy and 820 mGy.cm for CT Brain, 5.4 mGy and 225 mGy.cm for CT Chest, 6.7 mGy and 248 mGy.cm for CT PA, 4.6 mGy and 190 mGy.cm for CT KUB and 6.9 mGy and 349 mGy.cm for CT AP.

Conclusion:

The establishment of the cluster CT DRLs provided individual institutions with a better understanding if their CT doses are unusually high or low, while emphasising that these DRLs are not meant as hard dose limits or constraints to follow strictly.

RADSC ACP

Academic Day 2023

Abstracts (Education Poster)

EDUCATION POSTERS

7) Ms Cheng Qianhui

Senior Executive, Department of Neuroradiology, NNI

Interprofessional Collaboration Competency in Radiology and Neurology Residents during Virtual Team-Based Learning

Theme: *Education Research*

Authors: *Qianhui Cheng, Wai-Yung Yu, Vincent Ern Yao Chan, Preman Rajalingam, Kevin Tan*

Background:

Our team has previously demonstrated that both traditional in-person TBL and virtual TBL (vTBL) are effective and comparable in teaching neuroradiology to radiology and neurology residents.

The current study aims to assess residents' self-perception of Interprofessional Collaboration Competency during vTBL.

Methods:

The vTBL was conducted over Zoom and facilitated by a neuroradiologist and a neurologist. There were six interdisciplinary teams in the session and application scenarios of clinico-radiology nature were discussed. Facilitators provided information simulating the longitudinal nature of disease progression, encouraged discussions, and clarified doubts during large group discussions.

At the end of the session, the modified TBL Student Assessment Instrument (TBL-SAI) was used to assess residents' perceptions of vTBL, and the Interprofessional Collaboration Competency Attainment Survey (ICCAS) was used to assess residents' self-perceptions of interdisciplinary collaboration competency.

Results:

27 participants completed the TBL-SAI and ICCAS (21 radiology and 6 neurology residents) (75% response rate).

The TBL-SAI scores are Accountability Subscale (M=34.98, SD 7.34), Preference for vTBL subscale (M=51.66, SD 11.02), and Satisfaction (M=39.33, SD 8.50) and the total TBL-SAI (M=125.83, SD 26.33).

There were small effect sizes observed for the 17 items ICCAS (0.37- 0.49). "Promote effective communication among interprofessional (IP) members" (0.49) and "Learn from IP team members to enhance care" (0.47) saw the largest benefit.

63% of respondents reported their ability to collaborate inter-professionally had improved.

Conclusion:

vTBL provides an environment for interdisciplinary teams to learn from one another and involve one another in clinical decision-making, where IP communication and IP collaboration help co-contribute their learning and enhance patient care.

RADSC ACP

Academic Day 2023

Abstracts (Education Poster)

8) Ms Joy Vargas Belmonte

Principal Radiographer, Department of Diagnostic & Interventional Imaging, KKH

Use of Cranial Ultrasound Phantom Shortens Ultrasound Scan on Patient

Theme: *Learner Assessment and Evaluation*

Authors: *Joy Vargas Belmonte, Elizabeth Chen Mei Hua, Tang Phua Hwee*

Background:

Cranial ultrasound is routinely performed for premature babies and scan should be done quickly as patient's co-cooperativeness is limited.

Aim was to determine if use of cranial ultrasound phantom can result in Resident performing a cranial ultrasound scan for the first time on a patient in under 30 minutes.

Methods:

Cranial ultrasound phantom was incorporated into the Radiology Residents ultrasound training in 2023, together with lectures on scan technique, ultrasound appearance of normal variants and common pathologies on cranial ultrasound. After the one-on-one cranial ultrasound phantom session with the trainer, Residents obtained standard coronal and sagittal key cranial ultrasound images with scan time captured.

Residents then carry out cranial ultrasound on a patient with scan time captured.

Results:

11 Residents in earlier half of 2023 were trained using the cranial ultrasound phantom.

Scan duration was an average of 36 minutes on the cranial ultrasound phantom (range from 30 to 45 minutes) and was an average of 19 minutes for the patients (range from 13 to 35 minutes).

Only 1 resident took more than 30 minutes (35 minutes) to scan the patient.

Conclusion:

Use of cranial ultrasound phantom training allows more than 90% of Residents to perform cranial ultrasound scan within 20 minutes when doing this on the patient for the first time.

RADSC ACP

Academic Day 2023

Abstracts (Education Poster)

9) Mr Ho Hee Shen

Senior Principal Radiographer, Department of Diagnostic & Interventional Imaging, KKH

Learning Curve Effect on the Radiation Dose for Patients who Underwent Preoperative Internal Iliac Artery Balloon Occlusion Procedure for Abnormal Placentation

Theme: *Learner Assessment and Evaluation*

Authors: *Ho Hee Shen, Tay Yong Heng, Lai Hui Qi, Xiong Hong Fong, Lukies Matthew William, Chandramohan Sivanathan, Luke Michael Toh Han Wei*

Background:

Prophylactic internal iliac artery balloon occlusion (PIIABO) is a procedure offered to patients on patients with abnormal placentation prior to caesarean delivery to reduce the risk of intra-operative haemorrhage.

The objective of this retrospective study is to analyse the trend in radiation dose received by the mother and the foetus who underwent this procedure over a period of 7 years and discuss the correlation of dose trend based on user factors.

Methods:

Study group: 60 patients between June 2010 to September 2017 underwent PIIABO procedure. The dose received by both the mother and the foetus were calculated.

Results:

All mothers received less than 100 mSv of radiation while 55 out of 60 foetuses received less than 100 mGy of radiation. Most foetuses and mothers received radiation doses within the International Commission on Radiological Protection (ICRP) recommended safe dose level of 100 mGy.

There were 5 outliers for high foetus dose, noted from the early phase of the study. It is noted that these patients received higher radiation dose, likely due to the frequent usage of DSA to confirm pelvic vascular anatomy.

Conclusion:

The high foetal dose trend is observed during the early phase of the study suggests learning curve effect.

RADSC ACP

Academic Day 2023

Abstracts (Education Poster)

10) Ms Audrey Chia Qi Xin

Resident, SingHealth Diagnostic Radiology Residency Programme

Baseline Competency and Influence of Pathology Location on Medical Students Interpretation of Paediatric Chest Radiograph

Theme: *Education Research*

Authors: *Audrey Chia Qi Xin, Thida Win, Tang Phua Hwee*

Background:

Radiology training in the medical school curriculum is often limited to incidental exposure during clinical rotations which may lead to a lower skill and confidence level in basic imaging interpretation. This study aims to evaluate baseline competency of and influence of pathology location on paediatric chest radiograph interpretation amongst medical students during their clinical paediatric posting.

Methods:

The test was administered on the institution's e-learning platform. Ten paediatric chest radiographs were selected with a distribution of 3 normal and 7 abnormal radiographs featuring consolidations (3 were right-sided and 4 were left-sided, including 1 left retrocardiac consolidation). Other types of abnormalities were excluded. Participants were asked to classify each radiograph as normal or abnormal. A correct response scored 1 point while an incorrect response was awarded 0 points.

Results:

From January 2023 to April 2023, 38 medical students completed the test with an average score of 7.9 (S.D 1.15). Normal radiographs were significantly less frequently correctly classified (50.3%) compared to abnormal radiographs (88.7%, $p < 0.01$). Laterality of consolidation had no significant difference on the frequency of correctly classified abnormal radiographs ($p > 0.05$). Retrocardiac consolidation was significantly less frequently correctly classified (71.1%) compared to other left-sided consolidations (97.4%, $p = 0.01$).

Conclusion:

Medical students show a good overall baseline competency in the interpretation of paediatric chest radiographs for their level of training. However, they are less competent in identifying normal radiographs compared to abnormal radiographs. The discrepancy may be attributed to regret and framing bias. Superimposed anatomic structures are likely the cause of more frequently missed retrocardiac consolidations.

RADSC ACP Academic Day 2023

Abstracts (Education Poster)

11) Ms Lam Hoi Ying Janny

Senior Staff Nurse, Department of Radiology, SKH

Online Video on Care of Pleurx Education via SKH Intranet Infopedia

Theme: *Technology-enhanced Learning*

Authors: *Lam Hoi Ying Janny*

Background:

Patients who have undergone pleurx insertion procedure in Interventional Radiology (IR) get discharged and go home with pleurx catheter. Patients and caregivers need to understand how to take care of the catheter at home. To date, IR nurses go to wards to give pleurx education and provided teaching pamphlet.

However, IR nurses may not be able to provide education in wards in a timely manner due to our duty responsibilities, patients ended up with late discharge which indicates patient's additional cost. More so, ward nurses have limitations in teaching these patients as they are not trained in IR suite and their lack of technical-know-how in taking care of the catheter issues may occur.

Summary of Innovation:

I had proposed and worked with nursing education department (NED) to create a video demonstration via SKH intranet on pleurx catheter teaching for ward nurses to teach patients. We also created a patient family education record (PFER) on the care of catheter, dressing, follow up appointment, teach patients and caregivers upon discharge. This improves patients and caregivers level of understanding and enhances effective communications.

Conclusion:

The idea of having this online video education via SKH intranet can benefit more ward nurses or even doctors to understand and be familiar with taking care of the pleurx catheter. Thereafter, ward nurses can teach and demonstrate to patients or caregivers on the pleurx catheter education. Currently, the online video, together with PFER are in progress of launching.

RADSC ACP

Academic Day 2023

Abstracts (Education Poster)

12) Ms Tan Gaik Mooi (Florence)

Principal Radiographer (Clinical), Radiography Department, SGH

Ultrasound of Acute Pancreatitis: How Can I Be Acutely Aware?

Theme: *Other (Educational Exhibit)*

Authors: *Tan Gaik Mooi, Tia Ke Sing, Wong Yuet Wah, Yew Jia Sheun, Wong Hui Lin*

Background:

Acute pancreatitis (AP) is an acute inflammatory process of the pancreas that may also involve the peripancreatic tissues. The role of ultrasound in the initial evaluation of patients with suspected or confirmed AP is the detection of gallstones and signs of biliary obstruction as potential aetiologies of pancreatitis. Additionally, ultrasound can help detect and follow up on complications of AP. This exhibit aims to discuss the sonographic findings of AP coupled with modified scanning techniques on the pancreas.

Methods:

Ultrasound studies indicated for AP performed between 2010 and 2022 were retrospectively collated. A pictorial review with actual case illustrations will be presented and correlated with computed tomography (CT) or magnetic resonance imaging (MRI) where available.

Results:

In AP, the pancreas appears swollen, heterogeneous, and indistinct margin with peripancreatic fat. Concomitant biliary tract abnormalities, such as gallstones, choledocholithiasis, and biliary dilatation may cause AP. Complications associated with AP will be presented, including peripancreatic fluid collection, portal and splenic vein thrombosis, and pseudoaneurysm. Furthermore, various scanning tips of the pancreas, e.g., using a water-filled stomach, graded transducer compression, Valsalva manoeuvre with an abdominal protrusion, and changing different patient positions are illustrated.

Conclusion:

With a detailed sonographic evaluation, ultrasound can detect pancreatic parenchymal changes, fluid collection, vascular complications, and potential aetiologies of AP. On ultrasound, knowledge of various scanning techniques allows for improved visualisation and assessment of the pancreatic parenchyma and peripancreatic tissues. Timely diagnosis and treatment lie in understanding the sonographic features of AP and identifying its causes.

RADSC ACP

Academic Day 2023

Abstracts (Education Poster)

13) Ms Masriyani Binti Misri

Senior Staff Nurse, Department of Radiology, SKH

To Enhance Staff Knowledge and Confidence of Nurses in Radiology Department on Nuclear Medicine and Mammography Procedures

Theme: *Learner Assessment and Evaluation*

Authors: *Nurulatikah Binte Zainal, Masriyani Binti Misri*

Background:

In SKH Radiology, nurses in Arena (CT/MRI/NM/Mammo/Fluoroscopy) are rostered to cover different modality weekly. This is to better facilitate cross training for all staff to cross cover each other without any difficulties or lack of confidence.

Nurses feedback that they may not be able to remember the work processes as they are not frequently expose to all procedures on a timely basis. Largely, their concerns involved are purpose of the procedure and patient education.

Methods:

Slide presentation which includes video and pictures.

Giving in-services talk by using visual aid for clearer illustrations and upload to Infopedia as references material for the nurses in DoR.

Results:

Aim to improve staff knowledge and confidence level by 80% when carrying out procedures for both modalities.

Conclusion:

Visual materials give staff a better understanding and helps in their learning process. The materials are easily accessible in Infopedia anytime at work when they need a reference before they are rotated to modalities which can increase efficiency and confidence level. This can increase satisfaction for both staff and patients.

RADSC ACP

Academic Day 2023

Abstracts (Education Poster)

14) Ms Tay Bi Lian Eunice

Principal Radiographer, Department of Diagnostic & Interventional Imaging, KKH

To Determine If Higher Competency in Gynaecology and (Non-Cranial) Paediatric Ultrasound Correlates With Shorter Duration in Performing Cranial Ultrasound On A Phantom

Theme: *Learner Assessment and Evaluation*

Authors: *Tay Bi Lian Eunice, Elizabeth Chen Mei Hua, Tang Phua Hwee*

Background:

From 2023, cranial ultrasound was introduced to residents that passed their gynaecology and paediatric (non-cranial) ultrasound assessments (minimum score of 3, maximum 5).

Aim was to determine if having a competency in performing gynaecology and paediatric (non-cranial) ultrasound results in shorter time to perform a competent cranial ultrasound scan on a phantom (under 30 minutes).

Methods:

Residents were given one-to-one one hour practical training with the phantom after which their scan time was documented.

The documented time were then compared to their performance in gynaecology and paediatric (non-cranial) ultrasound.

Results:

Eleven residents in earlier half of 2023 were assessed.

All residents achieved the minimum residency score of 3 on the cranial ultrasound phantom after the practical training session. Average time taken to scan phantom was 35 minutes (range from 30 minutes to 45 minutes).

2 Residents scored 5 in Gynae assessment, took an average of 39 minutes to do the cranial phantom.
8 Residents scored 4, an average of 36 minutes; and 1 Resident scored 3, took 32 minutes for cranial phantom.

1 Residents scored 5 in Pediatric assessment, took 40 minutes to do the cranial phantom.
6 Residents scored 4, an average of 35 minutes; and 4 Residents scored 3, an average of 37 minutes for cranial phantom.

Conclusion:

Higher competency in gynaecology and (non-cranial) paediatric ultrasound does not correlate with shorter duration in performing cranial ultrasound on a phantom.

RADSC ACP

Academic Day 2023

Abstracts (Education Poster)

15) Ms Yenleyetha Yun Chiat

Senior Staff Nurse, Department of Diagnostic & Interventional Imaging, KKH

Feed and Wrap Technique, A Protocol For Nurses Preparing “Well” Infants For MRI Scan

Theme: *Other (Department Protocol)*

Authors: *Yenleyetha Yun Chiat, Teo Boon Yee Pamela, Ruby Armada Ocubillo, Noreen Yaun Montes, Li Qun, Zhang Mei, Guo Xueyan, Omar bin Mahmood, Ho Hee Shen, Toh Han Wei Luke Michael*

Background:

Successful neonatal MRI scan relies on having a settled infant within the scanner to permit acquisition of the necessary sequences and good-quality images.

Unsettledness may lead to incomplete or unsuccessful scans, and costly rescheduled scans with concomitant parental anxiety and inconvenience.

Significant motion artefact may confound or preclude interpretation, leading to diagnostic errors.

The Feed and Wrap Technique refers to the use of Feeding and Wrapping to induce natural sleep-in infants.

The aim of this study is to prevent infants from movement during the MRI scans; and to avoid the infants from undergoing sedation or general anesthesia (GA).

Summary of Innovation:

Patient’s preparations and other instructions to parents and ward staff prior to the MRI examination are being enlightened.

Internal staff’s roles and responsibilities are also being elaborated.

The feed and wrap technique are described with graphical illustration.

Conclusion:

For babies who need to undergo a MRI scan, it can create a lot of fear and fidgety as the machine resembles an enclosed tunnel. The infants’ anxiety may be overcome by the above method.

A standardised Feed and Wrap technique performed by experienced personnel may also avoid sedation or GA in infants who require MRI.

RADSC ACP

Academic Day 2023

Abstracts (Education Poster)

16) Ms Natalie Grace Fontiveros Feguro

Senior Staff Nurse, Department of Diagnostic & Interventional Imaging, KKH

Percutaneous Lumbar Puncture For Infants Using Ultrasonography

Theme: *Other (Department Practice)*

Authors: *Natalie Grace Fontiveros Feguro, Freya Bulacan Jayma, Lai Hui Qi, Matthew William Lukies, Xiong Hong Fang, Wu Xin Fang and Toh Han Wei Luke Michael*

Background:

Lumbar puncture is a minimally invasive procedure performed by inserting a needle into the thecal sac to obtain cerebrospinal fluid (CSF) for analysis. It is useful in a variety of conditions including meningitis, inflammation, and central nervous system malignancies.

Lumbar puncture for infants is commonly done in the ward without any imaging guidance. After several failed attempts, image-guided lumbar puncture by an Interventional Radiologist in the Angiography Suite may be considered.

The aim of this study is to demonstrate the department's practice in utilizing ultrasound as a mean to increase the success rate for spinal tap in infants.

Summary of Innovation:

Prior to the procedure, the ward is instructed to hydrate the patient to increase the volume of CSF through feeding of milk.

Before draping patient for a sterile field, ultrasound is used to image for adequate CSF, locate the conus level, and plan the needle trajectory. Under ultrasound guidance, the LP needle is inserted into the thecal sac and CSF obtained.

Some patients may not have enough CSF, resulting in repeated failed LP in the ward. Ultrasound allows Interventional Radiologist to assess adequate CSF volume before commencing the procedure and also plan the course needle puncture to avoid any blood vessels.

This ensures the safety and comfort of these patients and minimises adverse effects and complications such as bleeding or spinal injury.

Conclusion:

Ultrasound guided lumbar puncture ensures high success in obtaining adequate CSF. This aids in timely diagnosis and treatment for infants with unexplained fever, seizures, and inflammation.

RADSC ACP

Academic Day 2023

Abstracts (Education Poster)

17) Mr How Guo Yuan

Resident, NUHS Diagnostic Radiology Residency Programme

A Rare Case of Transient Urocolpos Secondary to Vesicovaginal Reflux

Theme: *Education Research*

Authors: *How Guo Yuan, Tiffany Wong Tuck Chin, Ong Chiou Li, Tang Phua Hwee*

Background:

Urocolpos refers to the distension of the vagina due to urinary accumulation. Vesicovaginal reflux refers to the retrograde flow of urine into the vaginal vault during voiding. While the etiology is not established, postulations include apposition of the labia, horizontally orientated vagina or positional factors such as opposing of legs when micturating. Patients commonly present during adolescent years, although middle-aged women are also affected. A myriad of urogynaecological symptoms have been described, these include urinary incontinence, urinary tract infections or enuresis. Therapeutic strategies hinge on the causative etiology, and whether it is secondary to anatomical defects or functional causes. Anatomical abnormalities may be surgically corrected, while functional etiologies are amendable to behavioral therapies such as toilet training. We describe an extremely rare case of an adolescent girl who presented with hematuria during menstruation and night enuresis, who was noted to have findings of vesicovaginal reflux. Initial pelvic ultrasonography raised the suspicion of urocolpos and demonstrated an avascular septation arising from the posterior cervical os. Subsequent evaluation on pelvic magnetic resonance imaging confirmed the presence of vertical urinary reflux into the vagina, indicating the absence of any fistulation between the urinary system and vagina. No renal abnormalities were detected. The patient was managed conservatively along with bladder training.

Methods:

Informed consent obtained to use imaging findings for teaching.

Results:

Imaging findings on ultrasound and MRI are highlighted.

Conclusion:

Radiologists should be aware of this unusual entity such that such patients are not over investigated.

RADSC ACP

Academic Day 2023

Abstracts (Education Poster)

18) Ms April Toh Lee Chuen

Senior Principal Radiographer, Department of Diagnostic & Interventional Imaging, KKH

Fire Safety Awareness: Igniting Safety through Technology Enhanced Learning

Theme: *Technology-enhanced Learning*

Authors: *Joycelyn Tan, Eunice Tay, Lai Hui Qi, Shawn Neo, April Toh and Ho Hee Shen*

Background:

Fire Safety awareness and drill is part of the mandatory safety process and regulation in the hospital setting. Previously, DDII and hospital fire safety department would arrange for a physical briefing on the day of the fire drill. This year, DDII Fire Safety team created e-learning slides to reach out to all staff.

Aim was to determine if the use of Technology Enhanced Learning (TEL) using e-learning can result in improved outcome staff's awareness of fire safety drill in DDII.

Methods:

Department of Diagnostic & Interventional Imaging (DDII) staff were made to go through mandatory e-learning slides on Fire safety in DDII with online quiz from 20 June 2023 to 4 July 2023. Online survey was rolled out thereafter to gather from staff on the use of e-learning platform.

Results:

More than 90% of the staff completed the online learning. Survey rolled out demonstrated favourable outcome on the use of TEL for fire safety awareness.

Conclusion:

There was improvement in the fire drill carried out on 5 July 2023. E-learning can result in improved outcome of staff on fire safety awareness and drill in DDII.