



meticulous procedural and radiographic technique. A detailed knowledge of relevant anatomy, physiology and pathology and an understanding of the physical and emotional complexity of subfertility is essential. The authors' will demonstrate that to provide a comprehensive HSG service requires experienced and empathetic operators, extensive clinical knowledge, a range of equipment, the technical skills to utilise it and close co-operation with referring clinicians.

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**P083 Down under: Ultrasound below the cervix, pathology and anatomy explained**

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**Background:** When assessing the uterus and ovaries during transvaginal ultrasound, common radiological blind spots include the vagina and urethra. Pathology in this region can include Bartholin, Skene and Gartner duct cysts. Varices may be identified.

Urethral pathology can include diverticulae, silicone injections and the effects of prolapse. Incidental soft tissue masses such as lipomas may also be seen. Malignant lesions include vulval carcinoma.

**Purpose:** It is important to be aware of pathology in this region. A careful and deliberate review of these areas by the operator may reveal a diverse range of clinically relevant pathology. An understanding of the anatomy and use of trans-perineal scanning when required can aid this.

**Summary:** We present a pictorial review and explain the relevant anatomy and scanning techniques.

**PAEDIATRICS**

**P084 Variation in laryngeal mask airway positioning and its impact on a proton beam therapy plan – A case study**

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**Introduction:** Proton beam therapy (PBT) dose distributions are particularly sensitive to density changes, which alter Bragg peak position, potentially leading to under dosing the target and overdosing of normal tissue. In our photon practice, paediatric patients treated under daily general anaesthetic (GA) require a laryngeal mask airway (LMA) for airway maintenance. We have observed variation in LMA position and resultant soft tissue and airway displacement on CBCT. This study aims to quantify this variation and explore the potential impact on a PBT plan.

**Method:** A case study was carried out on a patient with a target adjacent to the LMA. The airway and LMA were contoured on the planning CT scan and 4 weekly CBCTs. The volumes of the structures (cm<sup>3</sup>) were then compared and the dice coefficient calculated to quantify similarity. A PBT plan was created and recalculated with density overrides.

**Results:** The average dice coefficient between the contoured airway volume on the planning scan and CBCT scans were 0.54 (range: 0.5-0.59). The average dice coefficient between the contoured LMA on the planning scan and the CBCTs were 0.26 (range: 0.15-0.36). The density changes affected the planned PBT dose distribution and deposited large hot spots in the plan.

CBCT number	Planning Airway Volume (cm <sup>3</sup> )	CBCT Airway Volume (cm <sup>3</sup> )	Overlap Volume (cm <sup>3</sup> )	Dice Coefficient
CBCT1	58.9	59.9	32.51	0.55
CBCT2	58.9	52.94	32.89	0.59
CBCT3	58.9	45.57	26.23	0.50
CBCT4	58.9	45.38	27.86	0.53

**Conclusion:** This case study demonstrates variation in LMA position during treatment can cause density changes within a patient with a target volume adjacent to the LMA. In this case, the planned dose distribution in the PBT plan was affected, which could have a potential clinical impact.

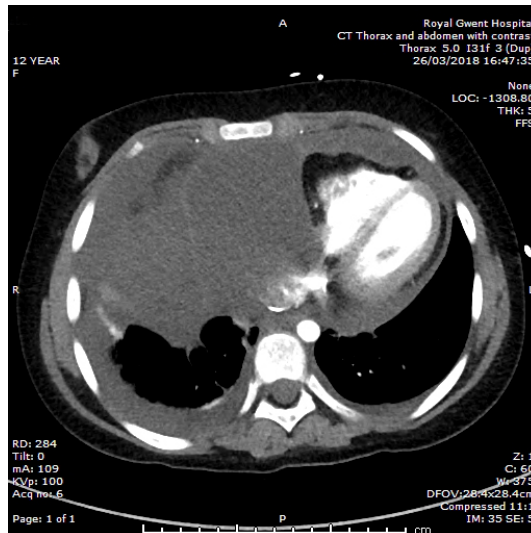


**P085 Mediastinal teratoma presenting with abdominal pain: An unusual presentation**

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**Introduction:** Mediastinal teratomas are a rare finding in children, comprising of 1-5% of all tumours found in the mediastinum. Teratomas are of embryonic origin composed of tissue or organs derived from the three germinal layers, most frequently occurring in the gonads followed by the mediastinum. Teratomas vary in presentation, often grow slowly and can present when the tumour has grown to a large size; therefore there are a wide variety of considerations which determine its management. We present a case of successful management of a large intrathoracic teratoma in a child.



**Case report:** A 12-year-old female presented acutely with symptoms of abdominal pain, vomiting and chest tightness. She was pale, tachycardic and pyrexial. Her inflammatory markers and troponin were high, chest x-ray revealed right sided consolidation. Her tachycardia persisted, CT was performed which revealed compression of the right heart by a mass with pericardial effusion. She was managed by the

paediatric cardiology and cardiothoracic teams, following which she had a successful excision. The tumour was encapsulated and extending into the pericardium. She made an uneventful recovery and has no signs of recurrence.

**Discussion:** Mediastinal germ cell tumours represent 24% of anterior mediastinal tumours which are mostly benign. Teratomas can remain undetected because of expansion at the cost of compliant thoracic tissues with abundant functional reserve. Compression symptoms are a common presentation. There have been some reports of tumour rupture leading to life threatening complications. The treatment of choice is complete surgical excision with long term follow up.

**P086 A retrospective analysis and application of the paediatric reflux grading system in reporting of micturating cystograms by advanced practitioner radiographers**

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**Background:** Vesicoureteral reflux (VUR) can be graded according to the international reflux grading system<sup>[1]</sup>. VUR can lead to renal scarring<sup>[2]</sup> therefore diagnosis management and treatment is critical<sup>[3]</sup>. Advanced practitioner (AP) radiographers at the trust have been reporting on paediatric micturating cystograms (MCUG) since 2013. From a previous audit (2018) assessing accuracy and quality of MCUG reports AP's achieved 100% in specificity, sensitivity and accuracy. However, no comment is made on the international grading of the VUR present.

**Purpose:** To review the VUR international grading system. To conduct a retrospective audit to collect data for all positive MCUG's for reflux. To review imaging and grade the VUR reflux accordingly.

**Summary:** The poster shows details of a local audit undertaken. The content will include the background of VUR and AP reporting at the trust. Describes the methodology, results and discussion for undertaking the audit. Radiological imaging pictorial review of the international grading system. The findings resulted in a change to local procedure for reporting of MCUG's with a VUR grade placed in the summary of the report.

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**P087 Top 10 CT head review areas in the fitting infant**

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**Background:** CT imaging is often the first line investigation when a fitting infant is admitted as an emergency to hospital. In the District General Hospital these studies are requested infrequently but accurate reporting is essential as positive findings will usually direct immediate patient management. The infant (less than 2 years) brain is difficult to assess due to lack of myelination, normal age variants and the often subtle appearances of pathology. Clinical history may be misleading and add to the challenges surrounding image interpretation.

**Purpose** A pictorial review highlighting the important areas for review in the infant brain to assist the infrequent reporter. The pathologies which may clinically present with fitting will be discussed and radiological findings reviewed. Common areas where pathology can be missed will be demonstrated and expected normal differences in the young child's brain discussed.

**Summary:** CT imaging of the fitting infant is an important tool to help identify the cause of seizures and to plan patient management. It is essential for the reporter to be aware of the pathologies which may present with fitting and to recognise the radiological features of these. We hope to improve confidence for reporters and the accuracy of reports to ensure optimal patient management.

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**P088 Microphthalmia: Born with the imaging findings of an ocular anomaly associated with blindness**

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**Background:** Microphthalmia (MO) refers to presence of small eye(s) within the orbit(s). With an estimated birth prevalence of 0.01%, MO accounts for severe visual impairment in up to 11% of blind children.

**Purpose:** We present the imaging findings of MO, in a newborn. A premature (postnatal 35wks) neonate had narrow palpebral fissure and bilateral deeply set appearance of the eyeballs. The baby could not open his eyes and the eyeballs were not palpable on physical examination. Because ophthalmologic evaluation was practically not feasible imaging studies were pursued. CT of the skull/brain revealed no osseous deformity in the skull and the orbits, or brain abnormality. The eyeballs occurred small-sized and of normal density. MRI revealed bilateral distinctly small eyeballs, measuring 5.2mm on the left and 5.4mm on the right side (normal, 9-10.5mm). Vitreous cavity appeared normal. The optic nerve and chiasm, and the oculomotor muscles appeared unremarkable. Brain morphology was normal, with no associated pituitary defects or extraocular findings involving the craniofacial region (i.e., anomalies of the face, neck and ear). Visual potential of the neonate was not appreciated, and the newborn was scheduled for follow-up ocular examination. Parents were informed about possible removal of the globes, with insertion of a conformer to expand the orbits within the first year of age.

**Summary:** MO is an ocular malformation that needs to be diagnosed and treated early in infants. Imaging studies may provide valuable anatomic and morphologic information that would not be apparent on the ophthalmology examination alone.

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**P089 Behaviours of student radiographers towards infection control on the neonatal intensive care unit**

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Currently, there is limited literature evidencing the knowledge and behaviours of student radiographers towards infection control on the neonatal intensive care unit (NICU). Radiography students spend a lot of time on NICU during placement over their 3 years at university. However, this research found that there is a significant difference in compliance rates of students, particularly between 2nd year and 3rd year students. This poster will present the findings of the primary study. A primary research study was conducted where a NICU based scenario was set up. 50 students were then directly observed as they worked through the scenario, designed to check compliance. Once they completed the practical element, they were given a questionnaire to complete, designed to understand knowledge. This method allowed the researcher to find out what the students did in practice compared to what they knew in theory. Comparing practical performance to theoretical knowledge identified the knowledge gaps. The results showed that compliance varied widely. The overall mean mark on the practical element was 51%. On the theoretical aspect the mean mark was 79.5%. The findings are consistent with literature which supports that compliance was inconsistent. Confirmation that compliance of student radiographers was low and knowledge of correct infection control on the NICU was inadequate. Considerable disparities between year groups, theory and practice. Knowledge gaps between second year and third year students was expected, however, the evidence of such significant knowledge gaps was unanticipated. Clear need for more robust and consistent infection control mandatory training with neonates.



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**P090 'Playing a part in the performance' of a child's X-ray procedure**

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There is increasing evidence of children's engagement in health services. Less is known about children's experiences of X-ray procedures or the ways they communicate during the procedure. Data were generated through non-participant observations of children undergoing X-ray procedures. Children and their parents were invited after the procedure to take part in a semi-structured interview. Children, parents and radiographers played specific parts during the X-ray procedures and this influenced communication. Three different categories of communication were developed but are not presented as a hierarchy of the communication children preferred. The first category was communication where a child was involved; children's voices were sought with the expectation that they could influence what happened during the procedure. The second category was communication where a child was interrupted; children's voices were replaced because of the bigger roles adults played. The third category was communication where a child was ignored; children's voices were overlooked, silenced or not sought by adults. Children in these procedures had a small role and little power to influence what happened during their procedure. The findings have been discussed using dramaturgical metaphors of roles, scripts and front and backstage performances that unified the three developed categories and lead to the theorisation of a core category of 'Playing a Part in the Performance'. Children are able and value being engaged in meaningful communication during their X-ray. Different roles and interactions can close down or open up children's opportunity and ability to play an active role in their procedure.

**ARTIFICIAL INTELLIGENCE / IMAGING TECHNOLOGIES**

**P091 A review of the current and future use of artificial intelligence (AI) in diagnostic radiology**

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**Background:** AI is on the forefront of health innovation, especially in radiology. The development of deep learning models such as convolutional networks has enabled programmers to design systems that are able to complete many radiological based tasks e.g. image analysis and segmentation.

**Purpose:** The aim of this poster is to; introduce AI and the underpinning principles and ideas, review the current AI developments taking place within chest and breast imaging, and understand the potential benefits, risks and limitations associated with the implementation of AI into clinical radiology.

**Summary:** We present a literature review of the different uses of AI within chest and breast imaging. Furthermore, we define the key terms of associated with AI; machine learning, deep learning and convolutional neural networks. We also illustrate the current issues surrounding AI and its application. Within chest imaging, AI programmes have been designed that detect diseases such as tuberculosis and pneumonia. In breast imaging, deep learning programmes have been developed that can aid in breast cancer screening and diagnosis. The main imitation surrounding AI research and development is the lack of number and quality of training datasets. It is important for radiologists to adapt and benefit from using AI; this is achieved through understanding and appreciating the theory and its application. Additionally, a standardised set of guidelines needs to be developed to validate and assess the effectiveness and safety of AI. The next step for advancement is the integration of AI systems into the clinical workflow.

**P092 Evaluating the stability of PET radiomic features to expectation-maximization reconstruction iterations**

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**Background:** Positron emission tomography (PET) imaging plays a fundamental role in the assessment of cancer<sup>[1]</sup>. The maximum likelihood expectation maximization (MLEM) algorithm is a common iterative image reconstruction approach used in clinical routine. Increasing the number of iterations can increase image sharpness. However, a trade-off exists between image sharpness and image noise<sup>[2]</sup>. Therefore, radiomic analysis may be affected as consequence of increasing the number of iterations<sup>[3]</sup>.

**Purpose:** To evaluate the impact of the number of iterations upon stability of PET radiomic features.

**Methods:** A Mediso Nanoscan PET/CT was used to scan 8 mice, with 4T1 tumours, injected with  $10.0 \pm 2.0$  MBq. Scans were reconstructed with five different numbers of iteration (1, 3, 6, 8, 10) and SPAARC (In-house developed tool built on Matlab<sup>[4]</sup>) was utilised to extract 138 radiomic features (bins=32)<sup>[5]</sup>. Coefficient of variation (COV) was calculated for each feature for each number of EM reconstruction iterations. Features were classified based on their COV values into four groups<sup>[6]</sup>.