P054 An audit to assess the availability of eGFR results in patients for CT IV contrast examination

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Background: Iodinated contrast agents can cause contrast-induced acute kidney injury (CI-AKI) especially in patients with certain risk factors including diabetes and known kidney problems. Estimated Glomerular filtration rate (eGFR) is recommended as the preferred parameter for assessing renal function prior to CT contrast examination1,3. Guidelines from ESUR 2018 recommend the provision of eGFR results at the point of referral1 while guidelines from ESUR 2018, NICE 2019 and RANZCR 2018 identify previous kidney problems and known diabetes as common risk factors to CI-AKI1,2,3.

Method: All outpatient CT IV contrast examinations were included retrospectively from January -- February 2021. eGFR results and history of previous kidney disease and diabetes were obtained both from referral notes and patients' responses to contrast safety questions as entered on CRIS (Computerised Radiology Information System).

Results: 1,943 outpatient CT IV contrast examinations were performed between January-February 2021. 949 (49%) patients did not have recent eGFR results (≤3 months) available before their CT appointment. 23% of these patients had risk factors for CI-AKI as agreed by the referred guidelines, with a total of 7%, 14% and 2% having a history of known kidney problems, diabetes and both respectively. In addition, 119 out of 153 patients with diabetes were on metformin medication, an added risk to CI-AKI3.

Conclusion: The audit does not meet the current available guidelines and hence there is a need to develop a robust local policy on CT IV contrast examinations. This should emphasize the referrer's responsibility to provide renal function results for patients especially those with risk factors to CI-AKI.

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PAEDIATRICS POSTER PRESENTATIONS

P055 Optimising image quality and radiation dose for neonatal incubator imaging

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Introduction: Neonates often require imaging within incubators however limited evidence exists as to the optimal method and acquisition parameters to achieve these examinations. This study aims to standardise and optimise neonatal chest radiography within incubators.

Methods: A neonatal anthropomorphic phantom was imaged on two different incubators under controlled conditions using a DR system. Exposure factors, SID and placement of image receptor (direct v tray) were explored whilst keeping all other parameters consistent. Image quality was evaluated using absolute visual grading analysis (VGA) with contrast-to-noise ratio (CNR) also calculated for comparison. Effective dose was established using Monte Carlo simulation using entrance surface dose within its calculations.

Results: VGA and CNR reduced significantly ($p < 0.05$) whilst effective dose increased significantly ($p < 0.05$) for images acquired using the incubator tray. The optimal combinations of parameters for incubator imaging were: image receptor directly behind neonate, 0.5mAs, 60kV at 100cm SID, however, if tray needs to be used then these need to be adapted to: 1mAs at maximum achievable SID. Effective dose was highest for images acquired using both incubator tray and 100cm SID owing to a decrease in focus to skin distance. There is significant increase ($p<0.01$) in VGA between using 0.5mAs and 1mAs but an apparent lack of increase between 1 to 1.5mAs.

Conclusion: Using the incubator tray has an adverse affect on both image quality and radiation dose for incubator imaging. Direct exposure is optimal for this type of examination but if tray needs to be used, both mAs and SID

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P056 Neonatal digital chest radiography - should we be using additional copper filtration?

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Introduction: Copper filtration removes lower energy X-ray photons, which do not enhance image quality but would otherwise contribute to patient dose. This study explores the use of additional copper filtration for neonatal mobile chest imaging.

Methods: A controlled factorial-designed experiment was used to determine the effect of independent variables on image quality and radiation dose. These variables included: copper filtration (0Cu, 0.1Cu and 0.2Cu), exposure factors, SID and image receptor position (direct+tray). Image quality was evaluated using absolute visual grading analysis (VGA) and contrast-to-noise ratio (CNR) and entrance surface dose (ESD) was derived using an ionising chamber within the central x-ray beam.

Results: VGA, CNR and ESD significantly reduced ($p<0.01$) when using added copper filtration. For 0.1Cu, the percentage reduction was much greater for ESD (60%) than for VGA (14%) and CNR (20%), respectively. When compared to the optimal combinations of parameters for incubator imaging using no copper filtration, an increase in kV and mAs when using 0.1mmCu resulted in better image quality at the same radiation dose (direct) or, equal image quality at reduced dose (in-tray). The use of 0.1mmCu for neonatal chest imaging with a corresponding increase in kV and mAs is therefore recommended.

Conclusions: Using additional copper filtration significantly reduces radiation dose (at increased mAs) without a detrimental effect on image quality. This is the first study, using an anthropomorphic phantom, to explore the use of additional Cu for DR neonatal chest imaging and therefore helps inform practice to standardise and optimise this imaging examination.

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P057 Reliability of sonographic testicular volume assessment

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Background: In paediatric ultrasound, reliable testicular volume assessment is crucial, particularly in varicocoele patients, where volume discrepancy (VD) of 20% may determine intervention. This study assessed reliability of sonographic testicular volume measurement.

Method: Retrospective analysis of scrotal ultrasounds over a two-year period was conducted alongside a prospective phantom study. Seven ovoid phantoms of predetermined volumes (between 1ml and 15 mls) were created and

scanned within non-transparent water-filled rubber gloves by five blinded operators (all consultant paediatric radiologists) using two ultrasound probes. Three orthogonal dimensions, automated and calculated volumes were recorded.

Results: Of 204 examinations performed 2019-20, 106 had testicular volumes documented. VD of 20% was found in 45 of 80 non-varicocoele patients and in 9 of 26 varicocoele patients (in one case the smaller testis was on the asymptomatic side). All 7 phantoms were under-measured by all 5 operators, by a mean of between 10% - 29%. Mean VD of 20% found in 5 of 7 phantoms. VD between operators ranged from 14% to 59%, with a VD of 20% in 3 of 7 phantoms. Inconsistencies were found in the ultrasound machine generated volume measurements -- these were discarded from analysis, prompting modification to our clinical practice until resolved. Technical properties of phantoms made reliable measurement of the vertical dimension challenging, likely contributing to variation. Superior phantoms are being produced to allow repeat measurements.

Conclusion: Reliability of sonographic testicular volume assessment is uncertain. In decision-critical situations, multiple measurements are recommended, and vigilance with regard to computer-based calculation glitches is advised.

P059 A qualitative analysis of the role of diagnostic radiographers in child safeguarding

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Background: Diagnostic radiography is an established method of investigating child safeguarding concerns (Hogg et al, 1999. Antwi et al, 2021a). The role of the radiographer in identifying signs that represent safeguarding concerns and acting as a conduit between the patient and other professionals is less well understood (Davis and Reeves, 2009).

Methods: Twelve semi-structured interviews were conducted online over Microsoft teams (TM) using an established interview guide. These were transcribed using Otter AI (TM) and reviewed for accuracy. Using framework analysis, three distinct themes were created that facilitated discussion around the role of the diagnostic radiography in child safeguarding.

Results: The interview results demonstrated a fundamental desire on the part of diagnostic radiographers to contribute to child safeguarding and an awareness of escalating procedures was shown. The underpinning knowledge of concerning signs and symptoms was inconsistent and the semantics of language was shown to be particularly significant in understanding those signs and symptoms. The evolving nature of the radiographic examination, influenced by technology and role development has had an impact on the assessment of some appearances of child safeguarding concerns.

Conclusion: For diagnostic radiographer to contribute to the recognition of child safeguarding concerns most effectively, a knowledge base commensurate with the imaging modality worked in needs to be created at pre and post registration level. This should include pathognomonic injuries and understanding of aetiology. Identification of physical and social signs and symptoms of child safeguarding concerns by diagnostic radiographers whilst not impossible, is regarded as improbable within contemporary and future practice.

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