Student Conference ePosters

Paediatric gonad shielding: an inconsistent practice
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Objectives: To evaluate the current use and effectiveness of gonad shielding in paediatric pelvic radiography as a patient care principle, and investigate attitudes of radiographers and their methods of practice of gonad shielding.

Method: A literature search was conducted and data was extrapolated concerning all aspects of shielding use. Various sources were summarised and critiqued to determine current trends and practices.

Results: The literature shows that gonad shielding is extensively advocated during pelvic radiography in paediatrics to address the ‘as low as reasonably achievable’ (ALARA) principle, one of the most important patient care principles for medical radiation specialists. When correctly positioned, paediatric gonad shielding reduces radiation dose to male and female reproductive organs by 95% and 62% respectively.1,2 However, despite this, and its use being widely encouraged by radiation protection bodies, research shows that only 51% of radiographers utilise gonad shielding, with only 17% of users protecting the gonads effectively.3 Misplacement and omission is reportedly due to radiographer’s lack of skill and confidence in correct placement, potentially leading to obscured anatomy and repeats.1

Discussion/Conclusion: Gonad shielding effectively minimises dose, however, it is not adequately used. Increased education should lead to consistent practice. Workplace environments should develop written protocols and provide refresher courses to improve the skill and confidence of radiographers in correct positioning. Universities should emphasise the importance of gonad shielding to students. This will ultimately lead to better patient care by minimising dose.

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What are you signing up for? Consent guidelines for radiographers
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Gaining consent is a vital component when performing a procedure and involves effective communication with the patient. Informed consent is a process of disclosing information regarding a certain procedure that allows the patient to make a knowledgeable and voluntary decision to undergo the medical examination. All patients have the right to a complete understanding of the procedure they are undergoing.

Health professionals failing to provide information of all relevant material risk regarding a procedure to a patient where side effects unknown to the patient have occurred, have led to several court cases. The Bolam vs Friern Hospital Management Committee case created the basis of informed consent, the Bolam Principle, beginning the evolution of medico-legal consent. The 2002 Ipp Report suggests a radiographer has no legal responsibility to obtain informed consent, whereas the Australian radiologist professional practice guidelines state that the responsibility may fall to the radiographer. Although there is no clear legal responsibility, as an ethical consideration, many radiographers follow a workplace protocol in gaining consent.

There are many challenges for radiographers when obtaining consent from various patient presentations such as paediatric patients, young adult age 14–16 years depending on their knowledge base, geriatric patients, the mentally ill, disabled patients, unconscious patients and non-English speaking patients.

The aim of this poster is to educate and place emphasis on the importance of a radiographer having an understanding of what consent is and their role in gaining consent for a particular procedure.

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The future of coronary angiography: high risk patients
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Objectives: Interventional coronary angiography has become as prevalent than coronary bypass grafts in current practice. However, the effects on high risk patients had not been studied. This review aimed to determine the physical and cost benefit of the intervention over CABG for diabetic patients with complex coronary artery disease, a high risk patient for either treatment.

Method: PubMed, CINAHL and EMBASE were used to acquire randomised control trials that compared the relevant population with the two interventions. The exclusion criteria were studies over 20 years, observational studies and studies not in English. The outcome measured was repeat revascularisation and non-fatal strokes.

Results: The FREEDOM & SYNTAX trials deduced a 2.75 greater chance of repeat revascularisation in interventional coronary angiography. The VA-CARD trial determined a 0.93 lower risk of repeat revascularisation in coronary angiography however this study was underpowered so the true outcome is unknown. Non-fatal strokes were considered to be 1–2.8% more likely in CABG patients.

Discussion/Conclusion: Overall, CABG is still considered the gold standard intervention for diabetic patients with complex coronary artery disease in comparison to interventional coronary angiography. This was based on the chance of revascularisation. However, a decreased number of non-fatal strokes suggest that the intervention has some benefits in comparison to CABG. Additionally, interventional coronary angiography has determined to be costly, in particular to public hospitals and for repeat angiography patients. Hence, despite the advancements in angiography, there are still improvements required before diabetic patients will have an improved quality of life from the intervention.

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Managing paediatric anxiety in radiography
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Background: Working with children in a clinical setting can be unfamiliar to many health care professionals, including radiographers. Familiarity with paediatric care is often restricted to specialised departments and dealing with paediatric patients can be daunting, especially for a radiographer with limited experience. Understanding the effects of pain and anxiety on a paediatric patient is beneficial when planning the most effective and age appropriate delivery of care.¹

Methods: Journals, research papers and articles were reviewed to identify contemporary methods used to reduce paediatric anxiety. Information from texts and online institutions was analysed and provided a clear understanding of anxiety and its identification. Research into the utilisation of distraction techniques and immobilisation was compiled from research papers, journal articles and governing bodies.

Discussion: The literature has shown a need to understand the causes and effects of anxiety in children and the need for combined care to encourage prevention. Identifying an anxious child and providing relevant care will improve the child’s experience and result in better imaging. Current practice does not emphasise proper care of an anxious child. Protocols provide basic guidelines, however, additional options exist and should be further explored. Implementation of distraction techniques, immobilisation and the awareness of paediatric needs can minimise a child’s anxiety.² These skills should be considered as fundamental to radiography to achieve the ALARA principle and a non-traumatic experience for children.³

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Forensic radiography – a challenging and fascinating career pathway
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Background: Forensic radiography is an integrated application of radiographic knowledge and practice, not only utilised in situations pertaining civil or criminal law, but also in conducting invaluable research. As technology develops so must the knowledge needed to utilise the equipment to produce valued diagnostic information.

Aims: Establish and compare the different roles of the forensic radiographer and gain a greater level of appreciation for this rapidly advancing speciality. Demonstrate the opportunities and challenges experienced when employed as a forensic radiographer to educate both the general public while simultaneously providing an insight into a potential career pathway for current radiographers.

Results: Trauma radiography, adult and paediatric autopsy radiography and paleoradiography were investigated. A review of the research demonstrated significant advantages of modern-day forensic radiography over traditional methods, such as autopsy. Forensic radiography presents a variety of technical and environmental challenges and undoubtedly has an emotional impact on the radiographer. The rapid acceleration of a technically advancing field warrants the need for more specialised forensic radiographers that can adapt to new knowledge and research.

Conclusion: Forensic radiography is a complex speciality within radiography that encompasses a range of different roles and purposes. As technology becomes more advanced and readily available, additional non-invasive methods of conducting forensic investigations provide an opportunity for current radiographers to expand their career pathway. Forensic radiography is becoming a more favourable and advantageous option when compared to traditional forensic and autopsy methods.

Stereotactic body radiation therapy versus conventional radiation therapy techniques for prostate cancer
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Objective: The purpose of this literature review was to investigate the therapeutic effect of SBRT for radical prostate cancer treatment in comparison to conventional radiation therapy techniques. These included conventionally fractionated external beam radiation therapy (CF-EBRT) and low dose rate- and high dose rate-brachytherapy (LDR-B, HDR-B). It also compared the toxicity and quality of life profiles of SBRT in contrast to standard radiation therapy techniques.

Methods: Structured search terms were used to locate research papers corresponding to the objectives of the review. Seven articles were selected to address therapeutic effect, and two studies to appraise toxicity and quality of life.

Results: A total of 1733 participants were examined across studies with median follow-up ranging from 14–84 months. The conventional radiation therapy techniques examined included HDR-B, LDR-B and CF-EBRT +/- HDR-B boost. All studies were concordant in that SBRT provides equivalent or superior biochemical failure free survival (BFFS) or overall survival rates compared with commonly used radiation therapy techniques. However, studies on toxicity and quality of life presented conflicting findings, particularly in relation to genitourinary toxicity.

Conclusion: SBRT provides non-inferior survival and BFFS rates in comparison to CF-EBRT, LDR-B and HDR-B. SBRT may increase the toxicity profile of surrounding anatomy and further investigation into this is warranted. Clinical trials such as TROG 15.01 SPARK: Stereotactic prostate adaptive radiotherapy utilising KIM (kilovoltage intrafraction monitoring) may further contribute to the paucity of evidence.
Optimisation of parameters for imaging bone-metal interface using spectral photon-counting computed tomography
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Objectives: Modern-day prosthesis for orthopaedic applications are mostly made with porous metal-like titanium, which facilitates bone in-growth into implants pores. However, in conventional CT, artefacts can severely limit assessment of tissue adjacent to metal structure. The objective is to optimise spectral photon-counting computed tomography (SPCCT) to reduce the effect of metal artefacts and to measure level of bony in-growth into the implant.

Methods: MARS is a preclinical SPCCT equipped with photon counting detector in which multiple energy bins can be exploited to study bone-metal interface with reduced metal artefacts. MARS SPCCT was used to scan calibration phantom and sheep bone with titanium scaffold to optimise X-ray filtration and energy settings to minimise metal artefacts. For optimising image quality, appropriate protocol parameters should be selected to achieve balance among detail and noise. To distinguish bone and titanium scaffold, proprietary image space material decomposition algorithm (MARS-MD) that uses constrained linear least square method was applied in the CT reconstruction images. Histogram-based segmentation method based on bone density (mean ±3σ standard deviation) resulted in bone scaffold differentiation.

Results: Significant reduction in artefacts allows bone-metal segmentation. However, beam hardening and partial volume effect caused misclassification of bone at bone-metal interface. This implies that further work is required to optimise methodology to measure bone structure and density with titanium implants.

Conclusion: Our results show that MARS SPCCT has the potential to distinguish bone and scaffold with less pronounced artefacts and measure bone mineral density.

Acute acalculous cholecystitis – a collaborative study
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This ePoster is a non-scientific study exploring the origin, imaging and care of acute acalculous cholecystitis (AAC). AAC is an inflammatory condition of the gallbladder with the absence of gallstones.¹ In this ePoster, the pathophysiology, presentation and diagnosis of AAC is initially explored, followed by a comparison between ultrasound and computed tomography (CT) when imaging AAC. Here it is then suggested that ultrasound is the preferred method when imaging for suspected AAC.¹,² This section of the ePoster also includes comparative CT and ultrasound images, with key indicators of AAC being highlighted. The final component of the ePoster investigates core care elements that look into how factors such as communication, safety and ethics shape how both the patient and practitioner approach an examination.³

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