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Commentary

AS usual a mixed bag of articles from both sides of the Atlantic. The first two are related to dose reduction and optimisation in computerised tomographic (CT) scans. The first article by Vollmar et al from Erlangan addresses a serious issue in the imaging of women. The very high radiation dose to the female breast and its consequent risk of carcinogenesis, have been identified as a serious limitation multi-detector CT scanning. Vollmar et al highlight a potentially new venue of reducing dose. So far most dose reduction algorithms in CT scanning have addressed the tube current. The article highlights the potential role of modulating tube voltage to achieve further dose reductions. This is investigated in the context of reducing radiation dose to the female breast but can be potentially applied in other areas as well. The second article confirms what most of us already know; MDCT radiation doses are higher than conventional CT and the increment is not strictly related to the number of detector rows.

The third selection in this issue is unusual in as much as short communications are not usually chosen as highlights. This one however I felt was relevant as it reflects of the state of Radiology as a speciality. This survey from UK highlights the issues facing those of us who are trying to plan for a radiology service for the future. With a declining interest in academic radiology we are not producing leaders, teachers and researchers for the future. This trend has led to the decline of radiology as a profession, with our rivals in the clinical arena rapidly encroaching on our territory. We have lost cardiac imaging to our cardiology friends and if we are not careful we are likely to acquire further friends in neurosciences, vascular radiology etc.

The last two are educational articles from the recent issue of Radiographics. Both are related to areas that most radiologists deal with every day. Spending time to refine our skills and understanding of the issues we deal with on an everyday basis is an aspect of our practice that often gets neglected as humans tend to become complacent. Both articles are an excellent read and reinforce many essential ingredients of a outstanding examination.

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Reduction of dose to the female breast as a result of spectral optimisation for high-contrast thoracic CT imaging: a phantom study

Various approaches to reduce dose to the female breast in thoracic CT have been investigated. We evaluated the potential for reduction of dose to the breast by optimal choice of the X-ray spectra. The effect of X-ray energy variation on dose to the female breast in thoracic CT was examined by simulations and measurements of image contrast, image noise and radiation dose. A standard thorax phantom was used with various extension rings and breasts added and the following contrast inserts: iodine, calcium hydroxyapatite and a pure soft-tissue density difference. Three-dimensional dose distributions were determined by a validated Monte Carlo tool. The contrast-to-noise ratio per unit dose (CNRD) was determined for tube voltages of 40 200 kV by simulations and for 60 140 kV by measurements on a clinical CT scanner.

CNRD curves did not show significant variations in soft-tissue density contrast, but considerable optimisation potential for iodine and skeletal imaging at reduced energies. Exact values depend on the patient's cross-section and X-ray spectrum. For example, reducing the tube voltage from 120 kV to 80 kV on the scanner reduced dose to the female breast typically by 50% without deterioration of the CNR. This method exceeds the dose reduction potential of other measures. We conclude that tube voltages in thoracic CT can be lowered for contrast medium and skeletal imaging without affecting the CNR but with a significant decrease in dose to the female breast.

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Radiation dose evaluation in 64-slice CT examinations with adult and paediatric anthropomorphic phantoms

The objective of this study was to evaluate the organ dose and effective dose to patients undergoing routine adult and paediatric CT examinations with 64-slice CT scanners and to compare the doses with those from 4-, 8- and 16-multislice CT scanners. Patient doses were measured with small (<7 mm wide) silicon photodiode dosemeters (34 in total), which were implanted at various tissue and organ positions within adult and 6-year-old child anthropomorphic phantoms. Output signals from photodiode dosemeters were read on a personal computer, from which organ and effective doses were computed. For the adult phantom, organ doses (for organs within the scan range) and effective doses were 8 35 mGy and 7 18 mSv, respectively, for chest CT, and 12 33 mGy and 10 21 mSv, respectively, for abdominopelvic CT. For the paediatric phantom, organ and effective doses were 4 17 mGy and 3 7 mSv, respectively, for chest CT, and 5 14 mGy and 3 9 mSv, respectively, for abdominopelvic CT. Doses to organs at the boundaries of the scan length were higher for 64-slice CT scanners using large beam widths and/or a large pitch because of the larger extent of over-ranging. The CT dose index (CTDIvol), dose length product (DLP) and the effective dose values using 64-slice CT for the adult and paediatric phantoms were the same as those obtained using 4-, 8- and 16-slice CT. Conversion factors of DLP to the effective dose by International Commission on Radiological Protection 103 were 0.024 mSv-mGy 1-cm 1 and 0.019 mSv-mGy 1-cm 1 for adult chest and abdominopelvic CT scans, respectively.

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Radiology trainees in the UK and Ireland: academic background, publication rates and research plans

To assess the level of achievement of current trainees, we investigated the academic qualifications, publication rates and future research plans of 240 radiology trainees in the UK and Ireland. All radiology trainees

in the UK and Ireland were surveyed by a questionnaire enquiring about academic record and career ambitions. Our study shows that the level of academic achievement of radiology trainees is high, and provides interesting information concerning the current group of radiology trainees in these regions. It will be of interest both to radiology trainers and to doctors hoping to pursue a career in radiology. It also demonstrates that a potential recruitment crisis in academic radiology exists.

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Understanding the Spectral Doppler Waveform of the Hepatic Veins in Health and Disease

Duplex Doppler sonography is a fundamental component of the complete ultrasonographic examination of the liver. Accurate interpretation of the spectral Doppler tracing from the hepatic veins is valuable, as it reflects important cardiac and hepatic physiology. Normally, there are four phases: A, S, V, and D; the S and D waves indicate flow in the antegrade direction toward the heart. In hepatic and cardiac disease, these normal waves may be absent, a finding indicative of flow in a nonphysiologic manner. In addition, transient patient factors such as phase of the respiratory cycle may influence the appearance of the spectral tracing. Familiarity with the normal and abnormal spectral Doppler waveforms from the hepatic veins and knowledge of their respective physiology and pathophysiology provide valuable insights. Systematic analysis of the direction, regularity, and phasicity of the spectral tracing and the ratio of the amplitudes of the S and D waves allows one to arrive at the correct differential diagnosis in most situations.

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Quality Initiatives: Blind Spots at Brain Imaging

Radiologists face the daily challenge of analyzing and interpreting a high volume of images in a timely manner. Minimizing errors, whether perceptual or cognitive in nature, is paramount for high-quality diagnostics and patient care. There are certain areas within the head encountered at routine brain imaging in which the interpreting radiologist is most prone to make perceptual errors. These areas, or blind spots, include the cerebral sulci, dural sinuses, orbits, cavernous sinuses, clivus, Meckel cave, brainstem, skull base, and parapharyngeal soft tissues. In addition, the use of an inappropriate window width and level for the evaluation of computed tomographic (CT) scans can be a virtual, rather than an anatomic, blind spot. The inclusion of a comprehensive checklist for evaluation of these blind spots as part of every brain imaging study is crucial for avoiding false-negative results. Knowledge of the anatomic features of these blind spots is also crucial, as well as familiarity with the normal CT and magnetic resonance imaging findings in these areas. In addition, the radiologist should be aware of possible interpretation pitfalls that may lead to false-positive results (eg, normal anatomic variants that may be mistaken for pathologic conditions). Finally, a well-developed differential diagnosis will help ensure correct interpretation and appropriate patient treatment.