Purpose: The purpose of the study was to make a standard of activity for optimising image quality and radiation dose with the CDRAD analyser program and contrast-detail phantom. The product is intended for radiographers, students and professionals working in the field of radiographic imaging. The functional aim was to create a standard of activity that enabled uniform procedure in optimising the image quality and radiation dose.
Methods and Materials: Images were taken using different parameters (mA, kVp filtration, etc). Three images were taken with the same parameters to achieve better reliability. The images taken of the contrast-detail phantom were evaluated with CDRAD analyzer program. The study revealed how different imaging parameters affected the image quality.
Results: According to the results, image quality was better and radiation exposure was lower when kVp was added to 75 from 66 and when 2 mm Al added filtration was used.
Conclusion: The results of the project can be utilised by radiographer students as part of evidence-based learning. Oulu University of Applied Sciences can also implement the results of the study in the curriculum. Thus, radiation safety can be improved in the School of Health and Social Care in accordance with the regulations of the Ministry of Social Affairs and Health.

B-0583 11:06

Mammography image quality in Switzerland

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Purpose: Although image quality in mammography has been positively associated with screening performance, mammography quality has seldom been assessed. In Switzerland, regional screening programmes undergo strict quality management procedures, which include continued training of radiographers. This study aimed at evaluating quality of mammograms in Switzerland, its evolution over time, and at identifying its determinants.
Methods and Materials: 7352 mammograms, performed between 1999 and 2007, were randomly drawn from 6 hospitals in 2 cantons with and without a screening program, and evaluated according to the PGMI (P: Perfect, G: Good, M: Moderate, I: Inadequate) classification system. Determinants of quality were assessed by multivariate logistic regressions for 2 indicators of quality.
Results: Overall, the inadequate image rate decreased over time (-0.8%/year, CI95% : - 1.14;-0.45) while the proportion of good or perfect images increased (+0.51%/year, CI95% : +0.18;+0.84). Higher image quality was associated with a mammogram being performed recently, for a cranio-caudal view, in a hospital with a high output (> 250 mammographic images/radiographer/year) and within a screening program. The inadequate image rate was 28% (95%CI: 12-42) lower with a digital mammogram and a perfect or good image classification twice as likely in the canton with an organised screening program (OR=1.96, 95%CI: 1.65-2.34).
Conclusion: Mammography image quality is steadily improving since 1999. Although quality-assurance procedures for screening programmes has contributed to the higher quality, the difference across settings has decreased. The annual volume of images performed per radiographer appears to be a strong predictor of image quality.

B-0584 11:15

Study of the scattered x-ray distributions around a mammography unit

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Purpose: To measure the distribution of scattered radiation in a mammography unit for shielding design purposes.
Methods and Materials: Measurements were carried out with an anthropomorphic phantom used to simulate a body from one adult patient. The dose rate for scattered radiation was recorded by placing a solid state sensor (Unfors Xi Survey Detector) every 10 degrees at 1 m distance from the FOV centre, in the axial and coronal planes of the breast. The scattered radiation distribution was treated as isodose curves, specifying the amount of radiation that will be delivered to a specific point in the room around the equipment (GE Senographe DMR). More than 50 exposures were made with a tube voltage of 30 kVp, anode-filter combination Mo/Mo and large focus.
Results: In the axial plane, results show that the scattered radiation is absorbed up to 73% on the back of the anthropomorphic phantom, at the potter bucky plane height. In the coronal plane, the scattered radiation significantly increases with the angle due to backscattering effect. Assuming the direction of the incidence beam is 0 degree, results show that the scattered radiation is 86% higher at 160 degrees than at 90 degrees.
Conclusion: The type of mammographic view and the patient´s body strongly influence the distribution of scattered x-ray radiation. These results can be used to improve the shielding design of a mammographic unit with less resources and less spending on shielding barriers.

B-0585 11:24

Optical guidance in percutaneous CT-guided procedures

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Purpose: A post-marketing prospective study was performed to assess accuracy and safety of a CT-based video guidance system. We also looked at shortening of procedure time and reduction of radiation exposure of the patients.
Methods and Materials: All participants signed an informed consent form. Percutaneous biopsy/RF ablation was conducted on 20 patients including both soft tissue and bone lesions. Eight procedures were RF ablations and 12 were biopsies/FNA. All procedures were performed using ActiSight needle guidance system. The miniature video camera of the system fitted all needles used for the procedures: 11G-20G according to common practice. Procedure-related data, including accuracy, time to reach lesion, number of scans, and complication rates, were compiled. ActiSight Needle Guidance System (ActiViews, Haifa, Israel) is designed to assist CT-guided interventions. It incorporates skin-attached reference markers and a miniature video camera mounted on the needle. Registration of the video image with the CT image allows showing the location of the needle in real time.
Results: Accurate access was achieved in all 20 lesions (100% success). Lesion diameter ranged 4 mm-38 mm (median 13 mm). Mean time for correct needle placement was 15 min. Total number of CT scans until beginning of actual procedure (biopsy and/or RFA) was 3.6.
Conclusion: Our preliminary experience shows that ActiSight-assisted procedures yield an accurate, fast process with less confirmation scans during needle placement. Accuracy of needle placement was independent of the lesion size or difficulty to reach the specific location. There were no system-related complications.

B-0586 11:33

A novel optimisation strategy in CT results in significant dose reductions

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Purpose: To compare optimisation of CT protocols using quality assurance phantoms and anatomical structures within a porcine model: a radiation dose and image quality study.
Methods and Materials: Three scan protocols were applied: current clinical protocols; phantom protocols (based on the use of lowest mA, kV and highest pitch settings before significant changes were objectively measured on images produced from a Catphan® 600 CT QA phantom) and further optimised protocols. These were applied in 4 CT suites, for 4 anatomical regions: posterior fossa; cerebrum; abdomen and chest. Image quality was evaluated using relative visual grading analysis based on EU image quality criteria guidelines, then critically reviewed with respect to CTDI and DLP findings.
Results: Current clinical protocols were retained in 5 out of 16 protocols. Catphan® 600-based protocols were retained in 2 cases with a dose reduction between 19% and 38% over current clinical protocols. Further optimisation was achieved in the remaining 9 cases with further dose reductions of 14% - 38%.
Conclusion: This study demonstrates that dose optimisation based on objective phantoms can improve CT protocols efficacy; however, if used in conjunction with animal models further dose and image quality optimisation can be attained. The use of animals in dose optimisation strategies allows the use of multiple exposures without radiation risks to patients facilitating experimentation and evaluation of image quality using anatomical structures comparable to those of patients.

B-0587 11:42

Paediatric CT scanning parameters used in Greek hospitals

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Purpose: To determine if specific protocols related with children ages are used in CT.
Methods and Materials: The survey consisted of 14 questions addressing scanner details and scanning parameters used for three examinations (brain, chest, and abdomen CT) for four age groups (1, 5, 10 years and adults).
Results: The survey was sent to 133 radiographers and 135 hospitals. The web-based questionnaire was filled out by 110 people, yet only 38 questionnaires were fully completed. The scanner was mainly in public hospital (52.6%), multislice (65.8%) with 16 detectors (26.3%). The paediatric CT examination was applied