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Abstracts from the Irish Association of Physicists in Medicine: 10th Annual Scientific Meeting

Invited Speaker

Standardisation of Medical Physics training in Europe

Virginia Tsapaki

Medical physics has done much to advance medicine. We can be proud of our collective accomplishments. The development of our profession in Europe has been driven by the regulatory requirements for radiation safety initially of staff and lately of patients. European legislation acknowledged the importance of physics in radiation protection of patients in the 1980s by requiring a "qualified expert in radiophysics" to be available to "sophisticated departments of radiotherapy and nuclear medicine". In the 1990s the term "medical physics expert" (MPE) was introduced and the involvement of MPEs was foreseen also in "other radiological practices". The new European Directive (59/2013) expanded the MPE's role in patient radiation safety. It defines the roles and responsibilities of experts who should be involved in radiation protection. The role of the Radiation Protection Expert (RPE) and the Medical Physics Expert (MPE) is clearly defined. The requirements for information, training and education are also addressed in order to highlight the importance of education and training in radiation protection. According to article 14 member states must ensure the education training and retraining to allow the recognition of radiation protection experts and medical physics experts in the field. The new law which is now implemented in all Member States proves that medical physics has a lot more to offer and places our profession on a more profound ground and provides us with opportunities that we never had before. This is our big opportunity to evolve and make ourselves leaders in radiation protection within the hospital environment and beyond. In a number of European countries, binding regulations appear also on non ionizing radiation such as MRI, US and others. Artificial Intelligence and leaderships issues are also given a lot of attention. The presentation will provide the current information on education and training across Europe together with emerging challenges and opportunities.

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Diagnostic Session 11:25 – 12:55

The impact of the heel effect and lag on the uniformity of a-Se detector for mammography application

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Multiple studies have shown early detection of breast cancer through routine mammography screening can reduce mortality by up to 25% [1]. However, this reduction of mortality is possible only if the key goal of mammography related to the image quality is achieved. Detector uniformity is an important image quality parameter to measure as part of a routine mammography QA programme. Many problems with digital systems have been determined through this measurement, primarily as a result of incorrect flat-field calibration and artifacts caused by image receptor defects. The European guidelines [2] suggest a method for the image uniformity assessment based on measurement of Signal-to-Noise ratio (SNR) and Pixel Value (PV) across a uniform image. Nineteen mammography systems from the same manufacturer installed in our organisation incorporate an a-Se direct conversion detector. Since their installation, instability and inconsistency of image uniformity has attracted medical physicist attention. A number of different tests have been carried out in order to understand and establish reasons for this instability. In this work, we will present the impact of the heel effect and image lag on these uniformity tests. A test protocol involving a screening simulation has been adopted in order to quantify the variation of uniformity across the detector due the lag effect. Images have also been analysed before and after cropping the image to reduce the impact of heel effect. Results show increased non-uniformity ranging between 20% and 30% due to the lag effect and approximately 10% due to the Heel effect.

References

1. World Health Organization; IARC handbooks of cancer prevention: handbook 7: breast cancer screening. IARC Press; 2001.
2. EUREF; European guidelines for quality assurance in breast cancer screening and diagnosis. 4th ed. Luxembourg; 2006.

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Dose optimisation from CR to DR: A paediatric perspective

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In 2017, the first DR X-ray system was installed in the OPD of a Paediatric Hospital, where it was primarily used for extremity and orthopaedic work. A second was installed in 2018 when the main X-ray room in Radiology was upgraded from CR to DR. A preliminary dose audit from procedures conducted in the OPD DR room was undertaken and compared with values from another paediatric hospital. The audit concluded that the exposure parameters and protocols used required adjustment in order to improve dose optimisation for paediatrics. To achieve this, Medical Physics, from both hospitals, worked with the service engineer to calibrate the AEC system. They also liaised with radiographers and the application specialist to ensure protocols were set up to suit paediatric patients, following