

PATIENT DOSE IN DIGITAL PROJECTION RADIOGRAPHY

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Digital imaging systems are replacing conventional screen-film radiography because of their advantages: greater dynamic range, wider exposure latitude, post-processing facilities, decreased costs. At the present time two types of digital modalities are available for projection radiography, namely computed radiography (CR) and direct radiography (DR): a difference between them can be stated in terms of dose and image quality. In the Radiology Emergency Department of our hospital a flat-panel DR equipment (Siemens Axiom Aristos FX) and 2 CR systems (Kodak CR-850) are employed. During 2006 five standard radiographic examinations (Abdomen, Chest, Lumbar Spine, Pelvis, Skull) were considered: doses delivered to patients in terms of both entrance skin dose (ESD) and effective dose (E) were calculated (by a mathematical model using standard exposure parameters and tube outputs) and compared in order to study the dosimetric discrepancies between CR and DR. Assessment of image quality was undertaken by Senior Radiologists to ensure that the quality criteria for diagnostic radiographic images of the European Guidelines were met. Results showed that both ESD and E in DR were lower than in CR; all images met the criteria in the European Guidelines for both modalities and were used for reporting by the radiologists. Since the operators (physicists, radiologists, radiographers) were the same and the quality of images was comparable in both modalities, this study shows that in the considered examinations DR can perform better than CR from a dosimetric point of view (same image quality at lower doses). Digital systems need careful and long efforts to take the greatest possible advantages of their features, and in particular the CR optimization is a dynamic process where physicists, radiologists, radiographers and manufacturers are involved to achieve a continuous improvement.

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