

Performance of Computed Radiography and Direct Radiography: Dose Containment and Image Quality

Zubir bin Ahmad Shazli & Soo-Foon Moey*

Department of Diagnostic Imaging and Radiotherapy, Kulliyyah of Allied Health Sciences,
International Islamic University Malaysia

ABSTRACT

Objective: This study was to evaluate the performance of computed radiography (CR) and direct radiography (DR) systems on radiation dose and image quality for chest PA examinations.

Materials and Method: Sixty ambulatory patients with body mass index in the range of 25 to 30 kg/m² from Hospital Tengku Ampuan Afzan (HTAA), Kuantan and Hospital Sultan Ahmad Shah, Temerloh, Malaysia were involved in this study. The active-matrix, flat panel imagers (AMFPI) technology was employed in the DR system for HOSHAS while HTAA used the single read out CR system. The entrance surface air kerma was measured using a DAP-meter. The chest radiographs were assessed by two radiologists using the modified evaluation criteria lists from the Commission of European Communities image quality criteria.

Results: The mean ESD of 0.098mGy for PA for HOSHAS was lower than that of 0.161mGy obtained for HTAA. However, the ESD at both centres were lower than 0.3mGy recommended by The International Atomic Energy Agency as well as the advisory diagnostic reference level of 0.25 to 0.3mGy. There is a significant difference in performance between CR and DR systems for chest radiography in this study mainly due to differences in detector technology with DR being more superior compared to CR both in ESD and image quality.

Conclusion: Image quality of chest radiographs from the two hospitals were diagnostically acceptable with the ESD and effective dose lower than that recommended by IAEA and UNSEAR. The significant difference in performance between CR and DR systems for chest radiography is mainly due to the differences in detector technology. Technology differences in CR or DR governed the radiographic technique used, patient radiation dose and the radiographic image quality. As such with digital radiography more specified information of the CR or DR system is required due to varying dose efficiency

KEYWORDS: Computed Radiography, Digital Radiography, Entrance Surface Dose, CR and DR Detector Performance, Image Quality

*CORRESPONDENCE: zubirahmadshazli@gmail.com