

Assessment of Organ Dose and Image Quality of CT Chest-Abdomen-Pelvis (CAP) Examination Using 1-Year-Old Anthropomorphic Phantom

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Objective: Lack of awareness and optimization practice among radiology personnel also might increase the probability of higher radiation exposure to the patients. The purpose of this study is to investigate the radiation dose in the radiosensitive organ and image quality in CT Chest-Abdomen-Pelvis (CAP) examination.

Materials & Methods: We evaluate the organ dose by using 1-year-old anthropomorphic phantom and thermoluminescence dosimeter (TLD). The study was performed on 64 slices multidetector CT scanner (MDCT) Siemens Definition AS (Germany) by applying six different CT protocols (P1 to P6). The tube potential of P1, P2 and P3 were fixed at 100 kVp and P4, P5 and P6 were fixed at 80 kVp with various tube current reference value (ref.mAs). Three TLD chips were inserted into the phantom slab no 7, 9, 10, 12, 13 and 14 to represent thyroid, lung, liver, stomach, gonads and skin respectively. The image quality was assessed by using Radiant DICOM Viewer software to extract noise value from each protocol.

Results: As a result, a decreased organ dose was noted along with reducing tube voltage and tube current and slightly increase in the noise index value. The organ with the highest dose was found in the liver in all CT parameter setting with a mean range 10.5–3.6 mSv while the range of noise value in all CT parameter setting are 11.38 HU–23.4 HU.

Conclusion: Optimization of CT acquisition parameter led to reduced radiation dose in radiosensitive organ in CT examination.