

AbstractID: 8428 Title: Organ and effective dose in pediatric patient in 64-slice computed tomography

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Purpose: The absorbed dose for the pediatric patient has been reported to be 1 to 2.6 times higher than in the adult using Monte Carlo simulations of head, chest, abdomen and pelvis examinations on single and/or 16-slice computed tomography (CT) scanners. In the UK, a study investigated the effective dose for studies on a 4-slice CT scanner using thermoluminescent dosimeters (TLDs). Our goal was to measure the organ dose and calculate the effective dose from clinical pediatric chest-abdomen-pelvis (CAP) and chest examinations on 64-slice CT scanners.

Method and Materials: An ATOM one year old anthropomorphic phantom with mimic biological tissue (Model 704-D, CIRS, VA; phantom loaned courtesy of T. Yoshizumi, Duke University) was scanned using clinical protocols on two 64-MSCT scanners (GE LightSpeed VCT and Toshiba Aquilion). Absorbed dose and effective dose were measured by loading 19 TLDs inside and 1 on the surface of the phantom at selected radiation sensitive organs according to ICRP publication 60 methodology, including TLDs to estimate the remainder tissues, and using the published tissue weighting factors.

Results: Standard pediatric clinical protocols with adaptive mAs methods were utilized on each scanner (120kVp, mAs of 22 -55, and collimation of 32 and 40 mm). Doses to the lens of the eye were 0.4 to 1 mGy in CAP examination. The effective doses were 7 to 16.5 mSv in CAP examination and 4.5 mSv in chest examination and 2.3 to 6.4 mSv in chest examination.

Conclusion: Our study results for effective dose and organ absorbed doses, including to the eye, for a one year old anthropomorphic phantom may help in the evaluation of radiation risk in any clinical studies of small children undergoing 64-slice CT examinations.