AbstractID: 10135 Title: Radiation Dose estimation from Pediatric Cone Beam Computed Tomography

Purpose: To estimate absorbed doses and effective dose (ED) from cone beam computed tomography (CBCT) with metal oxide semiconductor field effect transistor (MOSFET) detectors in an anthropomorphic phantom, and to estimate the risk of cancer incidence from CBCT.

Method and Materials: CBCT was performed in the abdominal region of a 5-year old anthropomorphic phantom using a Varian On-Board Imager with standard (125kVp, 80mA, 25msec) and low dose mode (125kVp, 40mA, 10msec). Full-fan mode was employed as scanning protocol and 20 MOSFET dosimeters were used to measure the absorbed doses at various organ locations. We evaluated the effective doses, the lifetime attributable risks (LAR) and relative risk (RR) of cancer induction for both standard and low dose mode.

Results: Highest absorbed doses were founded in the skin, ascending colon and stomach. EDs of CBCT were 37.8±0.7 mSv for standard dose mode and 8.1±0.2 mSv for low dose mode. LAR of cancer incidence ranged from 23 to 144 for standard dose mode and from 5 to 31 for low dose mode per 100,000 exposed persons. RR of cancer incidence ranged from 1.003 to 1.053 for standard dose mode and from 1.001 to 1.012 for low dose mode.

Conclusion: ED from pediatric CBCT for standard dose mode was considerably higher than that of MDCT, while the ED for low dose mode was comparable. For abdominal CBCT in the pediatric phantom, the highest LARs were for incidence of colon and bladder cancer and the highest RRs were for incidence of stomach and liver cancer.

Conflict of Interest (only if applicable):