

AbstractID: 2704 Title: Investigation of patient doses using a tomographic model for diagnostic radiology

Purpose: In this study, the patient's doses from diagnostic radiology were calculated using the tomographic model and Monte Carlo simulation. The tomographic model offers a realistic replication of human anatomy, and more accurate dosimetric results

Method and Materials: The tomographic model Korean Typical Man 2 (KTMAN-2) was segmented from PET/CT images and has $2 \times 2 \times 5 \text{ mm}^3$ voxel resolution. Three diagnostic x-ray examination procedures, abdomen AP, chest PA, and pelvis PA were considered in this study. Energy deposition within organs and entrance air kerma (EAK) were calculated using KTMAN-2 and Monte Carlo simulation. Also, organ dose comparisons were made for procedures of both a stylized and a tomographic model

Results: For the chest PA examination, the lung dose assessed for the KTMAN-2 is 0.08mGy. The absorbed doses to the stomach, liver and thyroid in the KTMAN-2 exceed those within the stylized model by 279%, 161% and 90%, respectively. In the case of the abdomen AP examination, gut region and bladder receive a larger absorbed dose than other organs in KTMAN-2. The absorbed doses to upper large intestine and small intestine are higher than in the stylized model. But conversely, the absorbed doses to lower large intestine and bladder in stylized model are higher than in the KTMAN-2. For the pelvis PA examination, absorbed doses to gut region in stylized model are higher than in the KTMAN-2

Conclusion: The model's exterior trunk shape, shape and position of organs and shielding of bone are leading factors contributing to differences in organ dose. Due to the supine position during tomographic images acquisition, back of KTMAN-2 was pressed down and the abdominal organs are slightly shifted towards the thorax and the lungs are compressed. Thus the organ location difference between lying and upright posture should be corrected

Conflict of Interest (only if applicable):