AbstractID: 4784 Title: CT Urography Radiation Dose Using Automatic Exposure Control

Purpose*:* To measure and compare patient radiation doses during CT urography with automatic exposure control (both angular and z-axis tube current modulation) to patient radiation doses without automatic exposure control (tube current modulation alone), and to correlate these doses with corresponding image noise measurements.

Method and Materials*:* Skin doses were measured by exposing thermoluminescent dosimeters placed on the abdomen (AP) and side (lateral position) of 18 patients examined with CT urography consisting of automatic exposure control (CARE Dose 4D group), and 20 different patients examined with angular tube current modulation only (CARE Dose group). Mean and standard deviation of patient skin doses were calculated. The CT urography protocol included three volumetric acquisitions of the abdomen and pelvis. Effective doses were calculated and used to compare radiation risk between the two patient groups. The variation in effective dose with patient size was also evaluated.

Image noise was evaluated by calculating the standard deviation of pixel values from a region of interest in patient liver images.

Results*:* The mean skin dose for CARE Dose 4D patients (63.4 ± 16.4 mGy) was 14.2% higher than that of CARE Dose patients (54.4 ± 7.39 mGy). The mean effective dose for CARE Dose 4D patients (10.6 ± 2.3 mSv) was 17.1% higher than that of CARE Dose patients (8.8 ± 1.8 mSv).

Image noise increased with increasing patient size, however the increase was less for patients exposed with automatic exposure control.

Conclusion*:* Patient effective dose, and thus radiation risk was 17.1% higher for CT urography patients examined with automatic exposure control compared to those examined with tube current modulation alone. Using automatic exposure control techniques in CT may be useful in reducing dose in small patients, however, for large patients the dose may actually increase to compensate for the increase in image noise.