

AbstractID: 8422 Title: The relationship between cerebral perfusion CT dose and MDCT collimation using TLD chips in an Anthropomorphic Head Phantom

Purpose: To investigate the differences in perfusion CT dose between 4 distinct collimator configurations on a 64-slice scanner.

Method and Materials: An Alderson-Rando head phantom was used in this study. A total of 110 LiF TLD-100 with dimensions of 3x3x0.8 mm were inserted in the phantom holes. Slices 2 and 3 of the phantom were used with two TLD chips per hole imbedded in between 2 plastic rods so that the chips are in the middle of the slice. Another 7 TLD chips were placed on the phantom surface, 2 of which were over the lens locations. All scans were performed on a Philips 64 Brilliance CT scanner with the following parameters: 80 kVp, 200 mA, 0.75 s rotation time, 40 cycles.

Results: If baseline dose is considered to be when the full 40 mm collimator is used, then preliminary data shows an average increase of 16% in measured TLD dose for the 25 mm configuration, a 21% increase for the 15 mm setting, and a 34% increase for the 10 mm detector configuration. Dose maps of the two Rando phantom slices of interest will also be presented to demonstrate the dependence of the dose profiles on the selected collimator width while keeping all other parameters unchanged.

Conclusion: As some of the doses in perfusion CT that we measured were in excess of 25 cGy, great effort should be made in trying to minimize the dose to the patient. Based on the type of scanner and the number of maximum slices available, the collimator configuration which results in the lowest dose while still providing sufficient coverage should be specified in addition to the standard 5 mm slice thickness prescription.

Conflict of Interest (only if applicable):