

AbstractID: 8171 Title: Real-time dose measurement of automatic tube current modulation in multislice CT

**Purpose:** To estimate real-time doses which are controlled by automatic tube current modulation (ATCM) in multidetector computed tomography (MDCT), and to verify if the dose decreases with the prediction by software.

**Method and Materials:** Brilliance 40M DCT scanner (Philips) provides five ATCM methods. These are automatic current selection (ACS), xy-plane dose modulation (D-DOM), z-axis dose modulation (Z-DOM), ACS combined D-DOM, and ACS combined Z-DOM. Real-time doses were measured by two CT pencil-type detectors operating with a Barracuda (RTI-e) electrometer connected to a PC running the software RTIgo 2.002 (RTI-e). One detector is DCT10C TDi ion chamber (RTI-e) with 100mm sensitive length. The other is CT-SD16 CT scanner (RTI-e) with 160mm sensitive length. Several geometric phantoms, which are circular, oval, and elliptical cylinders with 15cm height, were fabricated to simulate body shapes and to verify the xy-plane dose modulation. An Apollo phantom was also fabricated to verify the z-axis dose modulation.

**Results:** For circular cylindrical phantoms with 16-24cm diameter, doses decreased 28-69% for ACS, 28-67% for ACS combined D-DOM, and 24-66% for ACS combined Z-DOM. But dose increased 13-20% for 32cm diameter. For oval and elliptical cylindrical phantoms, dose decreased 17-27% for ACS, 15-40% for D-DOM, 31-39% for ACS combined D-DOM, and 15-28% for ACS combined Z-DOM. D-DOM and Z-DOM real-time dose variations were similar for circular cylindrical phantoms. However, real-time dose variations were not the same along with increasing diameter. For oval and elliptical cylindrical phantoms, ACS and ACS combined Z-DOM real-time dose variations were remarkable for the Apollo phantom.

**Conclusion:** The methods established by this study could investigate the real-time dose variations. Using ATCM techniques in MDCT scanning could decrease patient doses. However, it needs to pay more attention to use ATCM techniques for obese patients.