

AbstractID: 1382 Title: Dose Reduction For CT Coronary Artery Imaging Using a Special Bowtie

Dose is a particular concern for CT cardiac scans because of the required slow helical pitch. Traditional cardiac scans use bowtie designed for body imaging that maintains uniform x-ray flux for the whole body. However, since most of the interesting areas for the cardiac scan are within 25cm scan field-of-view (SFOV), the extra x-rays to the patient periphery do not provide too much useful information. Therefore, we propose the use of a specially designed bowtie for cardiac imaging to reduce overall dose and to provide lower noise for the center of the SFOV. This bowtie attenuates less x-rays near the center of the bowtie and more x-rays towards the edge compared to a typical body bowtie. We have evaluated this design using GE LightSpeed scanners with both phantom and patient scans. We used the standard small bowtie on the system to simulate the cardiac bowtie. We measured CTDI_w for cardiac and body bowties using the standard CTDI body phantom and observed 15% dose reduction with the cardiac bowtie. We also measured the noise variation as a function of distance from the center of the SFOV using a 35cm diameter Poly phantom to simulate an average size patient. The cardiac bowtie produced images with 3% less noise for the center 10cm SFOV. The cardiac bowtie has also been evaluated using cardiac patient scans. Patients were scanned twice according to the clinical protocol, and the two sets of images demonstrated equal image quality.