Coronary CT angiography in step-and-shoot technique with 256-slice CT: Impact of the field of view on image quality, craniocaudal coverage, and radiation exposure.

Abstract:
To evaluate the effect of a small field of view (FOV) for step-and-shoot coronary computed tomography angiography (CCTA) on craniocaudal z-coverage per scan step, image quality, and radiation exposure. 53 patients underwent prospectively ECG-gated CCTA on a 256-slice MDCT scanner using either a FOV > 250 mm (group 1, n=29) or a FOV <= 250 mm (group 2, n=24). Craniocaudal z-coverage was determined on coronal multiplanar reformations. Image noise, signal-to-noise ratio, contrast-to-noise ratio, and qualitative image parameters were assessed. Radiation dose was estimated from the dose length product and was standardized for a scan range from the main pulmonary artery to the diaphragm in order to make both groups comparable. Diagnostic image quality was achieved in 91.3% of the coronary artery segments of group 1 and 89.9% in group 2 (p=0.201). There were no major differences in image noise, SNR, and CNR between both groups. A smaller FOV leads to an increase of craniocaudal coverage of a single CT scan step (r=-0.879; p<=0.001). There was an increase of 23.8% of the mean z-coverage per scanned subvolume in group 2 (59.9 mm vs. 48.8 mm). Radiation dose was significantly lower in group 2 (229 vs. 285 mGycm, respectively). The use of a small transverse FOV for step-and-shoot CCTA at a wide
detector CT scanner leads to an increased z-coverage. 2 scan volumes are enough to image the cardiac anatomy. Radiation dose is decreased without negative impact on image quality.