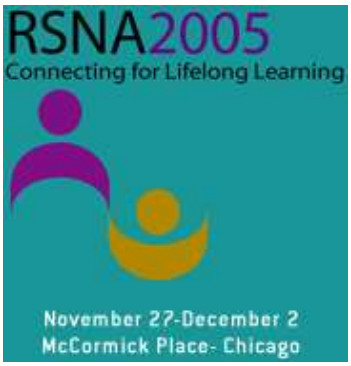

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Proposing a Standardized and Quantitative Assessment of Image Quality and Assessing Differences between Three Image Reconstruction Protocols for Coronary MDCT Angiography

Scientific Papers

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Participants

Antonio Jose Pena MD, Presenter: Nothing to Disclose
Ijad Madisch, Abstract Co-Author: Nothing to Disclose
Sophia K Cheng, Abstract Co-Author: Nothing to Disclose
Pal Maurovich-Horvat MS, Abstract Co-Author: Nothing to Disclose
Udo Hoffmann MD, Abstract Co-Author: Nothing to Disclose

PURPOSE

To propose a standardized and quantitative assessment of image quality and to assess differences between three different image reconstruction protocols for coronary MDCT angiography.

METHOD AND MATERIALS

We assessed 20 normal coronary segments from two patients who underwent standard coronary MDCT (Siemens Sensation 64, 64x0.6 mm collimation, 330 ms tube rotation, 850 mAs, 120 kVp, 60 ml of iopamidol-300 at 5 ml/s followed by 40 ml of saline at 5 ml/s). For each segment three data sets with a slice thickness/ reconstruction increment of 1.0/0.5mm, 0.75/0.4 mm, and 0.6/0.3 mm were reconstructed using a B25f kernel. For each segment we measured the contrast to noise ratio (CNR = coronary lumen -adjacent epicardial fat/ noise in the aorta root) in a standardized and reproducible fashion with regions of interest (6 mm²) placed at the same slice position in all three data sets. In addition, we calculated the slope for coronary edge detection based on regression analysis of the line density profile (LDP) using full width half maximum (FWHM50).

RESULTS

The average CNR was significantly lower in distal segments when compared to mid or proximal coronary artery segments, independent of the reconstruction algorithm used (p=n.s.). There was a trend that signal to noise ratio increased with slice thickness (14.2 +/-4.11, vs. 16.5 +/-16.5, vs.17.6 +/- 83; p<0.12, for 0.6; 0.75 and 1.0 mm; respectively). The slope for coronary edge detection based on regression analysis of the LDP with FWHM50 was significantly different between the reconstructions and decreased significantly with slice thickness independent of segment location (proximal, mid, distal) (p<0.02). However, the largest differences between the slopes were detected in distal vessels.

CONCLUSION

We present a standardized quantitative assessment for the visualization of the coronary arteries in Contrast- Enhanced Coronary Angiography by 64-slice Multi detector Computed Tomography (MDCT). This initial experience indicates that subtle differences in coronary geometry can be detected even in high quality exams of normal coronary segments.

Cite This Abstract

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