AbstractID: 3931 Title: Characterization of Motion Artifacts on CT-Reconstructed Images Using ROI-Based Features

Purpose:

The purpose of this abstract is to demonstrate the potential of characterizing motion artifacts in CT-reconstructed images using ROI-based features.

Method and Materials

Two model systems undergoing periodic motion were included in this study. The first consisted of elliptical objects undergoing periodic motion at frequencies similar to patient heart rates. The second consisted of 4D attenuation maps of a beating heart with coronary plaques in the LAD and LCX generated at pre-specified spatial resolutions with the NCAT 2.0 program developed by *Segars et al*. Sinograms were acquired and images were reconstructed at successive phase intervals using parameters similar to those used in clinical cardiac MDCT acquisitions. Images reconstructed at successive phases were compared using three similarity metrics: the mean absolute difference (MAD) and correlation metrics (CORR) described in *Manzke et al* and a root mean-square (RMS) metric. These metrics were applied over entire images and evenly-sized regions of interest (ROIs) within the images. These metrics were plotted over successive reconstruction intervals. Spatial maps of these metrics displayed over evenly-spaced ROIs at particular reconstruction intervals also were created. All simulations were performed using IDL 6.0 (Interactive Data Language, Research Systems Inc.).

Results:

Applying similarity metrics to evenly spaced ROIs within reconstructed images were effective in depicting regions around the moving ellipse that were more susceptible to motion artifacts. When applied to ROIs in an NCAT image reconstructed at a starting phase of 80% RR, the MAD and RMS values for the LCX ROI were 3.3 and 2.9 times greater than the corresponding values for the LAD ROI. The LAD plaque was much more visually apparent than the LCX plaque on the image.

Conclusion:

ROI-based features have the potential for characterizing the spatial-distribution of motion artifacts.

Conflict of Interest (only if applicable):

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