Comparison of image quality between ASiR and Safe CT reconstructed images In reduced dose Chest CTA.

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Purpose:

CT scan utilization continues to increase due to its pivotal role in medicine with growing concern about increasing radiation exposure to patients. There is a clear need to decrease radiation dose per examination without compromising image quality. SafeCT software (Medic Vision, Haifa, Israel) is a new post reconstruction approach that removes increased noise due to lower radiation exposure while maintaining image texture. The purpose of this study was to evaluate the possible use of SafeCT in chest CTA and compare it to ASiR reconstructed images using a reduced dose clinical protocol namely a 50% dose reduction.

Methods:

A series of 15 patients with clinical indications for evaluation of pulmonary embolism were scanned after a 50% dose reduction and 50% ASiR reconstruction. The original 50% reduced dose FBP images were then reconstructed by SafeCT. ASiR and SafeCT reconstructed images were compared for image quality in a randomized, blinded fashion. Two series of images from different areas of the chest of each patient were evaluated by 3 readers. Side by side image comparisons of image quality (two sided) and subjective ratings of image quality, after accounting for mode, reader and case variability used a generalized linear model (SAS v 9.3).

Results:

Readers compared (side by side) diagnostic image quality on a 5 point scale and rated imaged quality from 1 to 10, for a total of 270 ratings. Each of the three readers consistently rated the SafeCT reconstructed images as having equal or slightly better image quality (averaged +0.21/5 for preference and +0.2/10 for image quality, respectively). However, here was no statistically significant difference between the modes ($p>0.05$), most likely due to a limited sample size.

Conclusion:

There was a trend toward preference of SafeCT reconstructed images over ASiR images for the same level of reduced dose chest CTAs. While not statistically significant ($p>0.05$), this trend and the ability to use SafeCT independent of the scanner used to obtain the scan, suggest that SafeCT may be a viable dose reduction approach in clinical practice.