

## Image quality of adaptive iterative dose reduction 3D of coronary CT angiography of 640-slice CT: comparison with filtered back-projection

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**PURPOSE:** To assess the image quality of coronary CT angiography (CCTA) of 640-slice CT reconstructed by Adaptive Iterative Dose Reduction (AIDR) 3D in comparison with the conventional filtered back-projection (FBP).

**MATERIALS AND METHODS:** CCTA images of 51 patients were scanned at the lowest tube voltage possible on condition that the built-in automatic exposure control system could suggest the optimal tube current. They were, then, reconstructed with FBP and AIDR 3D (standard). Objective measurements including CT density, noise, SNR and CNR were performed. Subjective assessment was done by two radiologists, using a 5-point scale (0: nondiagnostic-4: excellent) based on the 15-coronary segment model which was grouped into three parts as the proximal, mid, and distal segmental classes. Radiation dose was also measured.

**RESULTS:** AIDR images showed lower noise than FBP images ( $45.0 \pm 9.4$  vs.  $73.4 \pm 14.6$  HU,  $p < 0.001$ ) without any significant difference in CT density ( $665.5 \pm 131.7$  vs.  $668 \pm 136.3$  HU,  $p = 0.8$ ). Both SNR ( $15.0 \pm 2.1$  vs.  $9.2 \pm 1.7$ ) and CNR ( $16.8 \pm 2.3$  vs.  $10.4 \pm 1.8$ ) were significantly higher for AIDR than FBP ( $p < 0.001$ ). Total subjective image quality score was also significantly improved in AIDR compared with FBP ( $3.1 \pm 0.6$  vs.  $1.6 \pm 0.4$ ,  $p < 0.001$ ), with better interpretability of the mid and distal segmental classes (100% vs. 95% for the mid,  $p < 0.001$ ; 100% vs. 90% for the distal,  $p < 0.001$ ). Mean effective radiation dose was  $2.0 \pm 1.0$  mSv.

**CONCLUSION:** The new AIDR 3D reconstruction algorithm reduced image noise by 39% compared with FBP without affecting CT density, thus improving SNR and CNR for CCTA. Its advantages in interpretability were also confirmed by subjective evaluation by experts.