

Dual source CT coronary angiography Diagnostic accuracy without the use of B blockers

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Abstract:

Purpose: To evaluate the effect of heart rate, heart rate variability on dual-source computed tomography image quality performed without the use of B blockers and to assess diagnostic accuracy of dual-source CT (using adaptive electrocardiographic pulsing) for coronary artery stenosis, by using invasive coronary angiography as the reference standard. **Materials and methods:** Patients were studied without b-blocker pre-medication. Unenhanced CT and CT coronary angiography with adaptive ECG pulsing were performed using DSCT (DEFINITION, Siemens Medical Solutions, Forchheim, Germany). A contrast-enhanced volume dataset was acquired (two tubes, 120 kV, 400 mAs/rot, collimation 64 · 0.6 mm). Fifty-one patients (11 women, 40 men; mean age, 60.5 years ±10 [standard deviation]) known to have or suspected of having coronary artery disease underwent dual-source CT and invasive coronary angiography. Accuracy of dual-source CT in depiction or exclusion of significant stenosis (P50%) was evaluated on a per-segment and per-patient basis. Effects of heart rate, heart rate variability were assessed. Patients were divided in three HRF groups: low, intermediate, and high (665, 66–79, and P80 beats/min, respectively), and four HRV groups given mean inter beat difference (IBD) during CT coronary angiography: normal, minor, moderate, and severe (IBDs of 0–1, 2–3, 4–10, and >10, respectively). The diagnostic performance was presented as sensitivity, specificity, positive predictive values, and negative predictive values validated against invasive coronary angiography (P50% lumen diameter reduction). **Results:** Good image quality was achieved in 98% of patients without the use of B blockers and no significant differences in image quality were found among HRF and HRV groups. Twenty-three patients were examined having a heart rate P65 beats/min, image quality was sufficient for diagnosis in 281 of 312 coronary segments (92%), whereas in 28 patients with a heart rate <65 beats/min, the image quality was sufficient for diagnosis in 387 of 388 coronary segments (100%). On a perpatient basis, 93% of patients (P65 beats/min) and 100% of patients (<65 beats/min) were considered evaluable. None of these differences were statistically significant. Similarly, no difference in diagnostic accuracy was found in per-vessel and -segment analyses. **Conclusion:** In 51 patients studied without b-blocker pre-medication, the overall image quality of dual-source CT coronary angiography is sufficient for diagnosis within a wide range of mean heart rates and variability of heart rates. Only heart rates that are both high and variable significantly deteriorate image quality, but the quality remains adequate for diagnosis.

Keywords: *Dual source; CT; Coronary angiography*

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