COMPARATIVE EFFECTIVENESS OF MYOCARDIAL PERFUSION SPECT AND CORONARY CT ANGIOGRAPHY FOR DIAGNOSIS OF CORONARY ARTERY DISEASE

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Background: Single photon emission computed tomography (SPECT) and coronary CT angiography (CTA) are widely used tests for evaluating patients with coronary artery disease (CAD). We prospectively compared the diagnostic performance of SPECT and CTA for detecting obstructive CAD using invasive quantitative coronary angiography (QCA) as the reference standard in a prospective, multicenter, international study.

Methods: SPECT and CTA were performed according to protocol guidelines, and all images were analyzed in blinded independent core laboratories. The primary endpoint was the accuracy of tests (area under the receiver operating characteristic curve [AUC]) for identifying patients with ≥50% stenosis by QCA. Secondary endpoints included the accuracy of tests for identifying patients with: ≥70% stenosis; high risk CAD (Duke CAD Prognostic Index ≥56); revascularization (REV) at 30 days.

Results: In the 381 recruited patients, the prevalence of obstructive CAD was 59%. The patient based AUC for detecting ≥50% stenosis was higher for CTA than SPECT (89 [86-92] vs 69 [64-74], p<0.0001), driven by higher sensitivity for CTA (91% vs 62%, p<0.0001) without differences in specificity (74% vs 67% respectively, p=0.23). Similar results were observed using a ≥70% stenosis threshold (AUC: 86 [83-90] vs 74 [70-79], for CTA and SPECT, p=0.001), with higher sensitivity for CTA but similar specificities. Subgroup analyses demonstrated similar findings. In vessel analysis, the corresponding AUCs for diagnosing ≥50% and ≥70% stenosis were 79 (76-82) and 75 (71-79) for CTA, and 67 (64-71) and 73 (69-77) for SPECT (p<0.0001 and p=0.42, respectively). The AUC for identifying patients with high risk CAD was comparable (79 [75-84] vs 75 [69-80] for CTA and SPECT, p=0.17). The AUC for identification of patients with REV at 30 days was higher for CTA than SPECT (73 [68-78] vs 59 [53-66], p=0.0001). Radiation dose of CTA was lower than SPECT (3.54 vs 10.48 mSv, P<0.0001).

Conclusion: CTA has better sensitivity and diagnostic accuracy than SPECT for detecting angiographic obstructive CAD. However, the two tests perform similarly for the identification of patients with high risk CAD. CTA is more predictive of REV at 30 days.