1173

Additional role of FFRct and stress CT perfusion in the management of patients with stable chest pain compared to cCTA alone

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Background: Computed tomography-derived fractional flow reserve (FFRCT) and stress computed tomography perfusion (stress-CTP) are new techniques that combine anatomy and functional evaluation to improve assessment of coronary artery disease (CAD) using coronary computed tomography angiography (cCTA).

Purpose: This study sought to determine the effect of adding FFRCT and stress-CTP to cCTA alone for assessment of lesion severity and patient management of patients

referred for chest pain.

Methods: 289 patients with stable chest pain scheduled for clinically indicated invasive coronary angiography (ICA) plus invasive FFR were evaluated with cCTA, FFRCT, and stress-CTP. Of 289 patients, 147 underwent static stress-CTP, while 142 were evaluated with dynamic stress-CTP.

Management plan with optimal medical therapy (OMT) or percutaneous coronary intervention (PCI) for each patient according to results of each non-invasive technique was recorded, and then compared to what effectively applied according to results of reference standard technique (ICA + FFR). The primary endpoints for the study were the correct allocation of patients to OMT or PCI using cCTA, cCTA + FFRCT and cCTA + stress-CTP, and the correct assessment of non-invasive techniques for all three vessels in relation to angiographically and FFR-defined significance.

Results: Compared to cCTA alone, the addition of FFRCT and stress-CTP to cCTA alone increased the agreement in allocating patients to OMT from 24% to 38% and 44%, respectively, while the addition of FFRCT and stress-CTP to cCTA alone increased the agreement in allocating patients to PCI from 29% to 32% and 36%, respectively. Using ICA + FFR as standard reference, cCTA showed agreement for all three vessels in 56% of patients, while combined approaches of cCTA + FFRCT and cCTA + stress-CTP showed agreement in 66% and 82% of patients, respectively.

Conclusions: The addition of functional assessment with FFRCT or Stress-CTP to cCTA has a substantial effect on the evaluation of the relevance of coronary artery disease and therefore on the management of patients compared to cCTA alone.