



ACC.14

TCT@ACC-12 | innovation in intervention

A2158

JACC April 1, 2014

Volume 63, Issue 12

Young Investigator Awards Competition

COMPARISON OF DIAGNOSTIC ACCURACY OF COMBINED ASSESSMENT USING ADENOSINE STRESS CT PERFUSION (CTP) + COMPUTED TOMOGRAPHY ANGIOGRAPHY (CTA) WITH TRANSLUMINAL ATTENUATION GRADIENT (TAG320) + CTA AGAINST INVASIVE FRACTIONAL FLOW RESERVE (FFR)

Oral Contributions

Room 147 B

Monday, March 31, 2014, 9:00 a.m.-9:15 a.m.

Session Title: Young Investigator Awards Competition: Clinical Investigations, Congenital Heart Disease, and Cardiac Surgery

Abstract Category: Clinical Investigations, Congenital Heart Disease, Cardiac Surgery

Presentation Number: 930-08

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Background: Computed tomography coronary angiography (CTA) has limited specificity for predicting functionally significant stenoses. Novel CT techniques including adenosine stress computed tomography myocardial perfusion (CTP) and transluminal attenuation gradient (TAG320) may improve the specificity and accuracy of CTA alone to detect functionally significant coronary stenoses.

Objective: To compare the diagnostic accuracy of combined CTP + CTA, TAG320 + CTA and CTP + TAG320 + CTA (MDCT-IP) assessment in predicting significant fractional-flow-reserve (FFR).

Methods: CTA, CTP and TAG320 were assessed using 320-MDCT. We assessed the diagnostic accuracy of combined assessment of CTP + CTA, TAG320 + CTA and MDCT-IP with FFR for the evaluation of functional stenosis severity in consecutive patients who underwent CTA, CTP as well as FFR assessment on invasive coronary angiography. Myocardial perfusion was assessed using the visual perfusion assessment. TAG320 was defined as the linear-regression-coefficient between luminal attenuation and axial distance. A TAG320 cut-off value of -15.1 HUs/10 mm as previously described was defined as significant. Functionally significant coronary stenosis was defined as ≤ 0.8 on FFR.

Results: In our cohort of 75 patients (age 64.1 ± 10.8 years, 52 males, 127 vessels), 44 vessels (35%) were FFR-significant. In 127 vessels, CTA predicted FFR-significant stenosis with 89% sensitivity and 65% specificity, TAG320 + CTA with 73% sensitivity and 97% specificity, CTP + CTA with 76% sensitivity and 89% specificity. MDCT-IP showed 81% sensitivity and 91% specificity. In 97 vessels where all techniques are available, combined assessment of TAG320 + CTA (AUC = 0.844) and CTP + CTA (AUC = 0.845) had comparable diagnostic accuracy ($P = 0.98$). The diagnostic accuracy of MDCT-IP (AUC = 0.91) was superior to the combined assessment of TAG320 + CTA or CTP + CTA ($P = 0.01$).

Conclusions: In vessels without significant calcification or artefact, TAG320 + CTA and CTP + CTA provide comparable diagnostic accuracy for functional assessment of coronary artery stenosis. MDCT-IP may provide the best diagnostic accuracy for functional assessment of coronary artery stenosis.