Abstract: P6181

The association of coronary lumen volume to left ventricle mass ratio with myocardial blood flow and fractional flow reserve.

Authors:
P A Van Diemen¹, SP Schumacher¹, MJ Bom¹, RS Driessen¹, H Everaars¹, WJ Stuijfzand¹, PG Raijmakers¹, PM Van De Ven¹, JK Min², JA Leipsic³, J Knuuti⁴, PR Boellaard¹, AC Van Rossum¹, I Danad¹, P Knaapen¹, ¹Amsterdam UMC - Location VUmc - Amsterdam - Netherlands (The), ²Weill Cornell Medical College, Cardiovascular Imaging - New York - United States of America, ³University of British Columbia, Medicine and Radiology - Vancouver - Canada, ⁴Turku University Hospital, PET centre - Turku - Finland,

Topic(s):
Imaging: Coronary Artery Disease

Citation:

Background: A low coronary lumen volume to left ventricle mass ratio (V/M) derived from coronary computed tomography angiography (CCTA) has been proposed as a factor contributing to impaired myocardial blood flow (MBF) even in the absence of obstructive coronary artery disease (CAD).

Objective: To elucidate the association of V/M with non-invasively obtained MBF parameters by means of [15O]H2O positron emission tomography (PET), as well as its correlations with invasively measured fractional flow reserve (FFR), overall and specifically in vessel with non-obstructive CAD.

Methods: This is a substudy of the PACIFIC trial, in which 208 patients underwent CCTA, and [15O]H2O PET prior to invasive coronary angiography (ICA) in conjunction with 3 vessel FFR measurements. Patient specific V/M was calculated for 152 patients. Matched vessel specific hyperemic MBF (hMBF), coronary flow reserve (CFR), FFR, and patient specific V/M were available for 431 vessels. The median V/M (20.71 mm³/g) was used to divide the study population into a group with a low V/M (<20.71 mm³/g) and a high V/M (≥20.71 mm³/g). Non-obstructive CAD was defined as a =50% stenosis grade on ICA.

Results: Overall, a higher percentage of vessels with an abnormal hMBF (34% vs. 19%, p=0.009), lower FFR values (0.93 [interquartile range: 0.85-0.97] vs. 0.95 [0.89-0.98], p=0.016), and a higher number of positive FFR values (20% vs. 9%, p=0.004) were observed among vessels in the low V/M group. Furthermore, a weak correlation between V/M, global hMBF (R=0.179, p=0.027), and global CFR (R=0.163, p=0.045) as well as a weak significant association with vessel specific hMBF (p=0.027), and FFR (p<0.001) was observed (figure 1). V/M was not independently predictive of vessels specific MBF parameters or FFR. Among vessels with non-obstructive CAD (361 vessels), an abnormal hMBF tended to be more frequently observed in vessels with a low patient specific V/M (21% vs. 13%, p=0.056). Globally, there was no correlation between V/M and hMBF nor CFR. Patient specific V/M tended to be weakly associated with vessel specific hMBF (p=0.083) and was associated with FFR (p=0.027) (figure 1). Lastly, patient specific V/M tended to be independently predictive of FFR in this specific group.

Conclusion: Overall, vessels with an abnormal hMBF, and positive FFR measurements were more frequently observed in patients with a low V/M compared to those with a high V/M. Furthermore, V/M weakly correlated with global hMBF as well as with CFR and was associated with vessel specific hMBF and FFR. However, there was no correlation between V/M and global nor vessel specific blood flow parameters in the absence of obstructive CAD, notwithstanding a weak association of V/M with FFR within this group was noted.
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1 Amsterdam UMC - Location VUmc - Amsterdam - Netherlands (The), 2 Weill Cornell Medical College, Cardiovascular Imaging - New York - United States of America, 3 University of British Columbia, Medicine and Radiology - Vancouver - Canada, 4 Turku University Hospital, PET centre - Turku - Finland.

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