TCT-615
The Effect Of Acute Coronary Syndrome Compared To Stable Angina On The Relationship Between Intravascular Ultrasound Minimal Luminal Area And Fractional Flow Reserve
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Background: The validity and utility of fractional flow reserve (FFR) in patients with acute coronary syndromes (ACS) is debatable, as microvascular dysfunction may affect FFR measurements. We sought to evaluate the correlation between intravascular ultrasound minimal luminal area (IVUS MLA) and FFR for intermediate lesions comparing patients with ACS and stable angina (SA).

Methods: We assessed 544 intermediate lesions (defined as 40% to 80% stenosis by visual estimate) with IVUS and FFR in the FIRST and VERDICT studies, which were pooled for analysis. Patients presenting with ST-elevation myocardial infarction less than 48 hours were excluded. Results: ACS and SA were present in 201 and 315 patients, respectively. The average reference vessel diameter (RVD) was similar in the ACS and SA groups (2.90 ± 0.56 mm vs 2.91 ± 0.53 mm, respectively, p = 0.97), as were the lesion locations. The optimal calculated value of IVUS MLA for predicting FFR < 0.8 was 3.0 mm² in the ACS group and 2.8 mm² in the SA group (C statistic = 0.73 and 0.65, respectively. Figure). Plaque burden (PB) was comparable among groups (61.0% vs 60.8%, respectively, p = 0.87). Within the ACS group, FFR < 0.8 was present more frequently in ACS lesions with PB > 70%, as compared to those with PB < 70% (36.7% vs 18.6%, respectively, p = 0.008). This observation, however, was not seen in the SA group (34.8% vs 27.6%, respectively, p = 0.21).

Conclusions: Despite similar RVD and PB, the optimal IVUS MLA that predicted FFR < 0.8 was larger in the ACS group. This difference could represent totality of myocardium at risk for ischemia in patients presenting with ACS.

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Quantification of the Functional Status of the Coronary Microvasculature Distal to Coronary Stenoses by Means of the Hyperemic Microvascular Resistance Index Does Not Require Correction for Collateral Flow Contribution
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Background: The ratio between distal coronary pressure and flow velocity has been introduced as a measure to quantify hyperemic microvascular resistance (HMR). Several studies have reported an increased HMR in the presence of pathophysiological alterations in the coronary microvasculature. However, on theoretical grounds, it has been argued that HMR does not reflect true microvascular resistance, since it does not account for collateral flow contribution to total myocardial blood flow, and that an increased HMR distal to coronary stenoses only reflects neglect of collateral flow contribution. We tested the hypothesis that high HMR distal to coronary stenoses, uncorrected for collateral flow, relates to inducible myocardial ischemia on myocardial perfusion scintigraphy (MPS), and therefore reflects actual pathophysiological alterations in the coronary microvasculature.

Methods: We studied 232 patients, with 299 intermediate stenoses where intracoronary pressure and flow velocity were assessed, from which hyperemic stenosis resistance (HSR) and HMR were calculated. MPS was performed to document inducible myocardial ischemia. High HMR was defined as HMR > 1.9 mmHg/cm/s.

Results: Overall, the odds ratio of high versus low HMR for the presence of inducible ischemia on MPS was 2.6 (95% CI: 1.5-4.4; p < 0.001). When stratified according to stenosis significance by HSR (ischemic threshold ≥ 0.80 mmHg/cm/s), the odds ratio of high versus low HMR was 3.3 (95% CI: 1.0-9.0; p = 0.02) for HSR > 0.88 mmHg/cm/s, and 1.3 (95% CI: 0.6-2.9; p = 0.52) for HSR < 0.80 mmHg/cm/s (p for interaction = 0.16). Restricting the analysis to lesions with FFR > 0.6 yielded equivalent results.

Conclusions: High HMR distal to a coronary stenosis, calculated without correction for assumed collateral flow contribution, is associated with an increased likelihood of inducible myocardial ischemia on MPS. Hence, an increased HMR distal to coronary stenoses does not reflect neglected collateral flow contribution, but reveals important pathophysiological alterations in the distal microvasculature, and may be used to accurately quantify the functional status of the coronary microvasculature distal to coronary stenoses.

TCT-617
Impact Of Gender In The Relationship Between Intravascular Ultrasound And Fractional Flow Reserve
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Background: Intravascular ultrasound minimal luminal area (IVUS MLA) has been shown to have moderate correlation with fractional flow reserve (FFR) in coronary lesion assessment. We sought to assess the impact of gender on IVUS MLA to predict FFR < 0.8 in intermediate lesions.

Methods: This study included pooled data from FIRST and VERDICT studies, which were separate, multicenter, prospective, international registries of patients with intermediate coronary lesions, defined as 40% to 80% stenosis by visual estimation. In total, patients were recruited from 24 different sites in the United States and Europe. We assessed 544 intermediate lesions in 516 patients, including 371 men and 145 women.

Results: FFR values were significantly lower in men than in women (0.83 ± 0.1 vs. 0.86 ± 0.1, p < 0.001). The proportion of lesions with FFR < 0.8 were higher in men compared to women (33.5% vs. 25.0%, p = 0.05). The average reference vessel diameter (RVD) was marginally larger for men than for women (2.93 ± 0.55 mm vs 2.84 ± 0.53 mm, p = 0.08). Men had higher plaque burden (PB) compared to women (61.7% versus 58.8%, p = 0.02). The optimal calculated value for IVUS MLA to predict FFR < 0.8 was 3.0 mm² in men and 2.6 mm² in women, respectively (c-statistic = 0.70 and 0.69, respectively). (Figure)

Conclusions: There is moderate correlation between IVUS MLA and FFR in both men and women. The gender-related difference in MLA cutoff values may result from differences in vessel size, PB and microvascular functionality. When IVUS MLA is used to determine ischemia in intermediate lesions, gender should be taken into account.

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