IMPARED CORONARY MICROVASCULAR FUNCTION IS ASSOCIATED WITH FEATURES OF PLAQUE VULNERABILITY

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Background: The relationship between coronary microvascular dysfunction and epicardial plaque vulnerability remains unclear. We hypothesized that impaired microvascular function is an independent predictor of plaque vulnerability.

Methods: Invasive physiological, virtual histology intravascular ultrasound (VH-IVUS), and serum high-sensitivity C-reactive protein (hs-CRP) were evaluated in 51 patients with non-obstructive coronary artery disease (fractional flow reserve (FFR) ≥0.75). Coronary flow velocity reserve (CFVR) served as an index of microvascular function (impaired defined as CFVR <2.0). Lumen area, plaque burden and composition were assessed in each VH-IVUS frame (0.5mm thickness). Percent fibroatheroma (%fibroatheroma) was defined as the percentage of IVUS frames with plaque burden ≥40% and confluent necrotic core ≥10%, and percent thin-cap fibroatheroma (%TCFA) was defined as the percentage of frames containing fibroatheroma with necrotic core in contact with lumen for at least 3 consecutive frames.

Results: Mean age was 57±12 years and 25% of patients presented with acute coronary syndrome. Despite similar amount of epicardial disease, characterized by lumen area (8.9±3.0 vs 10.1±3.3 mm2, p=0.3) and FFR (0.90±0.08 vs 0.92±0.07, p=0.2), patients with impaired microvascular function had greater hs-CRP (4.2 [2.3, 7.6] vs 1.0 [0.4, 4.2] ng/ml, p=0.006) and plaque burden (47±10 vs 36±13%, p=0.004), higher %fibroatheroma (57±27 vs 33±30%, p=0.009) and higher %TCFA (17±25 vs 6±9%, p=0.02). After adjustment for cardiovascular risk factors, hs-CRP, and plaque burden, impaired coronary microvascular function was an independent predictor of %TCFA (p=0.038, β=-0.42).

Conclusion: In patients with non-obstructive disease, impaired coronary microvascular function is associated with elevated hs-CRP and more fibroatheromas, and is an independent predictor of the number of TCFAs, a marker of increased VH-IVUS-defined plaque vulnerability.