Angiography derived index of microvascular resistance (IMR) in Takotsubo syndrome


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Background and purpose: Coronary microvascular dysfunction (CMD) has been proposed as a key driver in the etiopathogenesis of Takotsubo syndrome (TTS), likely related to an “adrenergic storm” upon a susceptible microvascular circulation. The aim of our manuscript was to assess and quantify CMD in patients with TTS through angiography-derived index of microcirculation (IMR) and evaluate its correlation with clinical presentation.

Methods: Coronary angiograms of 41 consecutive TTS patients were retrospectively offline analyzed to derive angiography-based indices of CMD. Three recently developed indices (NH-IMRangio, AngioIMR and A-IMR) were calculated and compared based on Quantitative Flow Reserve (QFR) analysis. CMD was defined as an IMRangio ≥25 units. The correlation between CMD and clinical presentation and outcomes was then assessed.

Results: Median age was 76 years, 85.7% were women and mean left ventricular ejection fraction (LVEF) at first echocardiogram was 41.2%. Angiography-derived IMR was higher in Left Anterior Descending artery (LAD) than Circumflex artery (LCX) and Right Coronary artery (RCA) with either NH-IMRangio (52.7 vs 35.3 vs 41.4), AngioIMR (47.2 vs 31.8 vs 37.3) or A-IMR (52.7 vs 36.1 vs 41.8). All patients presented CMD with angiography-derived IMR ≥25 in at least one territory with each formula. Angiography-derived IMR in LAD territory was significantly higher in patients presenting with LVEF impairment (≤40%) than in those with preserved ventricular global function (NH-IMRangio: 59.3 vs 46.3, p.value=0.030; AngioIMR: 52.9 vs 41.4, p.value=0.037; A-IMR: 59.2 vs 46.3, p.value=0.035).

Conclusion: CMD, assessed with angiography-derived IMR, is a common finding in TTS and it is inversely correlated with LV function. The available formulas have a substantial superimposable diagnostic performance in assessing coronary microvascular function.