Quantitative flow ratio for non culprit lesions in ST elevation myocardial infarction and multi vessel disease - a direct comparison with fractional flow reserve

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Funding Acknowledgements: None.

Objectives: In acute myocardial infarction and multivessel disease (MVD), current guidelines recommend treatment of the culprit lesion followed by staged full revascularization of functionally relevant stenoses. We sought to analyze the hemodynamic relevance of intermediate stenoses using quantitative flow ratio (QFR, an angiography-derived fractional flow reserve [FFR]) in a population presenting with ST elevation myocardial infarction (STEMI) and MVD on index procedure.

Methods: We retrospectively analyzed 36 coronary lesions in 34 Patients presenting with STEMI and MVD from January 2017 to September 2022. 31 (86%) patients were male, mean age 63 ± 7, mean ejection fraction (EF %) 50 ± 8, arterial hypertension 30 (88%), diabetes 13 (38%). The non culprit lesion location was left anterior descending (LAD) in 24 (67%), circumflex artery (RCX) in 8 (22%) and right coronary artery (RCA) in 4 (11%). All patients received an invasive assessment of non culprit lesions using FFR within 3 months after STEMI. A QFR assessment of non culprit lesions in an acute invasive coronary angiography has been compared with FFR results in a staged procedure.

Results: QFR showed an excellent accuracy in ruling out functionally relevant stenosis with no false negative results (sensitivity 100% compared to FFR). Three coronary lesions (8,3%) were graded false positive (functionally relevant). Due to poor image acquisition, we were unable to perform QFR analysis in ten coronary lesions (28%). Overall specificity (56,5%) was lower than reported in previous trials. After excluding the lesions that could not be analyzed due to poor acquisition we achieved specificity of 81,2% (Fig. 1).

Conclusion: QFR showed an excellent correlation with FFR (Fig. 1). Performing QFR in STEMI Patients with MVD could reduce the need of repeated invasive coronary angiographies and optimize the clinical therapy management in this high-risk population. Further studies on diagnostic performance and outcomes are needed.

Fig. 1: Correlation plot