Residual ischemia by stress CMR in stable post-STEMI patients. Association with clinical events and implications of guided revascularization


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Introduction: Stress cardiac magnetic resonance (sCMR) represents a gold standard approach to identify and localize myocardial ischemia. However, in the setting of stable STEMI patients, data on the prognostic implications of residual ischemia as derived from sCMR are scarce. Moreover, the association of sCMR-guided revascularization with angina class improvement and patients’ outcomes is unknown.

Objectives: To evaluate the implications of residual ischemia and sCMR related revascularization with prognosis and anginal symptoms of STEMI patients after the index event.

Material and methods: Reperfused, stable STEMI patients submitted to undergo sCMR within the first year after STEMI were included in the registry. We analyzed the association of residual ischemia and sCMR related revascularization with the occurrence of major adverse cardiac events (MACE), comprised of all-cause death, non-fatal myocardial infarction, re-admission for heart failure, or unplanned revascularization. Additionally, we explored the effect of sCMR related revascularization on angina class as derived from the Canadian Cardiovascular Society (CCS) Angina Score. A p-value <0.05 was considered statistically significant.

Results: The study group was made up of 234 patients who underwent sCMR for evaluation of non-revascularized lesions in the non-culprit arteries (n=139, 59.4%) or assessment of new onset chest pain (n=95, 40.6%). Residual ischemia was noted in a minority of patients (n=63, 26.9%), and most of them presented with mild or moderate ischemic burden (n=56, 88.9% with residual ischemia in ≤5 myocardial segments). During a median follow up of 7.49 [3.03-10.02] years, 78 (33.3%) patients presented MACE. In multivariate analysis, the extent (number of segments) of residual ischemia did not associate with MACE (HR 0.97 [0.83-1.12] per segment, p=0.65). Patients were categorized in 3 groups: Group 1 (G1, no ischemia-no revascularization, n=166), Group 2 (G2, ischemia-no revascularization, n=29), and Group 3 (G3, ischemia-revascularization, n=34). No differences in survival free from MACE were noted between these groups. Most patients (n=192, 84.6%) were in CCS Angina Score Class I before sCMR. Patients in G1 remained asymptomatic or paucisymptomatic during follow-up (CCS II-IV among 4.8 and 9%, p>0.05). In G3, patients were predominantly in CCS II-IV (52.9%) before sCMR, and a significant reduction in anginal symptoms was noted after revascularization (CCS II-IV between 6.5 and 12.1%, p<0.001). Patients with ischemia on sCMR but no revascularization (G2) depicted higher proportion of patients with CCS II-IV before (24.1%) and after sCMR (13 to 19.2%, p<0.05).

Conclusions: In STEMI patients evaluated post-discharge in stable phase, residual ischemia as derived from sCMR is usually mild and does not associate with the occurrence of MACE. sCMR-guided revascularization relates to a significant and sustained improvement of anginal symptoms but not to the event rate.
Survival free from MACE.

G2 vs. G1: HR 0.65 [0.3-1.43], p=0.28
G3 vs. G1: HR 0.89 [0.44-1.81], p=0.75

Survival free from MACE.
Changes in CCS Angina Score.