Impact of the infarct-related coronary artery on inflammatory profiles and outcomes in patients presenting with acute coronary syndromes: insights from a prospective multicenter real-world cohort

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Background: Patients with a total coronary occlusion (TCO) of the infarct-related artery (IRA) frequently present as ST-segment elevation myocardial infarction (STEMI). However, patients presenting as non-ST-segment elevation acute coronary syndromes (NSTE-ACS) on a routine ECG may actually have TCO at angiography, typically involving left circumflex (LCx) or right coronary artery (RCA) as the IRA. These patients might be at higher risk of MACE due to a delayed diagnosis and, consequently, an inappropriately prolonged time window to revascularization. Herein, we aimed to describe clinical characteristics and outcomes of IRA location in patients presenting with ACS enrolled in a real-world prospective cohort.

Methods: Between 2009 and 2017, 4,787 ACS patients were prospectively recruited in the SPUM-ACS prospective study. The primary outcome measure was major adverse cardiovascular events (MACE), a composite of all-cause death, non-fatal myocardial infarction and non-fatal stroke at one year. Multivariable-adjusted Cox regression models were fit using backward selection. Coronary angiographies were reviewed by operators of each site to assess the IRA location and TCO was defined in the presence of TIMI 0 flow.

Results: 4,542 ACS patients (95% of the total cohort) had angiographic studies available. Patients with left main (n=55) and bypass graft (n=55) as culprit artery were excluded and a final sample size of 4,412 patients were included in the present analysis; 56% (n=2469) presented with ST-elevation myocardial infarction (STEMI) and 44% (n=1943) with NSTE-ACS. Overall, the IRA was the right coronary artery (RCA) in 33.9% (n=1494), the left-anterior descending coronary artery (LAD) in 45.6% (n=2013) and the left circumflex (LCx) in 20.5% (n=905). In those presenting with STEMI, patients with LAD as IRA had an increased risk of MACE (1.43, 95% CI 1.02-2.00, p=0.04) as compared to those with RCA and LCx. In those presenting with NSTE-ACS, LCx and RCA as IRA had more frequently a TCO compared to the LAD (27% and 24%, respectively, vs. 9%, p<0.001). Features of patients with NSTE-ACS associated with TCO of the IRA included elevated lymphocyte and neutrophil counts, higher hs-CRP and hs-TnT, lower eGFR, and absent history of MI. Among patients with NSTE-ACS, LCx as IRA but not LAD and RCA was associated with an increased risk of MACE at one year (fully adjusted HR 1.68, 95% CI 1.10-2.59, p=0.02; reference: RCA and LAD).

Conclusion: Among all ACS patients included in the SPUM-ACS, those with NSTE-ACS at initial ECG and RCA and LCx involvement had more often a TCO of the IRA, but only LCx as IRA was an independent predictor of MACE during follow-up. Hs-CRP levels, lymphocytes and neutrophils counts, hs-TnT, eGFR and history of MI at admission were found to be independent predictors of IRA occlusion at angiography. Thus, NSTE-ACS patients showing such features should further be evaluated for timely PCI.