Acute atrial ischemia associates with early but not late new-onset atrial fibrillation in STEMI patients treated with primary PCI: relationship with in-hospital outcomes

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Background. New-onset atrial fibrillation (NOAF) is known to be a common complication in STEMI patients undergoing primary percutaneous coronary intervention (PCI), which is associated with a negative short- and long-term prognosis. Recently, two distinct phenotypes of NOAF have been described, namely early (EAF) and late NOAF (LAF). However, whether EAF and LAF recognize different pathogenetic mechanisms is unknown.

Purpose. To investigate atrial branches occlusion and EAF or LAF onset in STEMI patients undergoing primary PCI.

Methods. Retrospective cohort study including 155 STEMI patients. Patients were divided into 3 groups: sinus rhythm (SR), EAF or LAF. Clinical characteristics, angiographic features including occlusion of atrial branches, namely ramus ostia cavae superioris (ROCS), atrio-ventricular node artery (AVNA), right intermediate atrial artery (RIAA) and left intermediate atrial artery (LIAA), were assessed. We also investigated in-hospital complications, death, and a composite of major post-NOAF adverse events (AEs) including cardiogenic shock, acute pulmonary edema, sustained ventricular tachycardia and ventricular fibrillation.

Results. Mean age was 63.8 ± 11.9 years; 78.7% of men. NOAF was detected in 22 (14.2%) patients: 10 (6.4%) EAF and 12 LAF (7.7%). Compared to EAF, LAF patients were older ($p = 0.013$), with higher GRACE risk score ($p = 0.014$) and Killip class ($p = 0.015$), depressed ejection fraction ($p = 0.007$), elevated filling pressures ($p = 0.029$), higher c-reactive protein ($p = 0.014$) and more TIMI flow <3 ($p = 0.015$). As shown in Figure 1, EAF was associated with higher prevalence of occluded ROCS ($p = 0.010$), AVNA ($p = 0.005$) and RIAA ($p < 0.001$), compared to SR. Moreover, EAF patients had more frequently ≥2 diseased atrial branches than SR (19.5%, $p < 0.001$) and LAF (25%, $p < 0.030$) patients. In LAF patients, a higher incidence of pre-PCI cardiogenic shock, post-PCI AEs ($p = 0.019$ vs SR; $p = 0.029$ vs EAF) and death ($p = 0.004$ vs SR) was found.

Conclusions. The occlusion of atrial branches is associated with early but not late NOAF following STEMI. LAF patients had worse in-hospital AEs and mortality.

Abstract Figure.

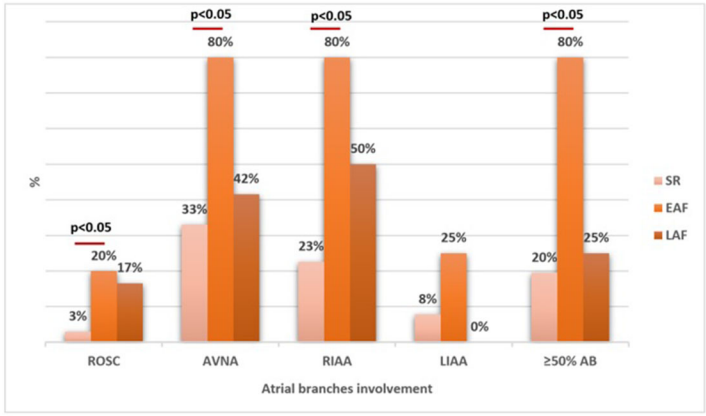

Figure 1. Anatomical involvement of atrial branches (AB) in patients with sinus rhythm (SR), early (EAF) and late atrial fibrillation (LAF). ROCS: ramus ostia cavae superioris; AVNA: atrio-ventricular node artery; RIAA: right intermediate atrial artery; LIAA: left intermediate atrial artery