

Recovery and Diagnostic Value of Right Ventricular Function and Strain in Patients with ST-segment Elevation Myocardial Infarction and Concurrent Chronic Total Occlusion

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Purpose:

The right ventricle (RV) is frequently involved in ST-segment elevation myocardial infarction patients (STEMI) when the culprit or a concurrent chronic total occlusion (CTO) is located in the right coronary artery (RCA). We investigated RV function recovery in STEMI-patients with concurrent CTO.

Methods:

In the EXPLORE trial, 302 STEMI-patients with concurrent CTO were randomized to CTO percutaneous coronary intervention (PCI) or no CTO-PCI. We analyzed 174 patients with serial cardiovascular magnetic resonance (CMR) RV data (baseline and 4 month follow-up) and divided them in three groups: CTO-RCA (CTO in RCA and culprit in non-RCA; n=89), IRA-RCA (culprit in RCA and CTO in non-RCA; n=56), and controls (no RCA involvement; n=29). Feature-tracking CMR RV strain and tricuspid annular plane systolic excursion (TAPSE) were measured using the 4-chamber longitudinal axis.

Results:

RV ejection fraction (RVEF), TAPSE and RV strain showed significant correlations. RV strain and TAPSE significantly improved in IRA-RCA and CTO-RCA (irrespective of CTO-PCI) at follow-up, but not in controls. Baseline RV free-wall longitudinal strain (FWLS) was lower in IRA-RCA compared to CTO-RCA and controls ($-26.0 \pm 8.3\%$ versus $-28.3 \pm 7.7\%$ and $-31.0 \pm 6.4\%$; $p=0.018$). However, RV strain was not predictive for RVEF at 4 month follow-up, nor mortality at 4 years follow-up. Still, RV global strain showed predictive value for New York Heart Association Classification >1 at 4 months.

Keywords:

Chronic total occlusion, Right ventricle, Strain analysis Chronic total occlusion

Figure:

Recovery of right ventricular function parameters from baseline to 4 month follow-up in patients with CTO-RCA, IRA-RCA or no-RCA involvement.

CTO = chronic total occlusion; FWLS = free-wall longitudinal strain; GLS = global longitudinal strain; IRA = infarct-related artery; RCA = right coronary artery; RV = right ventricle; RVEF = right ventricular ejection fraction; TAPSE = tricuspid annular plane systolic excursion.

Recovery of right ventricular function parameters

