

## Right ventricular-pulmonary artery coupling in the early stages of infarction could optimize patient risk stratification over five years

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**Background:** Right ventricular (RV) dysfunction is recognized as a cardinal prognostic marker in heart failure (HF) patients. Myocardial infarction (MI) is often followed by unrecognized RV dysfunction, which can be associated with worse outcome. It is recently shown that the ratio between TAPSE and PASP (RV/PA) may depict cardiopulmonary hemodynamics better than the two parameters alone.

**Aim:** To evaluate the interactions between left ventricular (LV) and RV function in early phase of MI and to assess the prognostic significance of RV/PA coupling in patients with first MI during 5 years follow up.

**Methods:** The prospective study included 144 patients with the first MI treated with the primary percutaneous coronary intervention (p PCI) who underwent Doppler echocardiography within 2±1 days of MI. LV function analysis included: LV ejection fraction (EF), ratio between early diastolic velocity and tissue annular velocity (E/e) and global longitudinal strain (GLS). RV function and RV-PA interaction was expressed as ratio between TAPSE and PASP. During the five-year follow-up, major cardiovascular events and especially hospitalization for HF were analyzed.

**Results:** Progressive RV/PA uncoupling was associated with higher degree of LV impairment and dysfunction (EF  $p < 0.001$ , E/e  $p = 0.002$ , GLS  $p < 0.001$ ) and severity of mitral regurgitation ( $p = 0.013$ ). Lower baseline RV/PA coupling significantly reflects the frequency of hospitalizations for HF in the population of patients with first MI during five-year follow-up (0.62 v.s. 0.51,  $p = 0.021$ ). After multivariate adjustment RV/PA remained an independent predictor of all major cardiac events (MACE) after five years (OR 14.0 [1.5–130.8],  $p = 0.019$ ).

**Conclusion:** A lower baseline RV-PA coupling, reflecting a higher degree of LV-induced pulmonary hypertension and secondary RV-dysfunction, is associated with decline of LV function in early phase of MI, and is independently associated with worse prognosis after five years. The value of RV-PA ratio as a prognostic marker warrants further investigation.