

The “Right” Side of Myocardial Infarction: Sinister Outcomes?

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Short Editorial related to the article: Right Ventricle Infarction in Current Practice: Insights from a Contemporary Registry at a High-Volume Tertiary Center in Brazil

Right ventricular myocardial infarction (RVI) is rarely an isolated event; rather, it generally complicates 10% to 50% of cases of acute inferior ST-segment elevation myocardial infarction (STEMI).^{1,2} Proximal right coronary artery occlusion, impairing right ventricular (RV) branch flow, is most frequently the culprit vessel, although it depends on coronary tree anatomy.

Previous studies underlined that RVI is often unrecognized, since RV ischemic dysfunction is generally transient, due to the different composition and higher resistance to hypoxia of the RV wall. In addition, the diagnostic criteria for RVI, which are mainly based on electrocardiogram (Figure 1), can lead to underestimation, unless RV involvement becomes clinically manifest with hemodynamic complications.³ In fact, acute RV dysfunction can lead to reduced output, insufficient left heart filling, and cardiogenic shock, despite preserved left contractility. Moreover, intrapericardial ventricular interaction can translate into an abrupt RV dilation and further compression of the left chambers.¹

The prognostic impact of RVI in patients with STEMI is still poorly defined. Outcomes data deriving from old studies, pre-primary percutaneous revascularization, showed a trend for increased mortality, cardiogenic shock, and arrhythmias in patients with RV involvement,⁴ whereas more recent studies suggested that only persistent RV dysfunction was associated with an increased risk of adverse events.⁵

In effect, there are few data and no dedicated trials to date that are specific for RVI management, especially with newer tools for primary percutaneous coronary intervention and mechanical circulatory support, in the era of STEMI networks leading to faster reperfusion.^{6,7}

The recently published study by Schaan de Quadros et al.⁸ is one of the most updated registries assessing the predictors and prognostic implications of RVI in a cohort of patients with STEMI treated at a high-volume tertiary center in Brazil.

They reported that the rate of RVI, based on electrocardiographic findings, was 13%. Hemodynamic

compromise (Killip 3 or 4) occurred in less than 10% of patients with no difference between patients with RVI and other STEMI location, whereas total atrioventricular block and need for temporary pacing were more frequent in patients with RVI.

In-hospital outcomes were not affected by RV involvement; however, there was a slightly higher rate of stroke and acute kidney injury, and 2-year mortality was comparable in patients with or without RVI.

Indeed, the short time to reperfusion (median 4 hours from symptoms onset), the use of potent antithrombotic drugs, and the high procedural success rate should be accounted to explain these positive results.

Some limitations of the study need to be acknowledged, including the single-center recruitment and the low number of events, limiting the generalizability and the statistical power of the study. Moreover, the population included younger and healthier patients as compared to other modern STEMI cohorts,⁹ and the rate of cardiogenic shock was lower than the 10% to 12% reported in literature,¹⁰ thus potentially conditioning the lack of significant differences in the Brazilian study.

However, consistent with previous studies,¹⁰ Schaan de Quadros et al.⁸ identified advanced age, female sex, and diabetes mellitus as the only independent predictors of 30-day mortality, whereas RVI was not. Sex and total atrioventricular block also predicted RV involvement in STEMI, confirming that the prognostic gap related to sex has not been filled yet.¹¹

Indeed, RVI is not a rare complication of STEMI, and it carries potentially fatal consequences that require prompt recognition and intervention for adequate management.

Echocardiographic and invasive hemodynamic assessments represent valid instruments for the diagnosis and monitoring of patients with RVI. In case of persistent RV dysfunction after coronary revascularization, fluids, inotropes, and peripheral vasodilators to reduce post-load have been mentioned as therapeutic options. The recent advent of mechanical assist devices dedicated to RV support (Figure 1) is opening a new frontier in the management of critical patients with RVI and refractory RV dysfunction, although their availability is still modest.¹

Therefore, future trials dedicated to patients with STEMI presenting with RVI are needed to better define the prognostic role of right-sided infarction and to elucidate the most appropriate management and indications for the new available support devices.

Keywords

Heart Ventricles; Myocardial Infarction; Percutaneous Coronary Intervention

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Manuscript received October 28, 2025, revised manuscript received November 03, 2025, accepted November 03, 2025

DOI: <https://doi.org/10.36660/ijcs.20250249>

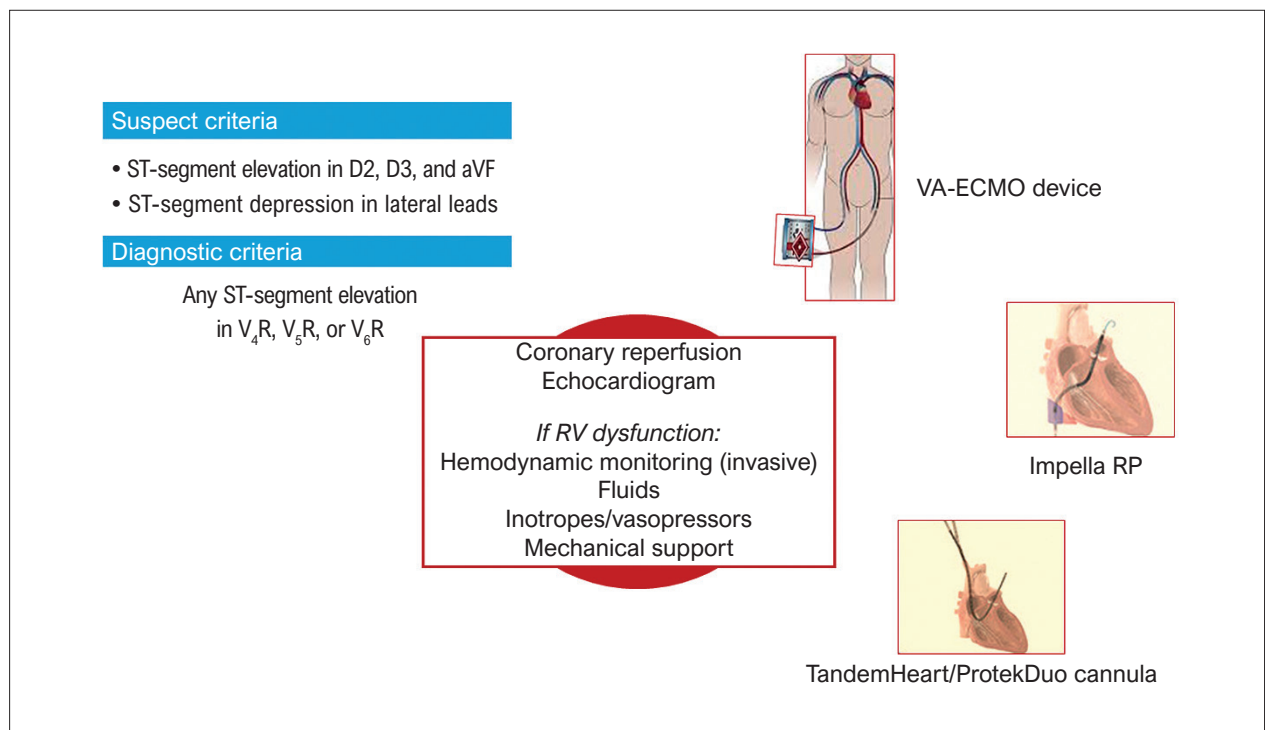


Figure 1 – Right Ventricular Infarction diagnostic criteria and management. RV: right ventricular; VA-ECMO: venoarterial extracorporeal membrane oxygenation device.

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