

ECG Diagnosis: Right Ventricular Myocardial Infarction

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Approximately 25% to 50% of cases of inferior wall myocardial infarction are associated with a right ventricular myocardial infarction (RVMI).¹ In a large meta-analysis, the presence of RVMI was associated with a 2.6-fold increased risk of mortality as well as an increase in ventricular arrhythmias, high-grade atrioventricular block, and mechanical complications.² The hemodynamic syndrome associated with RVMI includes hypotension, elevated venous pressures, and shock without evidence of congestive heart failure.³

The standard 12-lead electrocardiogram (ECG) provides information on the left ventricle but yields limited information on the right side of the heart. Leads V₁ and V₂ on the standard ECG provide only a partial view of the right ventricle free wall. The ECG findings suggestive of RVMI on the standard 12-lead ECG include ST elevation in leads II, III, and aVF with reciprocal ST depression in the lateral leads. Characteristically in RVMI, the ST elevation in lead III is greater than in lead II, and the ST elevation in lead aVF is greater than the ST depression in lead V₂.⁴

Right-sided precordial leads are critical to the evaluation of suspected RVMI. Using right-sided precordial leads, ST-segment elevation in lead V_{4R} ≥ 1.0 mm is diagnostic of RVMI.⁴ The ECG finding of ST elevation in lead V_{4R} for diagnosis of RVMI has 100% sensitivity, 87% specificity, and 92% predictive accuracy.^{4,5} Right precordial ST-segment elevation is a transient event that may be absent in up to half of patients with RVMI 12 hours after the onset of pain.^{6,7} ST-segment elevation in right-sided precordial leads, especially in V_{4R}, correlates with reduced

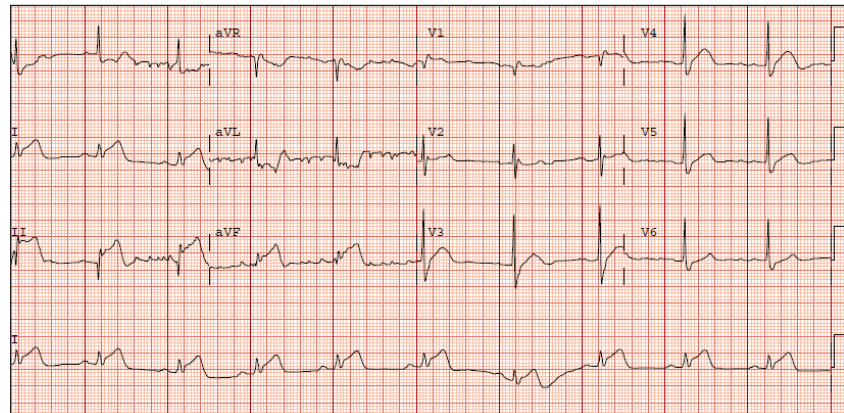


Figure 1. 12-lead electrocardiogram from a 63-year-old man with chest discomfort after running on a treadmill, demonstrating ST elevation in lead III greater than in lead II; ST depression in leads I and aVL; and ST elevation in lead aVF greater than ST depression in lead V₂. Findings are suggestive of a right ventricular myocardial infarction.

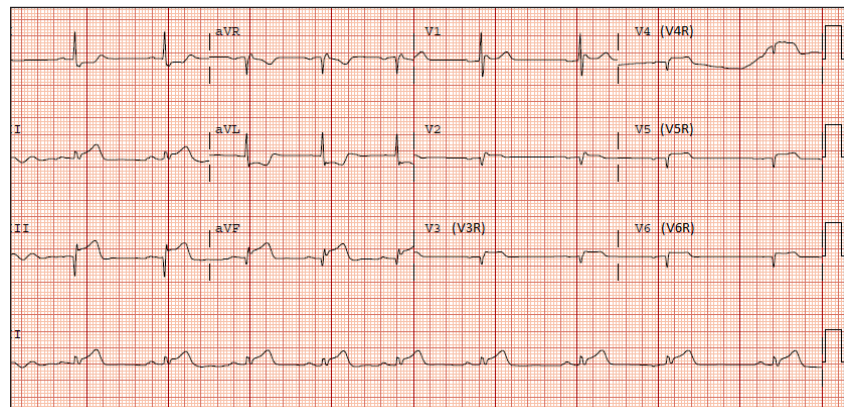


Figure 2. 12-lead electrocardiogram from the same patient as in Figure 1 using right-sided precordial leads, demonstrating ST-segment elevation in leads V_{3R}-V_{6R}, consistent with a right ventricular myocardial infarction.

right ventricle ejection fraction and is associated with major complications and in-hospital mortality.⁶⁻⁸

In RVMI, the resulting elevated right ventricle volume and right ventricle end-diastolic pressure displace the septum

toward the volume-deprived left ventricle, further limiting left ventricle filling. Hence, once the diagnosis of RVMI is established, one must be careful to avoid diuretics, beta-adrenergic blockers, morphine, and nitrates because they

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may further reduce preload, resulting in a precipitous drop in blood pressure.¹ Initial treatment of patients with RVMI includes blood pressure support with intravenous fluids and inotropic support if needed (eg, dobutamine), followed by prompt primary percutaneous coronary intervention to open the occluded coronary artery.¹ ❖

Disclosure Statement

The authors have no conflicts of interest to disclose.

How to Cite this Article

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