

The Clinical Picture

V₁: The most important lead in inferior STEMI

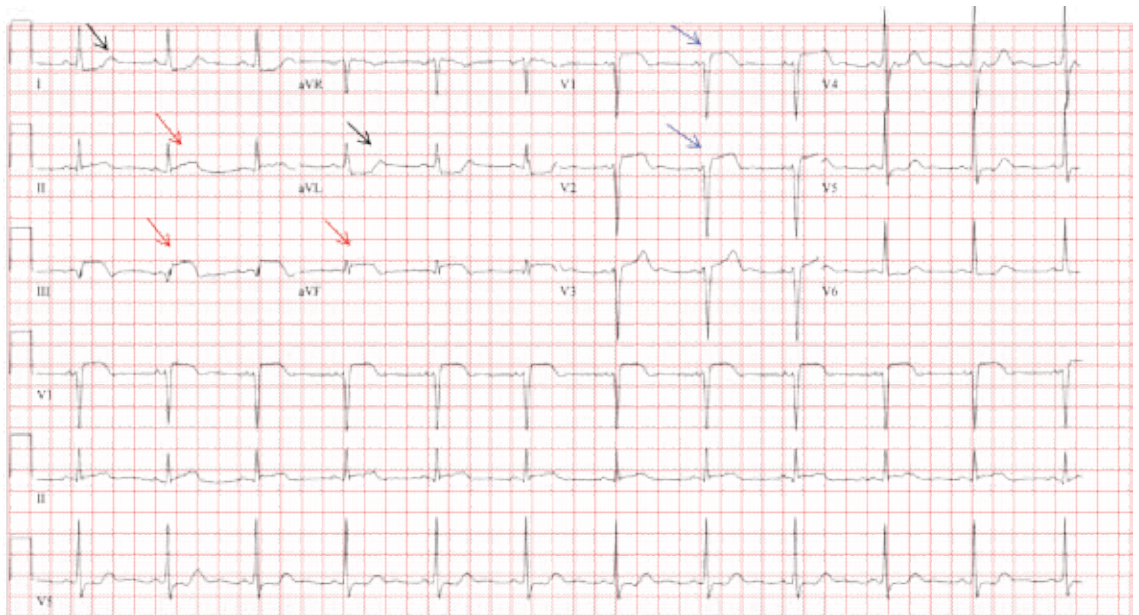


FIGURE 1. The patient's 12-lead electrocardiogram showed sinus rhythm at a rate of 70 beats per minute. ST-segment elevation involving leads II, III, and aVF (red arrows) suggested inferior myocardial infarction. Reciprocal ST-segment and T-wave changes were noted in leads I and aVL (black arrows). ST-segment elevation was also noted in precordial leads V₁ and V₂ (blue arrows), suggesting acute right ventricular infarction.

A 63-YEAR-OLD WOMAN with diabetes and hypertension presented with chest tightness that had begun 1 hour previously. Her blood pressure was 90/60 mm/Hg and her jugular venous pressure was elevated, but the physical examination was otherwise normal. Her electrocardiogram is shown in **FIGURE 1**.

Q: Which would be the most appropriate diagnosis?

- Pericarditis
- Acute inferior and right ventricular myocardial infarction
- Anterior and inferior myocardial infarction
- None of the above

doi:10.3949/ccjm.79a.11135

A: The correct answer is acute inferior and right ventricular myocardial infarction.

Her electrocardiogram showed sinus rhythm and inferior ST-segment elevation myocardial infarction (STEMI) evidenced by ST-segment elevation in leads II, III, and aVF. Hemodynamic instability or ST-segment elevation of more than 1 mm in lead V₁ raises the suspicion of right ventricular myocardial infarction. In such patients, the American Heart Association guidelines recommend electrocardiography with right-sided precordial leads.¹

A 1-mm ST-segment elevation in the right precordial lead V_{4R} is one of the most predictive electrocardiographic findings in right ventricular infarction.²

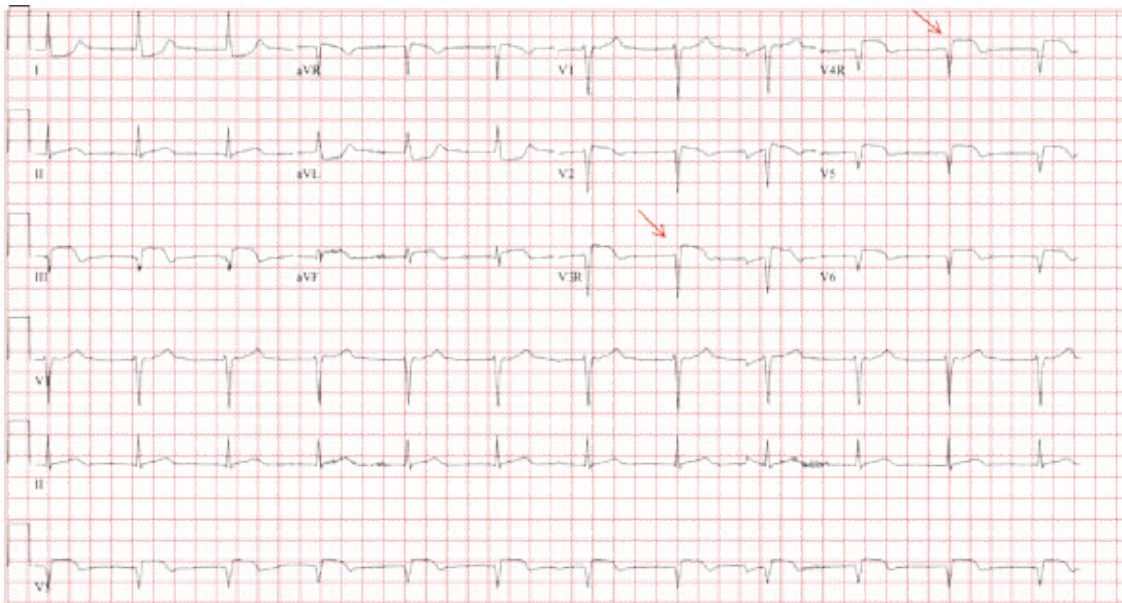


FIGURE 2. Electrocardiography with right-sided precordial leads showed more ST-segment elevation of greater than 1 mm in right-sided leads V₃R and V₄R (arrows), thus confirming right ventricular myocardial infarction.

The electrocardiographic changes in this type of myocardial infarction may be transient and resolve within 10 hours in up to 48% of cases.³

Echocardiography can also be used to confirm the possibility of right ventricular infarction.

Our patient therefore underwent electrocardiography with right-sided precordial leads, which showed ST-segment elevation of more than 1 mm in leads V₃R and V₄R, thus confirming right ventricular myocardial infarction (FIGURE 2).

Q: Which clinical condition can occur as a complication of right ventricular myocardial infarction?

- Profound hypotension after nitrate administration
- High-degree heart block
- Atrial fibrillation
- All of the above

REFERENCES

1. Antman EM, Anbe DT, Armstrong PW, et al; American College of Cardiology; American Heart Association Task Force on Practice Guidelines; Canadian Cardiovascular Society. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1999 Guidelines for the Management of Patients with Acute Myocardial Infarction). *Circulation* 2004; 110:e82–e292.
2. Robalino BD, Whitlow PL, Underwood DA, Salcedo EE. Electrocardiographic manifestations of right ventricular infarction. *Am Heart J*

A: All of the conditions can occur.

Right ventricular involvement is very common, noted in up to 50% of patients with acute inferior STEMI in postmortem studies.⁴ However, hemodynamically significant right ventricular dysfunction is much less common.

Intravenous volume loading with normal saline is one of the first steps in the management of hypotension associated with right ventricular infarction. Patients with significant bradycardia or a high degree of atrioventricular block may require pacing. Early reperfusion should be achieved, if possible. Heightened suspicion is critical to the early diagnosis of this condition, since the prognosis is much worse than for isolated inferior STEMI.⁴

Our patient was found to have right coronary artery disease requiring percutaneous coronary intervention. ■

- 1989; 118:138–144.
3. Braat SH, Brugada P, de Zwaan C, Coenegracht JM, Wellens HJ. Value of electrocardiogram in diagnosing right ventricular involvement in patients with an acute inferior wall myocardial infarction. *Br Heart J* 1983; 49:368–372.
4. Zehender M, Kasper W, Kauder E, et al. Right ventricular infarction as an independent predictor of prognosis after acute inferior myocardial infarction. *N Engl J Med* 1993; 328:981–988.

ADDRESS: Vijaiganesh Nagarajan, MD, MRCP, Department of Hospital Medicine, M2 Annex, Cleveland Clinic, 9500 Euclid Avenue, Cleveland, OH 44195; e-mail doctorvijai@yahoo.co.uk.