Acute isolated right ventricular myocardial infarction masquerading as acute anterior myocardial infarction

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DESCRIPTION

Right ventricular (RV) myocardial infarction (MI) often accompanies inferior left ventricular (LV) MI. However, isolated RV MI is very rare.^{1–3} A man (age range 30–40 years) presented with acute chest pain. ECG revealed ST segment elevation in leads V₁–V₄ (figure 1). He was taken to the cardiac catheterisation laboratory with presumptive diagnosis of acute anterior MI. However, angiography revealed a normal left coronary artery (figure 2A) and normal LV systolic

function. The right coronary artery (RCA) was occluded proximally (figure 2B). A percutaneous coronary intervention (PCI) was performed. Post-PCI angiogram revealed a non-dominant RCA (figure 2C). ECG after PCI revealed a significant decrease in the injury current in the right-precordial and mid-precordial leads (figure 3). Peak serum troponin was 5.2 ng/mL. This case demonstrates that isolated acute RV MI due to occlusion of a non-dominant RCA can masquerade as acute anterior MI.

Figure 1 ECG showing ST segment elevation in leads V₁–V₄.

Figure 2 Angiogram demonstrating normal left coronary artery (A), occluded right coronary artery (RCA) (B) and patent, non-dominant RCA after percutaneous coronary intervention (C).

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Figure 3 Post percutaneous coronary intervention ECG showing resolution of ST segment elevation.

Figure 4 Mechanisms of ST elevation in isolated right ventricular (RV) versus anterior myocardial infarction (MI). (A) Acute RV MI produces incomplete depolarisation (depicted by dots “.”) of RV free wall and positive injury current (arrow) in leads V₁–V₄. (B) Acute anterior MI produces incomplete depolarisation of anterior left ventricular and positive injury current in leads V₁–V₄.

Learning points

- The right ventricular (RV) is anterior to the left ventricular (LV), with the RV free wall underlying the right-precordial and mid-precordial ECG leads (figure 4). In isolated RV myocardial infarction (MI) the RV free wall remains electrically more positive than the LV after initial ventricular depolarisation (ie, during inscription of the ST segment), which accounts for the ST segment elevation in leads V₁–V₄.
- Recognition of the ECG presentation of isolated RV MI has important management implications. Hypotension due to isolated RV MI is treated with aggressive intravenous fluid infusion, whereas hypotension due to acute anterior MI is often treated with inotropes, vasopressors and less aggressive fluid management. In the catheterisation laboratory serial imaging of the left coronary artery (in an attempt to find the anticipated culprit lesion) can delay right coronary artery (RCA) reperfusion. In our patient 12 min were spent imaging the left coronary artery before injecting the RCA.

Contributors All authors contributed to the preparation of the manuscript. MJS participated in the original design of the report, KA participated in the care of the case, presentation of ECG and cardiac catheterisation images and WPF participated in the care of the case, preparation of figures, and writing and editing of the report.

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