

## Case Report

## Isolated Right Ventricular Infarction Presenting with ST-Segment Elevation in Precordial leads V<sub>1</sub>-V<sub>3</sub>

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We describe a rare case of a patient presenting with ST-segment elevation in precordial leads V<sub>1</sub>-V<sub>3</sub> due to occlusion of the ventricular branch of the right coronary artery during primary percutaneous coronary angioplasty.

Key words:

**Right ventricular infarction, ST-segment elevation.**

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**A**lthough ST-segment elevation in precordial ECG leads is characteristic of anterior left ventricular infarction, it may also be observed in patients with proximal right coronary occlusion. Here we describe a rare case of a patient presenting with ST-segment elevation in precordial leads V<sub>1</sub>-V<sub>3</sub> due to occlusion of the ventricular branch of the right coronary artery during primary percutaneous coronary angioplasty.

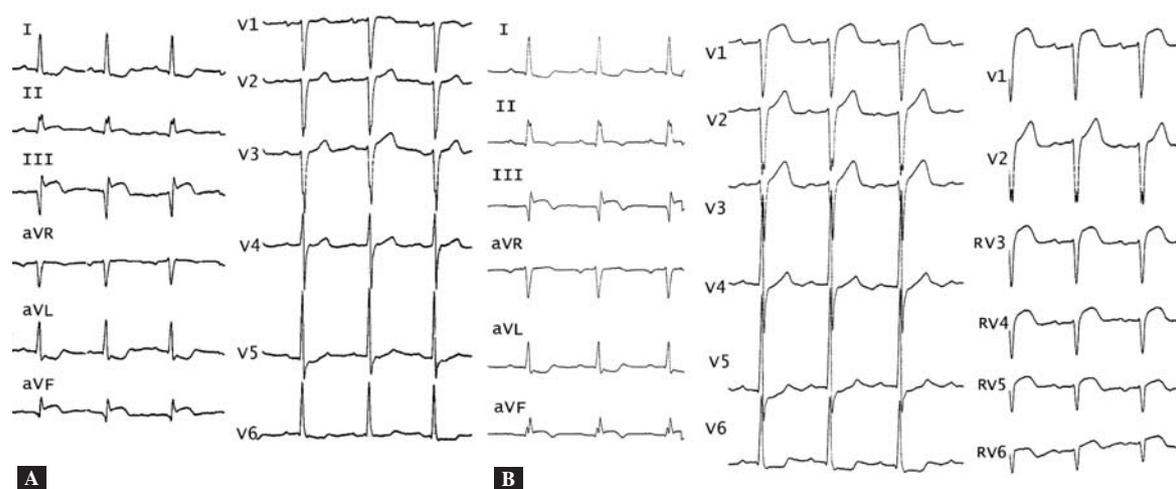
### Case presentation

A 58-year-old male patient with a history of diabetes mellitus and systemic hypertension was admitted to our hospital because of chest discomfort. The electrocardiogram performed in the emergency department demonstrated an inferior wall ST-elevation acute myocardial infarction originating from right coronary artery occlusion, with ST-segment elevation in leads II, III, aVF, the elevation in lead III being greater than in lead II<sup>1</sup> (Figure 1A), and without ST-segment elevation in the right precordial leads. It was decided to perform a primary intervention, and a 600 mg loading dose of clopidogrel and 500 mg of aspirin were administered to the patient. The coronary angiogram demonstrated total occlusion of

the right coronary artery, immediately after the bifurcation of the right ventricular branch (Figure 2A). The left coronary artery was without significant stenoses.

Primary percutaneous transluminal coronary angioplasty of the occluded right coronary artery was performed and two bare metal stents (3.0 × 16 mm and 3.0 × 24 mm) were implanted in line. Restoration of flow was obtained in the right coronary artery, with a nice angiographic result in the infarcted artery, but the branch for the right ventricle was confined by the stents and totally occluded (Figure 2B). The procedure was performed under anticoagulation with heparin and abciximab.

The patient was transferred to the coronary care unit, where he continued to have mild symptomatology and the electrocardiogram demonstrated partial restoration of the ST-segment elevation in the inferior leads, but also new ST elevation in left precordial leads V<sub>1</sub>-V<sub>3</sub> and in the right precordial leads (Figure 1B). The diagnosis of right ventricular infarction due to right ventricular branch iatrogenic occlusion was established. Fluids were administered and cardiac ultrasound revealed mild right ventricular dysfunction with an almost normal left ventricular ejection fraction. The patient had an uncomplicat-



**Figure 1.** A: Electrocardiogram of the patient on admission. ST-segment elevation in leads II, III and aVF indicates inferior wall ST-elevation myocardial infarction. B: Electrocardiogram of the patient after percutaneous coronary intervention. The ST-segment elevation in leads II, III and aVF is partially restored, while new ST-segment elevation is observed in precordial leads V<sub>1</sub>-V<sub>3</sub>, as well as in right precordial leads.

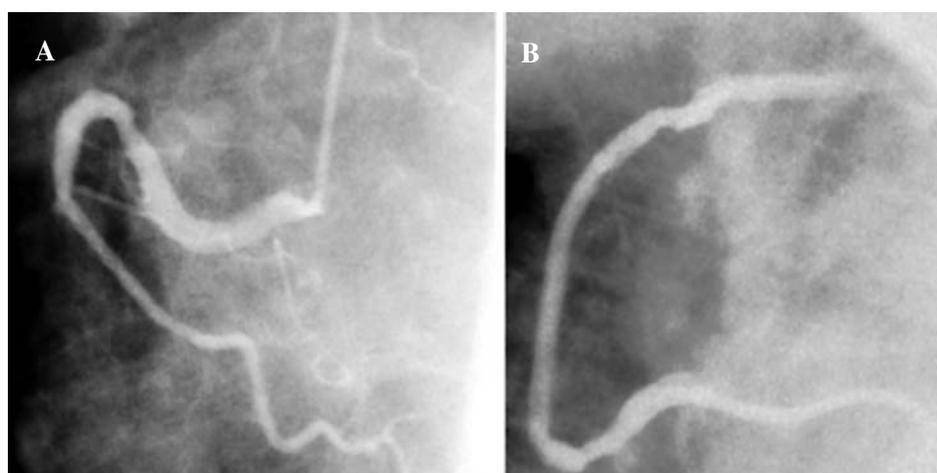
ed post-infarction hospitalisation period and he was discharged five days after the infarction under medical treatment with aspirin, clopidogrel, metoprolol, atorvastatin and enalapril.

Eight months later he complained of chest pain and an exercise test showed ST-segment depression in the inferior leads during maximum exercise. A new coronary angiogram was performed, which showed that the site of stent implantation was without significant restenosis and the left coronary artery was still without significant stenoses.

## Discussion

This case is an unusual presentation of right ventricular infarction, due to occlusion of the ventricular branch of the right coronary artery during primary percutaneous transluminal angioplasty, with ST-segment elevation in precordial leads V<sub>1</sub>-V<sub>3</sub>. The occlusion or even the opening of a side branch as a result of plaque shift during percutaneous coronary interventions is a well recognised phenomenon.<sup>2,3</sup>

Right ventricular infarction is a well defined enti-



**Figure 2.** A: The patient's right coronary artery is occluded after the bifurcation of the ventricular branch. B: Restoration of flow in the right coronary artery after percutaneous coronary intervention and stent implantation. Note the total occlusion of the right ventricular branch.

ty and many different diagnostic criteria have been proposed. Elevation of 1 mm or more in a right sided precordial lead, especially V<sub>4</sub>R, has a sensitivity of 82-100% and a specificity of 68-77%.<sup>4</sup> Although ST-segment elevation in precordial leads is characteristic of anterior left ventricular infarction, it is often observed in patients with proximal right coronary occlusion.<sup>5</sup> This ST-segment elevation may also extend to leads V<sub>4</sub> and V<sub>5</sub> in 7% of patients with a right ventricular infarction.<sup>6</sup> A great part of the right ventricular free wall may be directed anteriorly and this ST elevation may express the ischaemic injury of this part of the right ventricle. Also, the rotation of the heart as a result of right ventricular dilatation and the increase of right ventricular diastolic pressure might be possible explanations for this phenomenon.

In conclusion, isolated right ventricular branch occlusion may be accompanied by ST-segment elevation in left precordial leads. This should not be assumed to be indicative of anterior myocardial infarction in patients presenting with acute inferior myocardial infarction. It is important for doctors and especially interventional cardiologists to be aware of this

entity and protect the patients from unnecessary interventions.

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