Isolated right ventricular infarction due to occlusion of the right ventricular branch in the absence of percutaneous coronary intervention

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Isolated right ventricular myocardial infarction accounts for only 3% of all infarctions. It has previously been reported as a complication of percutaneous coronary intervention involving the right coronary artery secondary to occlusion of the right ventricular branch. In the present report, a patient is described in whom isolated right ventricular myocardial infarction developed due to occlusion of the right ventricular branch of the right coronary artery in the absence of percutaneous intervention.

Key Words: Imaging; Myocardial infarction; Occlusion; Right ventricle

Isolated right ventricular myocardial infarction (RVMI) is rarely seen, and accounts for only 3% of all infarctions (1). Its usual cause is the occlusion of a nondominant right coronary artery (RCA) (1). In addition, a number of case reports have described isolated RVMI in association with occlusion of a right ventricular (RV) branch of the RCA following percutaneous intervention to the RCA (2,3). In the present report, we describe a 60-year-old man with ST segment elevation in leads V1 through V3 caused by the angiographically confirmed occlusion of an RV branch, causing isolated RVMI.

CASE PRESENTATION

A 60-year-old man with chest pain 2 h in duration was admitted to the Gazi University School of Medicine (Ankara, Turkey). He was a smoker and had a positive family history of cardiac disease. His blood pressure was 140/80 mmHg and his heart rate was 74 beats/min, with a regular rhythm. The initial electrocardiogram (ECG) showed ST segment elevation in leads V1 through V3 and in the right precordial leads V3R through V5R (Figure 1). Following pretreatment with acetylsalicylic acid, he was taken to the catheterization laboratory for primary percutaneous intervention.

He had 40% stenosis in the left anterior descending (LAD) artery, 70% stenosis in the first diagonal branch and 60% stenosis in the

Un infarctus ventriculaire droit isolé causé par une occlusion de la branche ventriculaire droite en l'absence d'intervention coronaire percutanée

L'infarctus du myocarde ventriculaire droit isolé ne représente que 3 % de tous les infarctus. On a déjà déclaré qu'il s'agissait d'une complication d'une intervention coronaire percutanée de l'artère coronaire droite imputable à l'occlusion de la branche ventriculaire droite. Dans le présent rapport, on décrit le cas d'un patient dont l'infarctus du myocarde ventriculaire droit isolé s'est développé en raison de l'occlusion de la branche ventriculaire droite de l'artère coronaire droite, en l'absence d'intervention percutanée.

distal left circumflex artery (Figure 2). The right coronary artery was normal, but an RV branch of the RCA was occluded (Figure 3). Percutaneous intervention was not attempted because the vessel had almost a right angle takeoff. Thrombolytic therapy was also withheld because the myocardial region supplied by the vessel was too small. The patient was prescribed acetylsalicylic acid, enoxoparin, ramipril and atorvastatin. The in-hospital course was uneventful, and he was discharged from the hospital four days later.

The patient was asymptomatic and fully active one month later. A follow-up ECG showed no Q waves in the anterior and right precordial leads (Figure 4).

DISCUSSION

RVMI is predominantly a complication of inferior myocardial infarction (1). RV involvement can be diagnosed by the presence of ST segment elevation of 1 mm or more in lead V4R in the setting of acute inferior myocardial infarction (4).

The ECG changes of acute RV ischemia cannot be obscured by the coexisting dominant electrical forces of the ischemic mass of the inferior wall of the left ventricle (5); therefore, when isolated RVMI occurs, the ECG may show an acute anterior ST segment elevation pattern (leads V1 through V3) and right ST segment elevation (leads V3R

Figure 1 Initial electrocardiogram showing ST segment elevation in the anterior and right precordial leads

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Figure 2) Left coronary angiogram. Right anterior oblique view with caudal angulation

Figure 3) Right coronary angiogram demonstrating total occlusion of the right ventricular branch (arrows). **A** Left anterior oblique view with cranial angulation. **B** Right anterior oblique view

through V6R). In 1984, Geft et al (5) reported a study of 69 patients with an anterior injury pattern who were treated with intracoronary or intravenous streptokinase. Of these, five (7%) were found to have an

occluded RCA with a patent LAD artery. Clues to the diagnosis included a coexistent inferior small ST segment elevation in the inferior leads and an abnormal pattern of ST segment evolution in the anterior leads. In patients with anterior left ventricular infarction, ST segment elevation was the lowest in lead V1, increasing in amplitude toward lead V5. On the other hand, patients with an occluded RCA and RV infarction displayed the greatest amplitude of ST segment elevation in lead V1, which progressively decreased toward lead V5 (5).

A number of case reports have described acute anterior ST segment elevation in association with occlusion of an RV branch of the RCA following percutaneous intervention to the RCA. van der Bolt et al (2) studied nine patients with isolated acute occlusion of a large RV branch of the RCA following coronary balloon angioplasty. In all patients, isolated occlusion of the RV branch led to acute isolated RV ischemia with ST segment elevation in leads V1 through V3, V3R and V4R on the ECG (2). Similar to the present study, a case described by Acikel et al (3) showed ST segment elevation in leads V1 through V3 due to primary RCA angioplasty complicated by RV branch occlusion.

Our case confirms the previous studies and observations that ST segment elevation in leads V1 through V3 may be a sign of RV branch occlusion. Our case, to the best of our knowledge, is the first reported case of isolated RVMI due to occlusion of the RV branch of the RCA in the absence of percutaneous intervention. Although the appearance of ST segment elevation in precordial leads V1 through V3 is highly suggestive of acute anteroapical left ventricular infarction secondary to LAD occlusion, it may also represent isolated RVMI due to an occluded RV branch of the RCA.

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Figure 4) Electrocardiogram one month later