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Case Report

Acute myocardial infarction due to spontaneous postpartum multi-vessel coronary artery dissection

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ABSTRACT

Spontaneous coronary artery dissection is a rare cause of myocardial infarction in young, otherwise healthy people. We present a case report of a 37-year-old woman, without cardiovascular risk factors, who survived a major acute myocardial infarction due to multi-vessel spontaneous coronary artery dissection which was complicated by cardiogenic shock in the third week postpartum. She fully recovered with medical therapy in combination with angioplasty.

<Learning objective: Acute myocardial infarction (AMI) during pregnancy and postpartum is a rare but often catastrophic event and spontaneous coronary artery dissection is the most frequent cause of AMI in this population. Because of the high mortality rate, it is important to recognize this entity in the early stage of presentation. Coronary angiography remains the golden standard and should be performed without hesitation in unstable patients.>

Introduction

Spontaneous coronary artery dissection (SCAD) is a rare cause of acute myocardial infarction (AMI) in young, otherwise healthy patients, which may even lead to sudden death. The etiology of this condition is still not fully understood, it affects mostly women and nearly two-thirds of cases occur during childbirth or postpartum without any history of atherosclerotic disease. There are several factors associated with SCAD, such as smoking, atherosclerosis, connective tissue disorders, and pregnancy especially in advanced ages. Coronary artery dissection can occur spontaneously or as a consequence of chest trauma, cardiac surgery, coronary angiography, coronary intervention, or as an extension of aortic dissection.

Because of the limited evidence regarding treatment, there is no standard therapy established. Depending on the clinical presentation and hemodynamic stability, there have been different therapeutic strategies proposed, from conservative management to surgical or percutaneous or surgical revascularization.

Herein, we describe a case of multivessel SCAD in a 37-year-old woman complicated by cardiogenic shock in the third week postpartum, without any cardiovascular risk factors who fully recovered after treatment with angioplasty in combination with medical treatment.

Case report

A 37-year-old woman, three weeks postpartum (a preterm, healthy, first child, uneventful, vaginal delivery at 37 weeks of gestation), was transferred to our hospital after being admitted to a nearby hospital emergency department with sudden onset of sharp retrosternal chest pain, radiating to the left infrascapular region and down the left arm. The pain started 1 h before admission during a visit to the toilet and subsided within minutes. A few minutes later when she was walking, the pain recurred. This time, the pain was crushing and associated with dyspnea and nausea, followed by a collapse. During the last trimester of pregnancy she had experienced extreme fatigue and on the delivery day she vomited a few times without chest pain or palpitations. The patient's medical history was unremarkable apart from a spontaneous miscarriage 2 years earlier. There was no notion of hypertension, diabetes, hypercholesterolemia, or previous cardiovascular events. She did not use tobacco, drugs, or oral contraceptives. The family history was positive for cardiovascular disease: her brother had a history of smoking and coronary artery disease at the age of 50. She and her family were not known to have coagulopathy, autoimmune diseases or other syndromes associated with a thrombotic tendency.

On admission, she was in distress, had clammy skin, and was sweating profusely. Her blood pressure at home measured by paramedics, was 86/65 mmHg with a pulse of 70 bpm and a transcutaneously measured peripheral oxygen saturation of 93% at room air. Further clinical examination was normal. The electrocardiogram showed a regular sinus rhythm at 90 bpm, ST-segment

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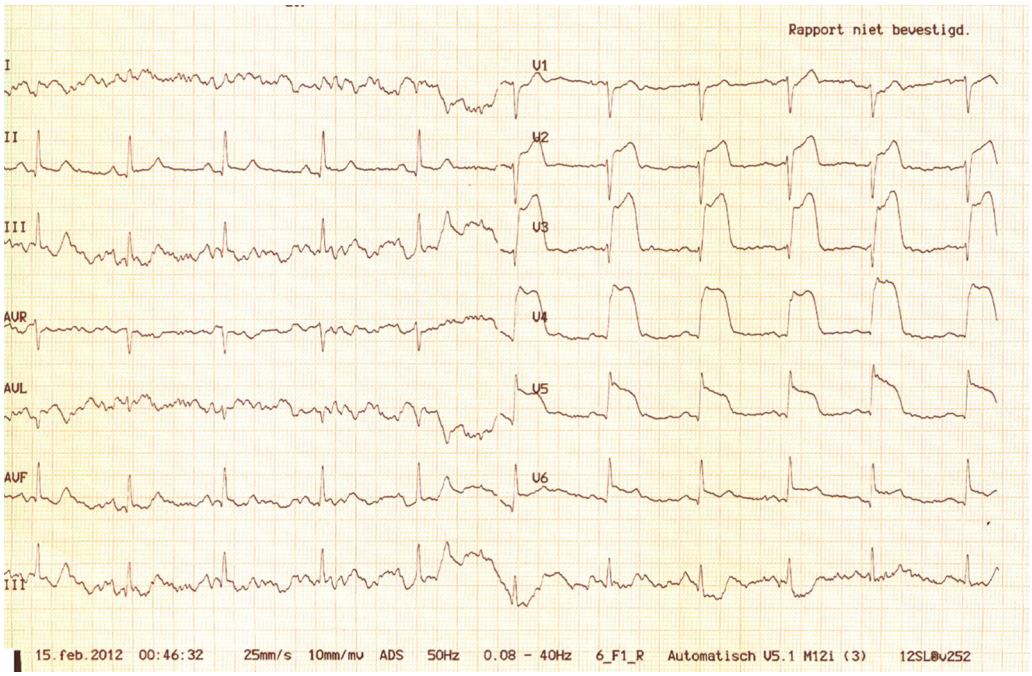

Fig. 1. The electrocardiogram of our patient admission shows a regular sinus rhythm at 90 bpm, with normal intervals and ST-segment elevation in inferior and anterolateral leads.

elevations of >2 mm in I, II, AVL, and >4 mm in V2–V6 and ST-segment depressions in III, AVR, and AVF (Fig. 1).

Laboratory analysis at presentation demonstrated slightly elevated high sensitivity troponin (<53 ng/L; reference value <14 ng/L), elevated creatinin kinase (249 mg/dL; reference value <167 mg/dL), hyperlipidemia (low-density lipoprotein 139 mg/dL 'recommended value < 115 mg/dL,' total cholesterol 249 mg/dL 'recommended value < 190 mg/dL'), no signs of inflammation, normal kidney and liver function, C-reactive protein of <0.060 mg/dL (reference value < 0.05 mg/dL) and normal D-dimer. The patient was stabilized hemodynamically and transported to the catheterization laboratory at our center.

Later on, trombophilia tests, auto-immune tests, and infectious serology analysis (cardiolipin IgG and IgM antibodies, lupus anticoagulants, APC (Actived Protein C) resistance, protein S and C, homocysteine, ANA, ANCA, CMV IgM, EBV IgM) all came back negative.

At the catheterization laboratory the ventriculogram demonstrated an ejection fraction of 22% with akinesia of diaphragmal, apical, and anterolateral segments.

Furthermore there was severe hypokinesia of posterobasal and moderate hypokinesia of the anterobasal portions. The coronary angiogram showed three-vessel disease with delayed distal vessel opacification and dissection. There was a subobstructive dissection in the mid segment of the left anterior descending coronary artery (LAD), an occlusion of the first diagonal branch, and dissection of the ramus intermedius and right coronary artery (RCA) (Figs. 2a and 3b).

The diagnostic procedure was followed by successful angioplasty of the proximal RCA with placement of one bare metal stent (multi-link 8 stent 4.0 mm × 18 mm) and moderately successful angioplasty of the LAD with placement of one drug-eluting stent (Promus element stent 2.25 mm × 24 mm; Boston Scientific, Natick, MA, USA).

Finally an intra-aortic balloon pump (IABP) was placed and the patient was subsequently admitted to our intensive care unit for further hemodynamic and respiratory support. Treatment with acetyl salicylic acid and clopidogrel was already started before the diagnostic coronarography.

After a few days additional treatment with low-dose beta-blocker, angiotensin-converting enzyme inhibitor, and spironolactone could be added. Finally, 12 days after admission she returned home.

Our follow up via the heart failure clinic shows remarkable improvement at the physical and psychological level. Echocardiography at six months demonstrated an improvement in left ventricular ejection fraction up to 45% and ergospirometry revealed a maximal oxygen uptake of 27.8 ml/kg/min (97% of predicted), maximal work rate 118 W (87% of predicted), and maximal heart rate 141 (90% of predicted) without any arrhythmias.

Discussion

AMI is a rare event in young, otherwise healthy women. The incidence of pregnancy-related myocardial infarction (MI) has been recently estimated in a large retrospective UK study to be 0.7 per 100,000 deliveries [1] and in a retrospective USA study as 6.2 per 100,000 deliveries [2].

The prevalence of AMI during pregnancy and postpartum in the USA has been reported to be 1 in 16,000 births [3].

AMI may occur at any stage in pregnancy and as long as 10–12 weeks postpartum. Up to 22% of the reported cases occur during the pregnancy and 78% during the postpartum with a peak incidence within 2 weeks of delivery [4–6].

Despite the early recognition of pregnancy-associated AMI and the current therapeutic approaches, the in-hospital fatality rate is still as high as 5%, ranging from 1% [2] to 11% [4], not including mortality at home after discharge.

The mortality rate is higher in women diagnosed with AMI in the antenatal period than in the postpartum period.

Fetal mortality rate is highly correlated with maternal mortality and has been estimated at up to 9% [3].

Maternal age, smoking, and atherosclerosis are strong independent risk factors. Maternal age over 35 years is associated