CASE REPORT

SPONTANEOUS RIGHT CORONARY ARTERY DISSECTION IN A NORMOTENSIVE POST-PARTUM FEMALE

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Acute myocardial infarction following coronary artery dissection during the post-partum period is a rare entity. Greater hemodynamic stress and hormonal changes increase the risk of developing a coronary artery dissection post-partum. Herein, we report the first case of a normotensive patient from Pakistan that presented with inferior wall myocardial infarction following 10-days post-partum due to right coronary artery dissection. This article highlights the importance of prompt diagnosis and subsequent life-saving treatment.

Keywords: Myocardial infarction; Post-partum; Coronary artery dissection; Right coronary artery

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INTRODUCTION

Spontaneous coronary artery dissection is the most common cause of pregnancy related myocardial ischemia in the post-partum period and is responsible for one-third cases of acute coronary syndrome in patients under 50 years of age.[1,2] In 1931, this term was first coined in the literature by Petty.[3] The reported incidence of spontaneous coronary artery disease is 0.7– .1%.[4] 38% of the cases occur in last trimester of pregnancy or post-partum.[5] Urgent diagnosis can be made with the help of coronary angiography.[6] Most of the time, patients are treated conservatively and decision for surgical or percutaneous intervention depends on the clinical condition of the patient and area of coronary circulation affected.[7]

Herein, we present the first case of post-partum myocardial infarction owing to solitary right coronary artery dissection from Pakistan. In addition to this, our patient also had no risk factor during her clinical course which makes this cause unique.

CASE REPORT

A 36-year-old normotensive and non-diabetic married female with a history of caesarean section 10-days before presented after having severe chest pain which was sudden in onset, radiating to whole chest and jaw, associated with profuse cold sweating and sinking of heart for last 30 minutes. There was no association of chest pain with respiratory movements. The patient denied any history of syncope, shortness of breath, intermittent claudication and leg swellings. Past medical history was unremarkable for myocardial infarction, ischemic heart disease, fever, cough, chest trauma, gastroesophageal reflux disease and jaundice.

Upon arrival, the patient appeared anxious, lying propped up in the bed with a respiratory rate of 28/min, blood pressure of 120/80 mm of Hg, pulse of 110/min regular, good volume with no radio-radial or radio-femoral delay. On examination, apex beat was not well localized. ECG of the patient revealed inferior wall myocardial infarction as shown in figure-1.

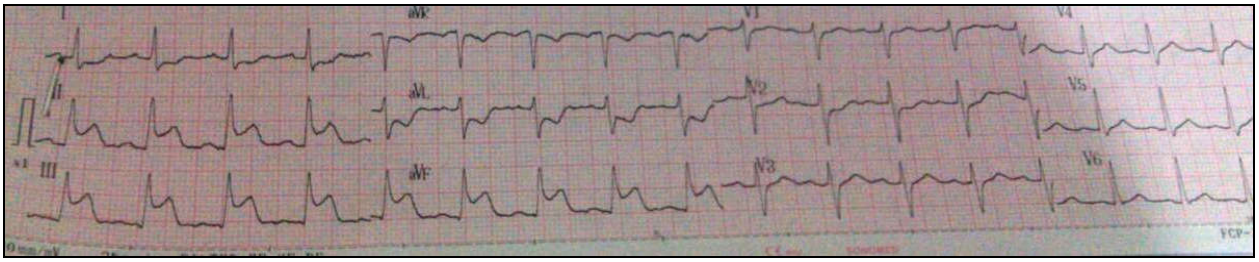

Figure-1: ECG significant for ST-elevation in the leads II, III and aVF with reciprocal changes in aVL and ST-depression in leads V2 and V3 – Inferior Wall MI

The patient was admitted to the intensive care unit and managed using Inj. morphine, Inj. metoclopramide, Inj. Heparin with a loading dose of tablet disprin and tablet clopidogrel. Because of the recent history of the caesarean section, streptokinase was avoided. As the patient was in the golden time frame, it was decided to shift the patient to catheterization laboratory for percutaneous coronary intervention. Coronary

angiography revealed tight ostial stenosis of the right coronary artery with dissection immediately following the dye injection (Figure-2, 3) starting from ostium reaching distally at the bifurcation. There was also staining of ascending aorta; the other coronary arteries were normal.

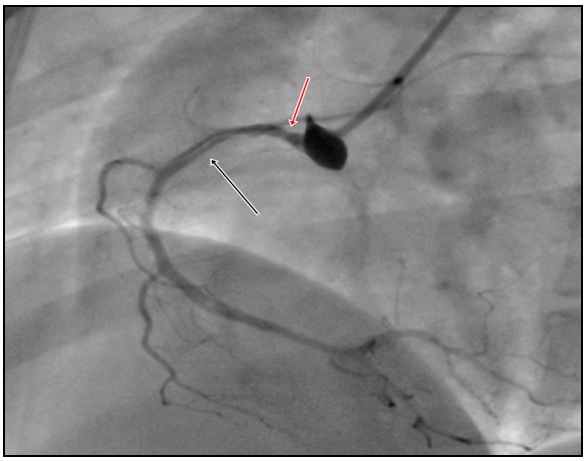

Figure-2: Coronary angiography revealing ostial stenosis of the right coronary artery by red arrow and dissection of the right coronary artery by the black arrow.

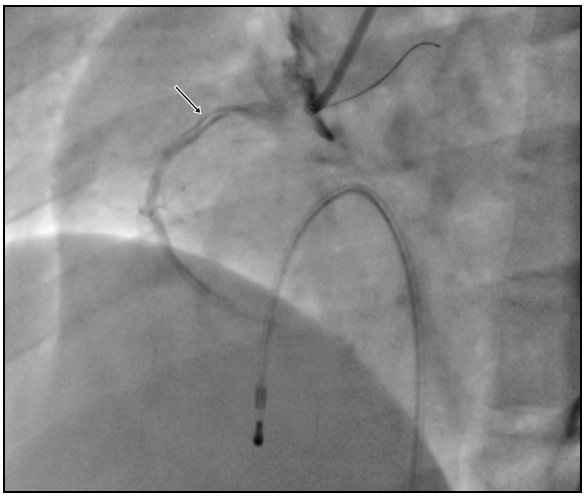

Figure-3: Coronary angiography revealing dissection of right coronary artery by black arrow.

As coronary angiography showed dissection of right coronary artery, Resolute Integrity 2.75×26 mm (DES) was placed at the ostium. The patient was shifted to Intensive Care Unit (ICU) for close monitoring of hemodynamic and rhythm. Trans-oesophageal echocardiography was done to look for the extension of dissection to ascending aorta but nothing significant was found.

Echocardiography findings were significant for normal aortic root and arch of the aorta, no dissection of the aorta, Infero-posterior hypokinesia (Ejection Fraction 40%), normal-sized left ventricle with mild systolic dysfunction with normal right ventricular systolic function. The patient remained hemodynamically stable and her stay in ICU was un-eventful. The patient was discharged on 6th post-procedure day.

DISCUSSION

Since the publication of the first report about coronary artery dissection in 1931, almost 200 cases have been published to date.[8] Spontaneous arterial dissection is the separation of different layers of the coronary arterial wall resulting in a false lumen and decreased calibre of the artery.[9] Mean age of post-partum females in one study was 33 years with the mean post-partum time frame of 38 days.[4] Left anterior descending artery is the most commonly involved vessel followed by right coronary artery which our case presented.[10] Our case had involvement of the proximal segment of the artery which is less commonly involved as compared to mid or distal segments.[11]

Most common location for coronary dissection is found between tunica media and tunica adventitia. Intra-medial haemorrhage due to disruption and bleeding of vasa vasorum leads to axial propagation of the dissection and clot formation which subsequently decreases calibre of the artery.[12] Progesterone and oestrogens release during the post-partum period is also responsible for increased risk of coronary artery dissection. Progesterone is linked with elastic fibre disarray and decreased synthesis of collagen.[13,11] Matrix metalloproteinase release associated with oestrogens is responsible for cystic medial necrosis.[14] Loss of structural support to the vasa vasorum due to this combined hormonal effect has been hypothesized to result in susceptibility to rupture. Changes occurring during puerperium include decreased vena cava compression and increased blood in systemic circulation due to blood contracting from the uterus. These changes increase the hemodynamic load and greater shear stress which can also be the cause of greater risk of coronary artery dissection.[15] In an autopsy study on post-partum cases, increased eosinophilic infiltrates were observed around tunica adventitia.[16] Eosinophils role in dissection can be attributed to the presence of collagenase-containing granules within them. Based on angiographic images of renal and cerebrovascular arteries, a strong association between coronary artery dissection and fibromuscular dysplasia has also been established.[17]

Since left anterior descending artery is involved most of the time, patients present with

ST-segment elevation myocardial infarct on the electrocardiogram.[18] Since our patient had involvement of right coronary artery, her presentation on electrocardiogram was of inferior wall myocardial infarction. Angiography is the investigation of choice.[19] In the case of recurrence or involvement of proximal segment of artery, cardiac computed tomography is a good modality to monitor such lesions.[20] Due to lack of this facility, we were not able to use this modality. Intravascular ultrasound can also be used to observe coronary anatomy.[20]

Treatment of coronary artery dissection varies on a case by case basis. It depends on the underlying artery involved, the extent of dissection and the myocardium affected by it.[21] Management strategies include pharmacological treatment, percutaneous coronary angioplasty, and emergent coronary artery bypass graft. Pharmacological therapies include B-blocker, anticoagulants and dual antiplatelet therapy and are reserved for hemodynamically stable patients.[22] Percutaneous coronary angioplasty with stents opens the calibre of the artery restoring the blood flow and resolving the dissection. Stenting should be performed distally to proximally to avoid propagation of dissection.[23] A study conducted by Moukarbel and Alam showed an effectiveness of 91% in angioplasty with stent placement.[24] Complications include placement of a stent in the false lumen compromising blood flow further and inducing ischemic symptoms.[4] The iatrogenic risk of coronary artery dissection in diagnostic catheterization is 0.03–0.06%.[25] If revascularization fails or multiple vessel disease is present, coronary artery bypass graft is an alternate option.[26] Short-term outcome of coronary artery bypass graft is good but at the expense of high occlusion rates long term.[4]

The recurrence rate of coronary artery dissection between various studies remains inconsistent. In a study conducted by Saw J, the recurrence rate was 10%.[27] In another study, the recurrence rate was documented as 17% only in women.[4] The 10-year incidence rate of any major cardiovascular event is 47%.[4] We recommend that a patient should be monitored closely in a subsequent pregnancy if a history of coronary artery dissection is present. In autopsy of peripartum patients, coronary artery dissection should be kept in mind. If fibromyalgia is suspected, examination of renal and cerebrovascular arteries should be done.

AUTHORS' CONTRIBUTION

RI did the write-up. AS and FM did the proof reading. AA did the conceptualization of study design and data collection. MA did data analysis and data interpretation. UHC did the literature search.

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