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Case Report
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Takotsubo-Reverse Syndrome with Non-Obstructive Coronary Artery Disease: A Case Report in Cardiac Magnetic Resonance Imaging

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Abstract

A case of a woman that has undergone a gynecologic surgery (caesarean section) with subsequent onset of dyspnea is illustrated. After the cardiological visit, the patients came to the Room for suspected pulmonary embolism. She performed laboratory tests that showed an increase in dimer and markers of myocardiocitonecrosis, Electrocardiogram normal, chest X-ray negative and Computed Tomography-Pulmonary Angiography that excluded the embolism. The patient ordered hospitalization in ICU. A Coronary angiography was performed and resulted in the absence of obstructive coronary disease. Six days after, the patient achieved a cardiac magnetic resonance with Gadolinium administration. The results showed akinesia of mid-basal segments and edema in the anterior and inferior basal septum; no late enhanced areas were seen. These findings were suggestive of Takotsubo reverse syndrome. Images showed the typical mid-basal ballooning.

Introduction

Takotsubo is stress-induced cardiomyopathy that simulates a myocardial infarction, typically represented by a transient dysfunction of the apical segments of the left ventricle. In literature is described as apical ballooning. Reverse Takotsubo is a variant from Takotsubo cardiomyopathy that involve mid-basal segments to being akinetic [1,2], and its incidence regards the minority of patients. The vast majority of patients with Takotsubo syndrome can recover cardiac function within three-six months. Commonly, acute complications such as heart failure left ventricular outflow tract obstruction, and moderate-to-severe mitral regurgitation is not seen.

Case Presentation

A 47-year-old woman, smoker, with recent caesarean section, after a period of assisted fertilization. The patient reports the onset of chest tightness and mild dyspnea even before hospital discharge. In the following days, she experienced worsening dyspnea at her home, which required a cardiological evaluation at the hospital of origin. Upon finding high dimer values, she was sent to our hospital. She came to the Pineta Grande Hospital at our emergency room due to a suspected pulmonary embolism. The patient was hemodynamically stable and performed laboratory tests, EKG, chest X-ray and a CT-Pulmonary Angiography. A molecular swab for SARS-COVID-19 was performed with a negative result. Upon finding an increase in the indices of myocardial necrosis, hospitalization in the ICU is arranged.

Laboratory test: Dimer = 2.71 mg/L FEU, CPK = 210 U/L, CK = 17.30 ng/ml, Troponin = 5.732 ng/ml.

EKG: Normal.

Chest X-ray: Bilateral basal pleural hypodiaphania, determining a blurred appearance of the diaphragm and perihilar congestion.

Echocardiography: Global contractility is reduced, and akinesia of medium-basal segment of the inferior and inferolateral wall is seen, slightly aortic insufficient.

After three days, echocardiography showed an EF of 45%, and then three days later, the EF of 50%.

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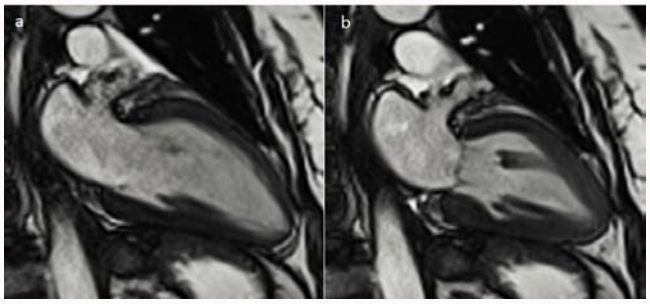

Figure 1: 2 Chambers long axis Cine-TrueFisp in end diastole ED (a) and end systole ES (b). Images shows the hypokinetic mid-basal segments marked in ES (b) and mid-basal ballooning is seen. This condition contrasts with classic Takotssubo syndrome, where the apical segments are hypokinetic, and apical ballooning is seen.

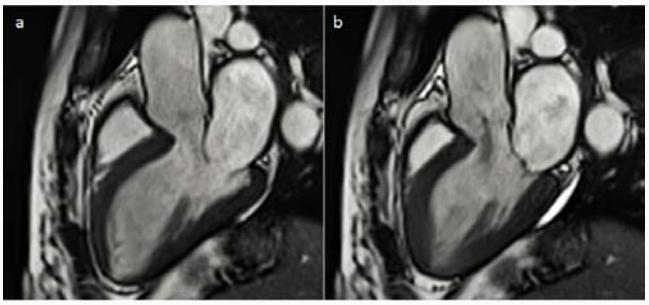

Figure 2: 3 Chambers Cine True-fisp in ED (a) and ES (b). Images shows mid-basal ballooning and a slightly LV outflow tract regurgitation in ES is seen (b).

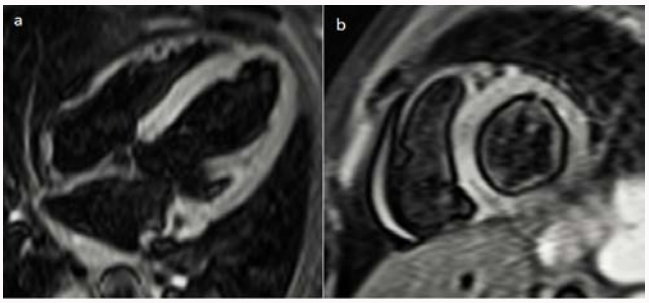

Figure 3: 4 Chambers long axis (a) and short-axis (b) T2 STIR Black-Blood. STIR is the gold standard to detect muscular edema. In this case edema involved the anterior and inferior basal septum.

Computer tomography of pulmonary vessels: Bilateral pleural effusion, pericardial effusion, and interstitial edema.

Coronary angiography: Absence of obstructive coronary artery disease.

Magnetic resonance imaging: Six days from the hospitalization, the patient performed a cardiac MRI with delayed contrast enhancement that shows EF 50% with akinesia of mid-basal segments. Inflammation of the anterior and inferior basal septum and the anterior basal wall. No contrast enhancement areas showed in the DE sequences referred to inflammation or necrotic areas.

Discussion

Takotsubo syndromes a cardiomyopathy stress-induced due to psychological and physiological factors that cause transient left ventricular dysfunction [3-5]. This syndrome can lead patients to acute settings. Patients can develop severe emotional distress that can induce stress cardiomyopathy [6-8]. The pathogenesis is still unknown, but the mediators as catecholamines, histamines and cytokines have a role in coronary artery spasm, microvascular dysfunction, or toxicity (Figure 1) [9,10].

The clinical presentation of patients with stress-induced cardiomyopathy includes chest pain at rest, shortness of breath, pulmonary edema LV dysfunction, cardiac biomarkers elevated, and ECG abnormalities (Figure 2) [11-14]. The Takotsubo syndrome could mimic Myocardial Infarction (MI). Acute pulmonary embolism could be considered in the differential diagnosis. Coronary Artery Disease (CAD) must be excluded by coronary angiography [15].

Moreover, stress-induced cardiomyopathy is most difficult to characterize from myocarditis, but typical myocardial contractility patterns, angiography findings, and rapidly improving clinical conditions can help to distinguish Takotsubo from MI or myocarditis (Figure 3) [16].

However, most of patients with Takotsubo syndrome recover cardiac function within three-six months.

Takotsubo reverse is a variant of classic form characterized edema in the mid-basal segments, but the mean age target is lower than classic form. In younger patients, the high density of adrenoreceptors at the base of the heart can explain this cardiomyopathy variant. Reverse Takotsubo is associated with less pulmonary edema, dyspnea, and shock than classic Takotsubo (Figure 4).

Cardiac Magnetic Resonance plays an important role in the differential diagnosis between Takotsubo and myocardial infarction or myocarditis and provides more details on right and left ventricular function. The transmural edema corresponds to the akinetic areas in the wall in contrast to MI, in who the edema matches with coronary region.

A limitation of this technique for acute settings is its availability

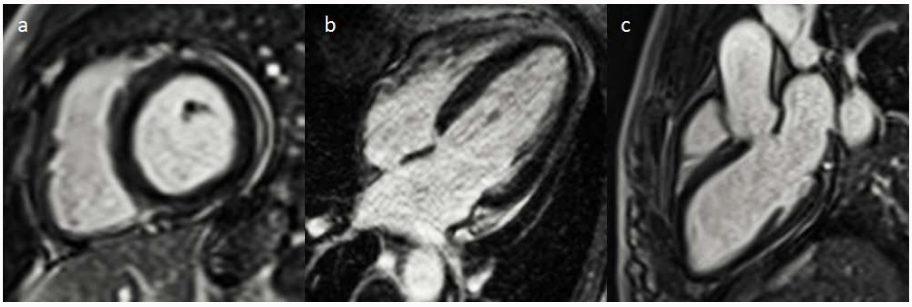

Figure 4: Delayed Enhanced Short axis (a), long axis 4 chambers (b) and 3 chambers (c) shows the absence of fibrosis areas or infarction areas.

and well-trained operators.

In this clinical case MRI allowed to achieve a diagnosis in a reasonable time and helps us in differential diagnosis. Reverse Takotsubo is rare, and its pathophysiological cause is similar at classic form, but his identification is important because it tend to be not recognizable as the traditional presentation, nevertheless both types of Takotsubo have same clinical course.

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