

Inverted Takotsubo Versus Acute Myocarditis: the Importance of Cardiac Resonance for Differential Diagnosis

Takotsubo Invertido Versus Miocardite Aguda: a Importância da Ressonância Cardíaca para Diagnóstico Diferencial

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Introduction

Takotsubo syndrome (TS) is a differential diagnosis of chest pain in the emergency similar to acute myocarditis. This is the case report of a patient who presented in the emergency department with chest pain and acute heart failure. Echocardiography findings were suggestive of inverted TS, a variant of TS, and it was impossible to exclude acute myocarditis. Cardiac magnetic resonance (CMR) was essential for the differential diagnosis.

Case report

A 32-year-old female patient born in the state of Espírito Santo was admitted to the emergency room with tight chest pain associated with dyspnea, dizziness, nausea, and vomiting. The patient developed acute pulmonary edema responsive to diuretic therapy and vasoactive drugs and was referred to the coronary intensive care unit. She denied any recent history of fever, respiratory symptoms, diarrhea, stress episodes, smoking, or use of illicit drugs, anorectics, or teas. The patient was vaccinated against influenza. An examination revealed a severe general condition consisting of pale skin, no changed on cardiac auscultation, no jugular turgescence, normotensive status with the use of dobutamine, and tachydyspnea at minimal effort using a 10 L/min reservoir mask. Electrocardiography revealed sinus tachycardia, with T wave inversion in DI and aVL. Laboratory tests presented changed myocardial necrosis markers (troponin at 5.13; reference value, <0.04). Transthoracic echocardiography showed an ejection fraction of 26%, severe global left ventricular (LV) systolic dysfunction with hypercontractility of apical segments, and akinesia of the middle and basal segments of all walls (Video 1). Coronary cineangiography showed no coronary lesions. CMR showed a delayed enhancement sequence with mesocardial distribution in the LV anteroseptal and middle segment compatible with myocarditis (Figure 1). The patient's cardiovascular condition progressed well; however, during the hospitalization, she

presented with low back pain, the investigation of which revealed a retroperitoneal mass. Findings of resection of the mass followed by a frozen tissue examination were suggestive of an undifferentiated neoplasia awaiting histopathological and immunohistochemical analyses.

Discussion

Stress-induced cardiomyopathy, also known as TS, was initially described by Sato et al. in 1990. It is characterized by a transient change in LV contractility with ventricular apical akinesia and compensatory basal hypercontractility in the absence of obstructive coronary disease.^{1,2}

Its pathophysiology remains to be elucidated. The possible mechanisms of its development include spasm in multiple coronary arteries, microcirculatory dysfunction, and injury caused by excessive endogenous catecholamines that causes myocardial stunning and microinfarction. This is a reversible cardiopathy related to physical or psychological stress that is predominant in postmenopausal women and often mimics an acute coronary syndrome. However, there is no correspondence between the affected myocardial region and the territory of a single coronary artery, and coronary angiography findings are typically normal or show mild lesions.^{1,2}

A TS variant called inverted TS (ITS) has been described with an incidence of 2.2%, with coronary cineangiography findings evidencing the inversion of the contractile pattern.¹⁻³

The patient can clinically present with chest pain and changed myocardial necrosis markers. Electrocardiography findings can range from nonspecific changes in ventricular repolarization to ST-segment elevation. Echocardiography shows characteristic changes as already described that can be confirmed on coronary cineangiography. Both TS and ITS have a favorable prognosis, with treatment consisting of supportive measures.

Acute myocarditis, which has an estimated incidence of 0.2–1.2%, is characterized by the presence of an inflammatory response of the myocardium, often as a result of a primary infectious aggression elsewhere.^{4,5} The most frequent aggressor is the infectious agent, which can be secondary to immune system attacks, as in cases of peripartum myocarditis. Some of the most common infectious agents are viruses, especially enteroviruses.⁶ The clinical presentation varies from oligosymptomatic cases without ventricular dysfunction to severe cases of fulminant myocarditis with significant impairment of ventricular function and sudden death in young patients with no previous history of coronary disease.⁴ The disease in approximately 70% of patients with asymptomatic

Keywords

Diagnosis; Magnetic Resonance Imaging; Takotsubo Cardiomyopathy.

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interstitial edema. There is an overall increase in the rate of early enhancement by gadolinium between the myocardium and skeletal muscle in T1-weighted images and evidence of at least one focal lesion with non-ischemic regional distribution in the inversion recovery (IR) of the signal using the late enhancement technique. The presence of two of these three findings infers the presence of myocarditis. These findings are grouped in the Lake Louise criteria.^{8,10}

In TS, CMR is useful both to diagnose and identify possible complications such as LV outflow pathway obstruction, valve disease, pericardial effusion, and LV thrombus.⁹ In TS patients, CMR normally shows no IR, suggesting the absence of myocardial ischemic necrosis in addition to the presence of basal segment hyperkinesia suggestive of this syndrome. However, during the acute phase, there may be other contraction patterns such as middle ventricular akinesia and apical preservation as well as baseline akinesia with mid-ventricular and apical preservation.⁹

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In short, TS and acute myocarditis are differential diagnoses of chest pain. Laboratory tests, electrocardiography, and echocardiography are nonspecific. Therefore, CMR is extremely important for the differential diagnosis, treatment, and prognosis. This report presented a case of acute myocarditis in which the initial echocardiographic examination suggested a pattern of ITS but CMR showed a myocarditis pattern.

Authors' contributions

Research conception and design: Belinassi CM, Carneiro SS, Negri DPG, Rios DM, Carvalho MJ, and Murad JA.

Conflict of interest

The authors have declared that they have no conflict of interest.