

Takotsubo Cardiomyopathy In A Woman With Immune-Mediated Necrotizing Myopathy

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Abstract

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Introduction:

Takotsubo cardiomyopathy is a transient cardiac syndrome characterized by left ventricular apical akinesis that can present as an acute coronary syndrome. As this syndrome often occurs following severe psychological or physical stress, it has been nicknamed stress induced cardiomyopathy or broken heart syndrome. Here we present a rare case of takotsubo cardiomyopathy in a woman with immune-mediated necrotizing myopathy.

Case description:

A 44-year-old African American with a 10-year history of immune-mediated necrotizing myopathy presented to the emergency department with new onset retrosternal chest discomfort. She was diagnosed with immune-mediated necrotizing myopathy more than a decade ago and subsequently found to have autoantibodies recognizing 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) reductase antibodies. She had no history of statin exposure and experienced slowly progressive weakness despite aggressive immunosuppressive therapy. She was evaluated in the emergency department with mildly elevated serial troponin. She had normal electrocardiogram. Left heart catheterization and coronary angiogram was performed. She had clean non-atherosclerotic coronaries; however the left ventriculogram showed a mildly akinetic left ventricular apex with ballooning (takotsubo syndrome).

conclusion:

Takotsubo cardiomyopathy has been associated with connective tissue diseases including lupus and be considered in patients with autoimmune myopathy. Increasing awareness will help in diagnosis and proper treatment.

INTRODUCTION

Takotsubo cardiomyopathy is a transient cardiac syndrome characterized by left ventricular apical akinesis that can present as an acute coronary syndrome. As this syndrome often occurs following severe psychological or physical stress, it has been nicknamed stress induced cardiomyopathy or broken heart syndrome. Here we present a rare case of Takotsubo cardiomyopathy in a woman with immune-mediated necrotizing myopathy.

CASE REPORT

A 44-year-old African American female with a 10-year history of immune-mediated necrotizing myopathy

currently on treatment with mycophenolate mofetil 1500 mg twice daily, Prednisone 25 mg daily and monthly intravenous immunoglobulin treatments presented to the emergency department with new onset retrosternal chest discomfort that lasted for ten minutes and was associated with diaphoresis and palpitation. Following the recurrence of similar symptoms the next day, she decided to see her family physician who referred her to the emergency department. She was diagnosed with immune-mediated necrotizing myopathy more than a decade ago and subsequently found to have autoantibodies recognizing 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) reductase antibodies. She had no history of statin exposure and

experienced slowly progressive weakness despite aggressive immunosuppressive therapy. She did not have any other risk factors for atherosclerotic disease such as hypertension, dyslipidemia, and smoking or had a family history of coronary artery disease. She was evaluated in the emergency department and had mildly elevated serial troponin T levels of 0.22->0.22->0.29->0.39. She also had mildly elevated serial CPK levels 184->181->207 and CPKMB levels 11.4->11.6->16 as well as CKMB index levels of 6.2->6.4->7.4 on serial cardiac marker evaluation. She had only a minimally abnormal electrocardiogram (Figures 1 and 2). Her chest x-ray was normal (Figure 3). She denied any unusual emotional stress or physical trauma other than usual ongoing struggles associated with her myopathy. She was taken to the cardiac catheterization laboratory with the presumptive diagnosis of acute coronary syndrome. Left heart catheterization and coronary angiogram was performed. She had clean non-atherosclerotic coronaries (Figures 5, 6 and 7) ; however the left ventriculogram showed a mildly akinetic left ventricular apex with ballooning (Takotsubo syndrome)(fig 4) .

Figure 1

Electrocardiogram at presentation with chest pain shows normal sinus rhythm @ 81/min, Short PR interval (104msec) with accelerated AV conduction.

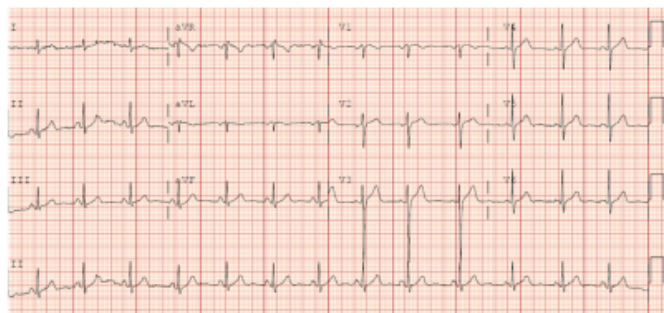


Figure 2

Electrocardiogram from the day after left heart catheterization and coronary angiogram showing sinus tachycardia @100/min.

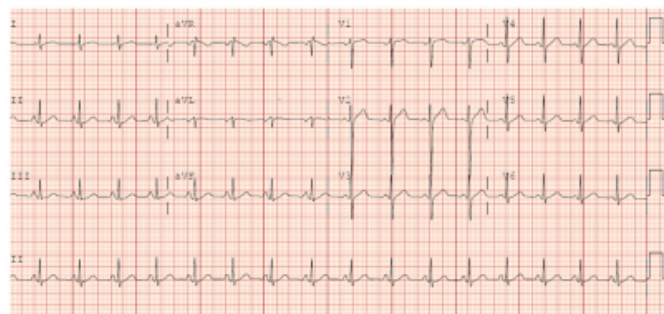


Figure 3

Chest x-ray showing normal heart size and clear lung fields.



Figure 4

LV angiogram showing apical ballooning (compare arrow at apex and base -mild apical dyskinesia, EF50%)

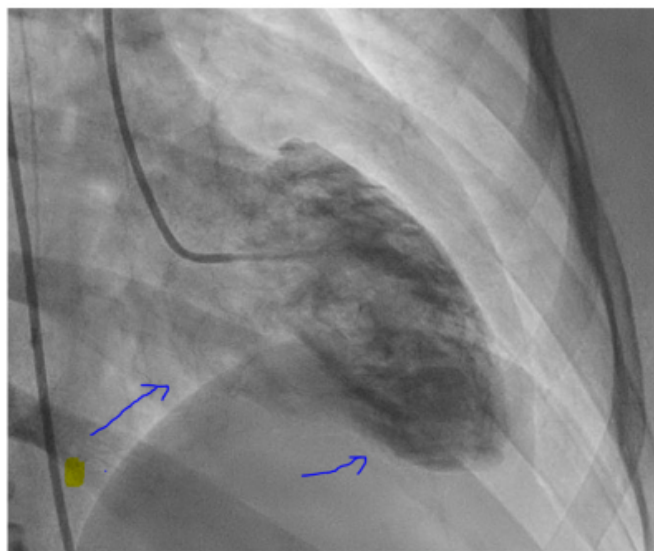


Figure 5

Fig 5-6 Right anterior oblique view of the left main, left circumflex and left anterior descending coronary arteries.



Figure 6

Fig 5-6 Right anterior oblique view of the left main, left circumflex and left anterior descending coronary arteries.

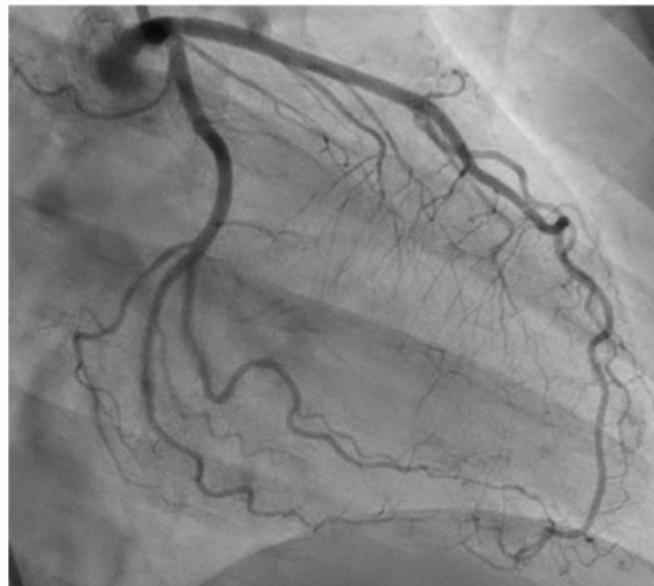


Figure 7

Normal Coronary Angiogram (Right anterior oblique view of a large dominant right coronary artery)



Follow up echocardiogram next day showed resolving akinesia and normal left ventricular function with an EF of 55%. She was discharged in a stable condition and followed up as an outpatient in the cardiology office with a good recovery.

DISCUSSION:

The autoimmune myopathies are a heterogeneous family of diseases characterized by proximal muscle weakness, elevated serum levels of skeletal muscle enzymes, abnormal muscle biopsies, and autoantibodies (1). The most common subtypes of autoimmune myopathies include dermatomyositis, the antisynthetase syndrome, and immune-mediated necrotizing myopathy. Cardiac manifestations have been well described in patients with various forms of autoimmune myopathy (2). These include diastolic dysfunction, coronary artery disease, myocarditis, arrhythmias, and pericarditis.

Among those with immune-mediated necrotizing myopathy, a recent study (3) demonstrated that branch block was present in 11 (22%) of 50 patients and echocardiogram abnormalities were noted in 25 (61%) of 41 patients. Diastolic dysfunction, affecting 11 (27%) of the patients, was the most common abnormality seen on echocardiogram; two of the patients were reported to have abnormal left ventricular wall motion.

Takotsubo cardiomyopathy has been previously described in only two patients with autoimmune myopathy. A single patient with the antisynthetase syndrome developed

Takotsubo cardiomyopathy in the context of post-procedural pain following pericardiocentesis (7). And a second patient presented simultaneously with both Takotsubo cardiomyopathy and immune-mediated necrotizing myopathy (16).

Although patients with myocarditis have demonstrable infiltrates on cardiac biopsy, the mechanisms underlying other forms of cardiac injury in patients with autoimmune myopathy remain poorly understood. In particular, no studies have reported on the pathological appearance of cardiac tissue from those with immune-mediated necrotizing myopathy.

Takotsubo cardiomyopathy, also known as stress induced cardiomyopathy, is a rare cause of transient apical ballooning, most often preceded by severe physical and psychological stressors that include severe illness, injury or sudden unexpected death of loved ones, and accidents. This can also occur following severe illness, hospitalization to intensive care admission, unexpected procedures or surgery (5,6,7).

The literature indicates that 1-2 % of patients who are initially diagnosed with acute coronary syndrome have transient left ventricular ballooning syndrome (7,8). Generally, the clinical presentation of Takotsubo cardiomyopathy is also quite similar to the acute coronary syndrome with most of the patients presenting with chest pain, dyspnea and diaphoresis. Electrocardiogram (EKG) abnormalities and elevated cardiac biomarkers are also frequently observed in these patients. Trans-thoracic echocardiogram may show apical ballooning. However, coronary angiography demonstrates normal coronary arteries with minimal or no atherosclerosis. Magnetic Resonance Imaging (MRI) or left ventriculography typically reveals transient left ventricular apical ballooning. Mid-ventricular or basal (reverse) variants have also been described (4,8).

Although the precise pathophysiologic mechanisms of Takotsubo cardiomyopathy have yet to be fully elucidated, catecholamines induced myocardial stunning has been proposed as a possible mechanism. Studies have shown a higher density of beta-adrenergic receptors in the apical heart thus suggesting higher levels of circulating catecholamines excessively influencing this segment resulting in apical negative cardiac myocyte inotropy. Alternatively, some suggest that the akinetic appearance of this region can be related to high systolic apical circumferential wall stress. The exact etiology of higher

incidences of Takotsubo in postmenopausal women is unknown. One proposed hypothesis is that reduced circulating estrogen levels might render the microvascular system more susceptible to catecholamines (7). Indeed, animal studies have shown that estrogen attenuates immobility effects of stressors on the myocardium (9).

Due to its similarity with the acute coronary syndrome, Takotsubo cardiomyopathy patients are typically treated with aspirin, beta-blockers and intravenous heparin at presentation. Once diagnosed correctly with Takotsubo cardiomyopathy, patients should receive supportive care and medical management until left ventricle function recovers. Beta-blockers may be beneficial, angiotensin converting enzyme inhibitors and diuretics are reasonable to administer in the acute phase but data regarding their long-term efficacy does not exist. In some cases apical ballooning may also cause left ventricular outflow tract obstruction (LVOT) due to left ventricle basal hyperkinesis. In these subjects, it may be prudent to avoid inotropic agents, angiotensin converting enzyme inhibitors or receptor blockers to prevent worsening of left ventricular outflow tract obstruction. If left ventricular function has not fully resolved during the inpatient admission, those with Takotsubo cardiomyopathy should also be followed by echocardiogram in the outpatient setting to ensure complete resolution and prevent complications.

The prognosis of Takotsubo cardiomyopathy is usually good, although cardiac function recovery may be slow (10,11). However mortality does rarely occur in 0% to 8% of patients (12,13). The degree of left ventricular dysfunction is not predictive of increased mortality (14) as left ventricular function resolves within days to weeks of initial presentation. Early in the course of the episode, patients may develop left sided heart failure with or without acute pulmonary edema. Other complications include left ventricular mural clot, systemic or pulmonic events, mitral valve regurgitation, ventricular arrhythmias, cardiogenic shock and, in extreme cases, left ventricular wall rupture (15,16).

CONCLUSION

Takotsubo cardiomyopathy should always be considered in the differential diagnosis of chest pain especially in postmenopausal females with any preceding physical or psychological stressors. This syndrome has also been associated with connective tissue diseases including systemic lupus erythematosus (5) and systemic sclerosis (6). The case presented here emphasizes that Takotsubo

cardiomyopathy should also be considered in patients with auto-immune myopathy and perhaps especially in those with immune-mediate necrotizing myopathy. Increasing awareness about the disease will lead to earlier diagnosis and proper treatment.

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