

Case report

Takotsubo Syndrome: An Unusual Presentation Mimicking STEMI

Abstract:

Tako-Tsubo syndrome, also known as stress cardiomyopathy, is a rare and often underdiagnosed condition that presents with symptoms similar to acute coronary syndrome. We present the case of a 58-year-old female with no significant past medical history who presented to the emergency department with chest pain, shortness of breath, and electrocardiographic changes suggestive of acute myocardial infarction. Coronary angiography was negative for obstructive coronary artery disease, and transthoracic echocardiography showed characteristic apical ballooning of the left ventricle consistent with Tako-Tsubo syndrome. The patient was managed with supportive care and beta-blocker therapy, and follow-up imaging demonstrated complete resolution of her ventricular dysfunction. This case highlights the importance of considering Tako-Tsubo syndrome in the differential diagnosis of patients presenting with symptoms of acute coronary syndrome and underscores the need for prompt diagnosis and management of this potentially life-threatening condition.

Keywords: Tako-Tsubo, ischemic cardiomyopathy, ST elevation, stress cardiomyopathy.

Introduction:

Takotsubo cardiomyopathy (TTC) is a reversible form of left ventricular dysfunction that typically occurs in response to emotional or physical stressors (1). TTC was first described in Japan in the early 1990s, and its name is derived from the Japanese word for an octopus trap, as the shape of the left ventricle during TTC resembles the trap (2). The exact pathophysiology of TTC is still not fully understood, but it is thought to be related to sympathetic overstimulation and subsequent myocardial stunning (3). TTC is more common in postmenopausal women, although it has been reported in men and younger women (4). The diagnosis of TTC can be challenging, and a high clinical suspicion is necessary to distinguish it from acute coronary syndrome (5).

Case presentation:

A 58-year-old female with no significant past medical history presented to the emergency department with sudden-onset chest pain, shortness of breath, and diaphoresis. Electrocardiography showed ST-segment elevation in leads DI, V2-V6 with ST depression in lead DIII and aVF (Figure 1), and troponin was elevated at 3.2 ng/mL.

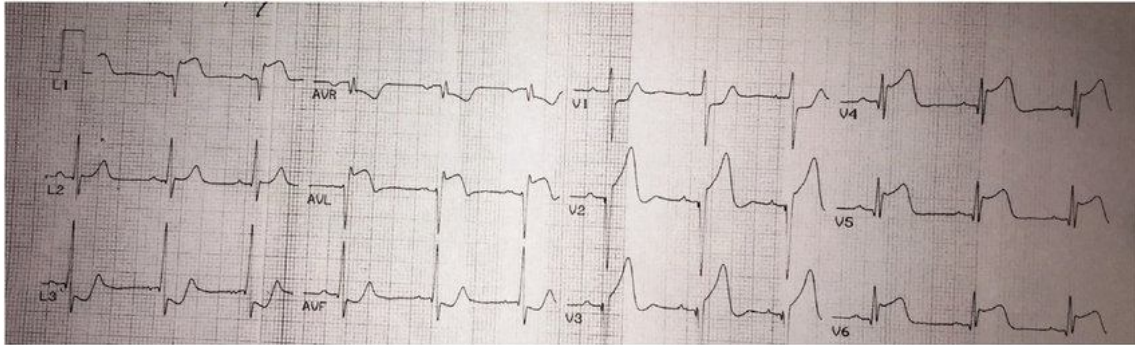


Figure 1: Electrocardiogram of the patient showing ST-segment elevation in leads DI, V2-V6 with ST depression in lead DIII and aVF.

The patient was diagnosed with acute myocardial infarction, and emergent coronary angiography was performed, which showed no obstructive coronary artery disease (Figure 2). Transthoracic echocardiography showed characteristic apical ballooning of the left ventricle with hyperkinesis of the basal segments, consistent with Tako-Tsubo syndrome (Figure 3).

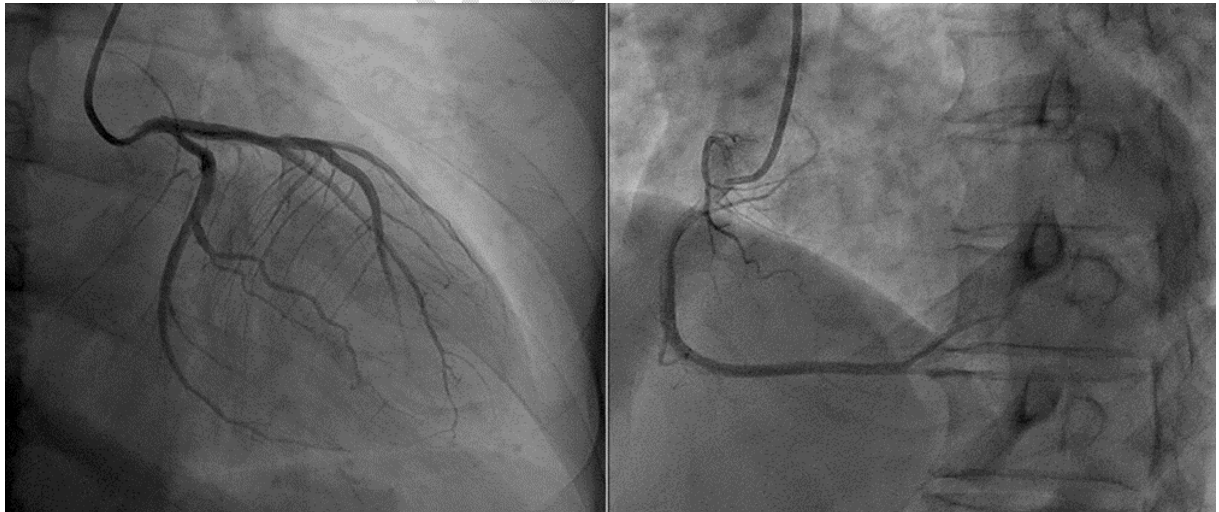


Figure 2: coronary angiography of the patient showing normal coronary arteries.

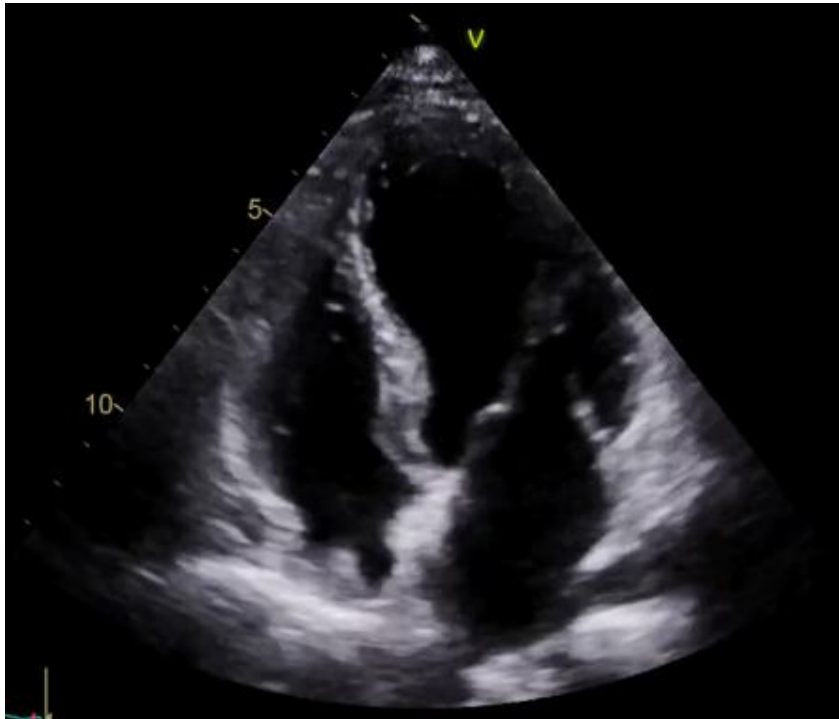


Figure 3: Transthoracic echocardiography demonstrating characteristic apical ballooning of the left ventricle.

The patient was managed with supportive care and beta-blocker therapy, and her symptoms improved gradually over the next few days. Follow-up imaging showed complete resolution of her ventricular dysfunction, with normalization of left ventricular ejection fraction. The patient was discharged with instructions to follow up with her primary care physician and to avoid triggers for stress.

Discussion:

The diagnosis of TTC can be challenging, and a high clinical suspicion is necessary to distinguish it from acute coronary syndrome. Electrocardiography typically shows ST-segment elevation or T-wave inversion in the precordial leads, which can mimic acute ST-elevation myocardial infarction (6). However, unlike acute coronary syndrome, TTC is characterized by the absence of obstructive coronary artery disease on coronary angiography (7). Echocardiography can be particularly useful in the diagnosis of TTC, as it can show the characteristic transient left ventricular dysfunction and absence of significant valvular disease or ventricular hypertrophy (8).

The exact pathophysiology of TTC is still not fully understood, but it is thought to be related to sympathetic overstimulation and subsequent myocardial stunning. This leads to the

characteristic appearance of a transient ballooning of the left ventricle, similar in shape to a Japanese octopus trap, on echocardiography or left ventriculography (3). Emotional stressors, such as grief, anger, and fear, are commonly reported triggers, but physical stressors, such as surgery and medical illnesses, can also precipitate TTC (9).

Management of TTC is primarily supportive, and patients typically recover from ventricular dysfunction within weeks to months. However, in some cases, complications such as heart failure, arrhythmias, and cardiogenic shock can occur and may require more aggressive management. In such cases, mechanical circulatory support or extracorporeal membrane oxygenation may be considered (10). Beta-blockers and angiotensin-converting enzyme inhibitors are commonly used to prevent recurrent TTC episodes (11).

conclusion:

Tako-Tsubo syndrome is a rare and often underdiagnosed condition that can present with symptoms similar to acute coronary syndrome. Prompt recognition and diagnosis of this condition is important to avoid unnecessary invasive procedures and to provide appropriate management, which is primarily supportive. This case highlights the importance of considering Tako-Tsubo syndrome in the differential diagnosis of patients presenting with symptoms of acute coronary syndrome, and the need for further research to better understand its pathophysiology and optimal management.

References:

1. Templin C, Ghadri JR, Diekmann J, et al. Clinical features and outcomes of Takotsubo (stress) cardiomyopathy. *N Engl J Med*. 2015;373(10):929-938.
2. Dote K, Sato H, Tateishi H, et al. Myocardial stunning due to simultaneous multivessel coronary spasms: a review of 5 cases. *J Cardiol*. 1991;21(2):203-214.
3. Lyon AR, Bossone E, Schneider B, et al. Current state of knowledge on Takotsubo syndrome: a Position Statement from the Taskforce on Takotsubo Syndrome of the Heart Failure Association of the European Society of Cardiology. *Eur J Heart Fail*. 2016;18(1):8-27.
4. Ghadri JR, Wittstein IS, Prasad A, et al. international expert consensus document on Takotsubo syndrome (Part II): diagnostic workup, outcome, and management. *Eur Heart J*. 2018;39(22):2047-2062.
5. Y-Hassan S. Takotsubo cardiomyopathy: a review. *J Card Fail*. 2016;22(8):639-646.
6. Sharkey SW, Lesser JR, Menon M, et al. Spectrum and significance of electrocardiographic patterns, troponin levels, and thrombolysis in myocardial infarction frame count in patients with stress (takotsubo) cardiomyopathy and comparison to those in patients with ST-elevation anterior wall myocardial infarction. *Am J Cardiol*. 2008;101(12):1723-1728.

7. Bybee KA, Kara T, Prasad A, Lerman A, Barsness GW, Wright RS, Rihal CS. Systematic review: transient left ventricular apical ballooning: a syndrome that mimics ST-segment elevation myocardial infarction. *Ann Intern Med.* 2004;141(11):858-865.
8. Eitel I, von Knobelsdorff-Brenkenhoff F, Bernhardt P, et al. Clinical characteristics and cardiovascular magnetic resonance findings in stress (takotsubo) cardiomyopathy. *JAMA.* 2011;306(3):277-286.
9. Ghadri JR, Cammann VL, Napp LC, et al. Differences in the clinical profile and outcomes of typical and atypical takotsubo syndrome: data from the International Takotsubo Registry. *JAMA Cardiol.* 2016;1(3):335-340.
10. El-Battrawy I, Behnes M, Hillenbrand D, et al. Prevalence, clinical characteristics, and predictors of patients with thromboembolic events in takotsubo cardiomyopathy. *Clin Cardiol.* 2019;42(2):219-225.
11. Kurisu S, Sato H, Kawagoe T, et al. Tako-tsubo-like left ventricular dysfunction with ST-segment elevation: a novel cardiac syndrome mimicking acute myocardial infarction. *Am Heart J.* 2002;143(3):448-455.

UNDER PEER REVIEW