



Dynamic Left Ventricular Outflow Tract Obstruction: A Potential Complication of Takotsubo Cardiomyopathy

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ABSTRACT

Takotsubo cardiomyopathy is characterized by a clinical presentation similar to those of acute coronary syndrome and nonobstructive coronary arteries. This syndrome is triggered by physical or mental stress and is sometimes accompanied by left ventricular outflow tract (LVOT) obstruction. Takotsubo cardiomyopathy is caused by a hyperdynamic basal portion of the left ventricle. Detecting LVOT obstruction is important to initiate targeted treatment. Beta blockers and fluid resuscitation are the primary therapies used to decrease the LVOT gradient. Inotropic agents and nitrates should be avoided to prevent increasing the level of LVOT obstruction. Clinicians should keep dynamic LVOT obstruction in mind when evaluating patients with Takotsubo syndrome. Transthoracic echocardiography is an essential and practical method to diagnose this complication.

Key Words: Apical ballooning; left ventricular outflow tract obstruction; Takotsubo syndrome

Dinamik Sol Ventrikül Çıkış Yolu Obstrüksiyonu: Takotsubo Kardiyomiyopatisinin Potansiyel Komplikasyonu

ÖZET

Takotsubo kardiyomiyopatisi, akut koroner sendroma benzer klinik tablo ve obstrüktif olmayan koroner arterler ile karakterizedir. Bu sendrom fiziksel ya da zihinsel stres tarafından tetiklenir. Sol ventrikül çıkış yolu (LVOT) obstrüksiyonu bazen Takotsubo sendromuna eşlik eder. Bu fenomene sol ventrikülün hiperdinamik bazal kısmı neden olur. LVOT obstrüksiyonunu tespit etmek, hedefe yönelik tedaviyi başlatmak için önemlidir. Beta-blokerler ve sıvı restitasyonu LVOT gradyanını azaltan ana tedavi yöntemidir. LVOT obstrüksiyonunun artmasını önlemek için inotropik ajanlardan ve nitratlardan kaçınılmalıdır. Klinisyenler, Takotsubo sendromu hastalarını değerlendirirken dinamik LVOT obstrüksiyonunu akılda tutmalıdır. Transtorasik ekokardiyografi bu komplikasyonu teşhis etmek için temel ve pratik bir araçtır.

Anahtar Kelimeler: Apikal balonlaşma; sol ventrikül çıkış yolu obstrüksiyonu; Takotsubo sendromu

INTRODUCTION

Takotsubo cardiomyopathy (TTC) is triggered after a stressful physical or mental event and is characterized by left ventricular apical ballooning without coronary artery stenosis. Apical ballooning may be accompanied by hyperkinetic basal segments, which cause left ventricular outflow tract obstruction (LVOT)⁽¹⁾. Dynamic LVOT obstruction can be seen in 15% to 25% of patients with TTC. Detection of LVOT obstruction is important to determine the treatment process. In this case report, we present the concomitance of dynamic LVOT obstruction and Takotsubo syndrome.

CASE REPORT

A 56-year-old woman was admitted to the emergency service with the sudden onset of chest pain. Electrocardiography (ECG) revealed no ST-segment elevation (Figure 1). The patient's vitals were: heart rate, 120/bpm; blood pressure, 106/68 mmHg; and blood oxygen level, 96%. Physical examination did not reveal significant findings other than a midsystolic murmur at the right second intercostal space. Laboratory findings revealed an elevated troponin T level of 0.143 (cutoff, 0.014). Transthoracic echocardiography (TTE) showed hypokinetic mid and apical segments, with hyperkinetic basal segments of the left ventricle (Figure 2). Color doppler TTE demonstrated mild mitral regurgitation without systolic

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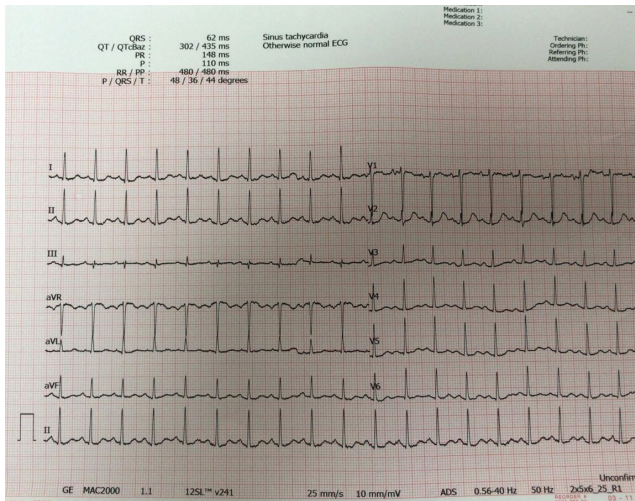


Figure 1. Electrocardiography revealed only sinus tachycardia with otherwise normal findings.

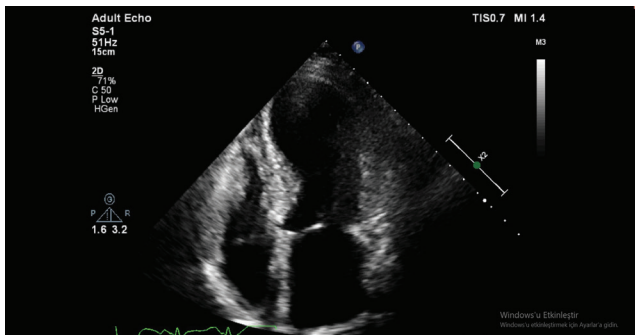


Figure 2. Transthoracic echocardiography demonstrated apical ballooning of the left ventricle.

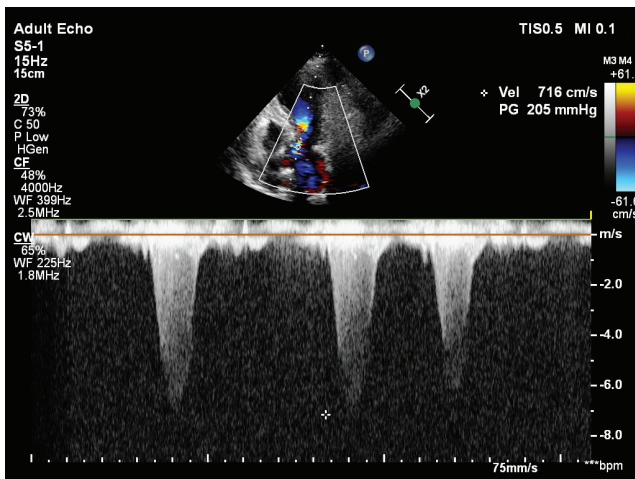


Figure 3. Transthoracic echocardiography color Doppler imaging revealed a 205 mmHg gradient at the left ventricular outflow tract.

anterior motion. LVOT turbulence was detected on TTE. The LVOT maximal gradient was measured at 205 mmHg, which is excessively high without systolic anterior motion or asym-

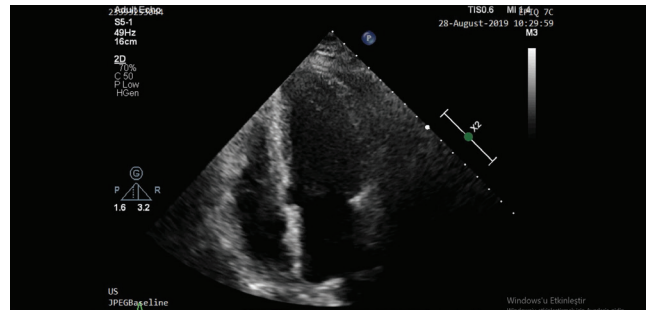


Figure 4. Transthoracic echocardiography revealed the disappearance of apical ballooning and restoration of left ventricular function.

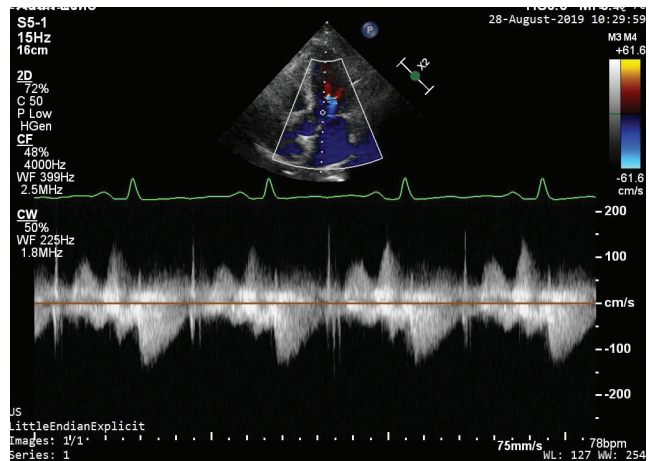


Figure 5. Transthoracic echocardiography color Doppler imaging showed a normal left ventricular outflow tract gradient after treatment.

metric septal hypertrophy (Figure 3). Coronary angiography was performed and detected normal epicardial coronary arteries. The patient was transferred to the intensive care unit where fluid resuscitation and beta blocker treatment were initiated to decrease the LVOT gradient. After 3 days, the patient’s hemodynamic parameters were stable. At this time, control TTE images were obtained. TTE revealed improved left ventricular function with only mild apical hypokinesia (Figure 4). TTE Color Doppler images showed a disappearance of LVOT turbulence and a normal LVOT gradient (Figure 5). The patient was discharged without any symptoms.

DISCUSSION

TTC is characterized by apical ballooning as a response to the catecholamine surge caused by a stressful event⁽¹⁾. ECG changes often present; however, ECG may sometimes be inconclusive. Elevated cardiac biomarkers are usually present. Coronary angiography is essential to differentiate TTC from acute coronary syndrome⁽²⁾.

Dynamic LVOT obstruction can be seen in 15% to 25% of TTC cases, and hyperkinetic basal segments cause outflow obstruction⁽³⁾. In addition, moderate to severe mitral regurgi-

tation, hypotension, and cardiogenic shock are more common in TTC patients with dynamic LVOT obstruction⁽⁴⁾. Dynamic outflow obstruction should be treated to prevent further hypotension and cardiogenic shock. The suggested treatment is beta-blockers combined with fluid replacement⁽⁵⁾. Increased preload decreases the level of outflow obstruction by increasing outflow tract and left ventricular size. Beta-blockers provide regression in hyperkinesia of basal segments and could decrease the gradient by reducing the heart rate and increasing LV filling and size⁽⁵⁾. Inotropic agents and nitrates should be avoided to prevent further deterioration in patients with LVOT obstruction. Detecting LVOT obstruction is very important for the initiation of targeted treatment in TTC patients. Clinicians should keep LVOT obstruction in mind in these patients. Fluid resuscitation and beta blocker treatments are essential. Because latent LVOT obstruction may be present in these patients, patients should be evaluated for latent LVOT obstruction after an acute event⁽³⁾. In this case report, we aimed to underline the importance of dynamic LVOT obstruction in apical ballooning syndrome as well as targeted treatment to prevent further deterioration.

Informed Consent: Written informed consent was obtained from the patient who participated in this study.

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Conflict of Interest: The authors have no conflict of interest to declare.

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