

# A Case of Recurrent Takotsubo Cardiomyopathy

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## Abstract

Takotsubo cardiomyopathy is an uncommon etiology of cardiac chest pain. Classically it occurs in post-menopausal women undergoing emotional stress. Clinical characteristics include cardiac enzyme elevation, electrocardiogram changes, apical wall motion abnormalities, left ventricular dysfunction and normal coronary artery angiogram. The abnormal wall motion recovers in a few months. Typical treatment is medical management until resolution of symptoms with angiotensin converting enzyme inhibitors and beta blockers. Recurrence is documented, but is an extremely rare finding. Here we report a case of a woman who had a recurrence of takotsubo cardiomyopathy nine months after her first encounter, both due to an emotional stressor.

## Keywords

Cardiomyopathy; Heart Failure; Takotsubo Cardiomyopathy; Stress Induced Cardiomyopathy; Echocardiogram

## Abbreviations

TCM: Takotsubo Cardiomyopathy

ACS: Acute Coronary Syndrome

ECG: Electrocardiogram

EF: Ejection Fraction

LV: Left Ventricle

TTE: Transthoracic Echocardiogram

LVEF: Left Ventricular Ejection Fraction

LHC: Left Heart Catheterization

ACE: Angiotensin-Converting Enzyme

ARB: Angiotensin Receptor Blockers

## Introduction

Takotsubo cardiomyopathy (TCM), stress cardiomyopathy, broken heart syndrome, or transient left ventricular apical ballooning syndrome has an uncertain prevalence. It typically occurs in post-menopausal women and may account for up to 2.5% of all patients with acute coronary syndrome (ACS) symptoms [1, 2, 3, 4]. Although a small fraction of patients have no identifiable trigger, TCM is most commonly preceded by an emotional or physical stressor [1, 3, 4, 5].

The most common presenting symptom of TCM is chest pain, followed by dyspnea [2, 3, 4]. Patients often have electrocardiogram (ECG) abnormalities that are large in magnitude, most commonly ST segment elevations in the

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pre-cordial leads and T wave inversions [3, 4, 5]. Elevated cardiac enzymes are also a common feature, occurring in 86.2% of cases [3, 5]. On echo cardiogram TCM typically presents with marked left ventricular dysfunction that is in a greater distribution than that of a single coronary vessel, however cardiac catheterization typically show normal coronary vessels [1, 2, 3, 5]. What further characterizes TCM is the recovery of EF within days to weeks, with an average EF at follow-up ranging from 60-76% [3, 5]. The treatment for TCM is largely supportive and recurrence is rare. Here we present a unique case of recurrent TCM with variable presentation whose initial episode was treated to resolution with the current-day standard of treatment.

### Case Presentation

This case involves a 65 year-old Caucasian never-smoker female with a medical history significant for Type 2 diabetes mellitus and hyperlipidemia who presented to her primary care provider with palpitations and shortness of breath of several days duration. The palpitations were described as intermittent and worse with exertion. She denied any chest pain during these episodes. Incidentally, a few days prior to symptom onset, she reports feeling intense distress discovering her injured husband on the floor surrounded by a mild amount of blood after he fell in their kitchen. Family history was notable for diabetes and coronary heart disease in her grandparents diagnosed in their seventh decade. An ECG was done which showed diffuse t-wave inversions and a troponin was found to be 1.6 ng/m (reference range: 0.000-0.040 ng/m). She was thought to have a non-ST elevation myocardial infarction and was emergently referred to the hospital. On arrival, she was hemodynamically stable. Serial troponins peaked at 1.6 ng/ml. ECG showed sinus rhythm with anterolateral T-wave inversions. She was treated with aspirin, metoprolol 12.5 mg twice a day, enalapril 5 mg twice a day, and started on a heparin drip for a presumed non-ST elevation myocardial infarction. She underwent a left heart catheterization (LHC) showing non-obstructed coronary vessels. A left ventricle (LV) ejection fraction was calculated to 45% by ventriculogram. There were also wall motion abnormalities consistent with Takotsubo pathophysiology as follows: mild LV dilation, LV dyskinesia at the anterior, apical, and distal inferior walls; and a hyperdynamic base. A transthoracic echocardiogram (TTE) was checked during the same admission and corroborated the LV morphology as seen on LHC. She was discharged the following day with instructions to continue

her home insulin, and continue enalapril and metoprolol as above and her symptoms resolved. A 6-week follow-up TTE revealed a LV ejection fraction (LVEF) of 60%, no LV dilation, and no wall motion abnormalities consistent with resolution of her Takotsubo cardiomyopathy. She was instructed to discontinue her enalapril and metoprolol and remained symptom-free until her second episode.

Nine months after her initial presentation, the patient and her husband traveled to gather with family as they were mourning the unexpected death of the patient's brother-in-law. During this visit, the patient noted the sudden onset of retrosternal chest tightness, non-radiating, intermittent, nonexertional but positively associated with palpitations. She then presented to the Emergency Department for further evaluation. On arrival, she was tachycardic to 101 beats per minute, but vitals were otherwise normal. Serial troponins peaked at 5.936 ng/ml. An ECG showed sinus rhythm with early repolarization in the precordial leads. A TTE showed an LVEF of 35-40%, midto-apical akinesis and an LV outflow tract gradient of 45 mmHg.

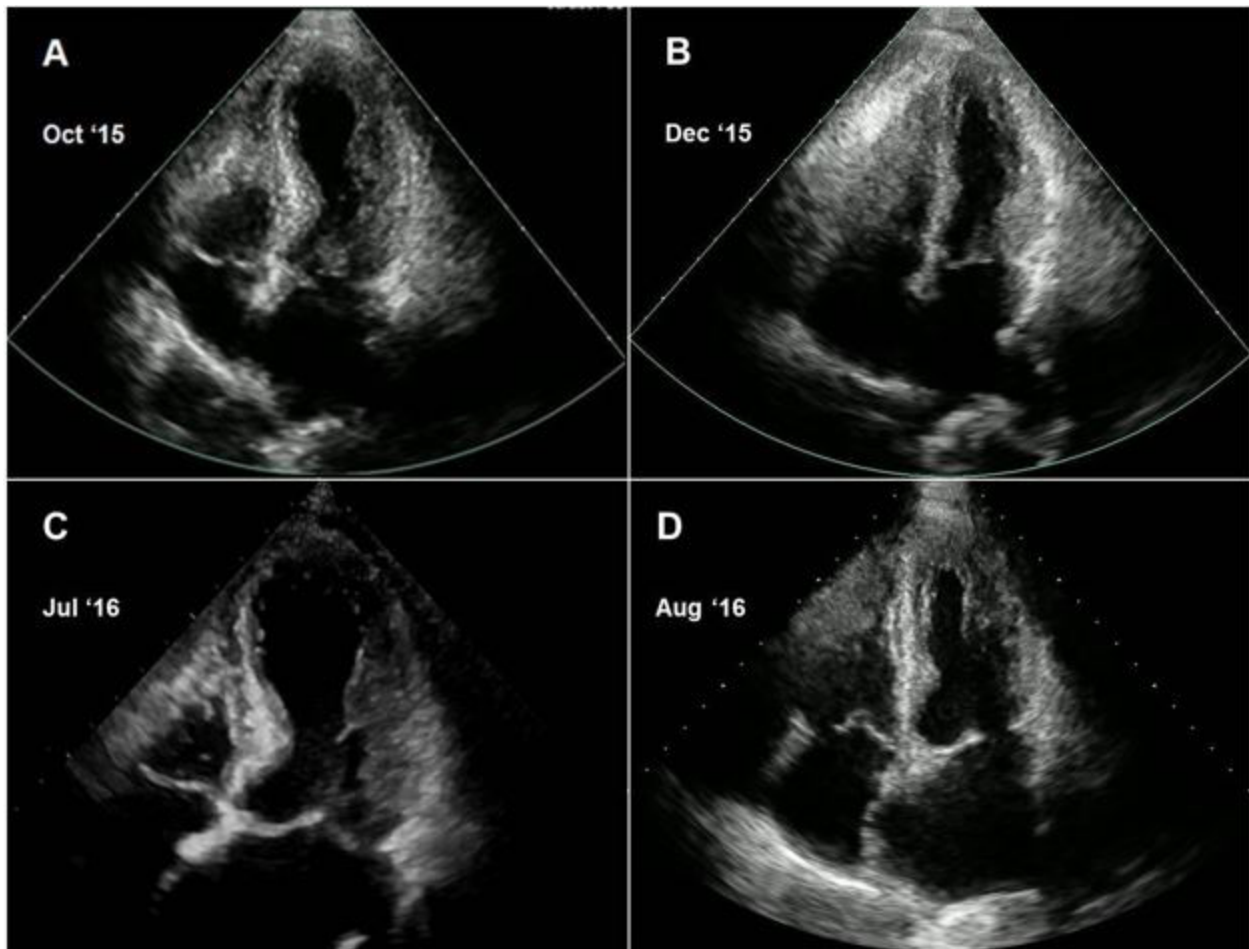
Given the patient's known history of Takotsubo's cardiomyopathy and similar presentation, she was thought to have a recurrent event, thus a repeat LHC was not obtained. She was placed on aspirin 81mg daily, lisinopril 2.5mg daily, metoprolol 12.5mg daily, and pravastatin 40mg daily. Her symptoms resolved under a 48-hour observation and she was discharged with instructions to continue the medications until otherwise instructed by her home cardiologist. She returned home, underwent a follow-up echo cardiogram 4 weeks after discharge that revealed an LVEF of 55% with no wall motion abnormalities and reported no symptom recurrence consistent with resolution of her second episode.

### Discussion

Recurrence of TCM is a rare phenomenon making the incidence difficult to determine [1, 2, 3, 4, 5, 6]. Individual reports of incidence have been highly variable with ranges from 1.5-10% [1, 2, 4, 5, 6]. Systematic reviews estimate recurrence rates of 1.5- 3.5%. Of note, they also found that the cumulative incidence of recurrence increased from 1.2% at the first six months, to nearly 5% at 6 years [4].

Recurrence occurs primarily in women and more commonly after TCM episodes associated with severe left ventricular dysfunction [4]. Singh demonstrated that patients with recurrence commonly have a significantly lower

**Figure 1.** Serial Transthoracic Echocardiogram images demonstrating Takotsubo Cardiomyopathy onset (A,C) and resolution (B,D). All images obtained in four-chamber view during end systole.



LVEF during the first episode of TCM, compared to their counterparts that did not experience recurrence [4]. Interestingly, several case studies have shown that the a physical or emotional stress or precipitating recurrence can be different between episodes [4, 6] as we observed in our case.

The most effective treatment for TCM is currently unknown due to the lack of case-control trials. Therefore, TCM is often treated supportively. TCM patients are most commonly discharged on antiplatelet medications, angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARB), and beta adrenergic antagonists [4]. It has been demonstrated that TCM subjects treated with an ACE inhibitor experience lower mortality rates than those who did not receive therapy [7].

However, there is little data to suggest whether treatment with these agents protects against recurrence. In fact, there have been several case studies of recurrent TCM

in subjects who were previously treated with or were taking an ACE inhibitors, aspirin, and beta-blockers at the time of their recurrence [6, 8]. The meta-analysis performed by Singh, however, found a negative correlation between the use of an ACE inhibitor/ARB and rate of TCM recurrence [4, 8]. There was no significant association between the rate of recurrence and use of beta-blocker medication. Brunetti re-assessed the Singh data accounting for population weighted meta-analysis regression and found similar results [4]. ACE inhibitors/ARBs are thought to reduce recurrence by either reducing sympathetic activity, through interaction with the renin-angiotensin system, or through anti-inflammatory effects on myocardium [4]. The efficacy of ACE inhibitors/ARBs shows some potential, but more data will need to be collected to determine if they do indeed prevent recurrence. Specific agents, dosing, and duration will also need to be clarified as our case demonstrates a treatment duration of less than 4 weeks

with an ACE inhibitor was not successful in preventing recurrence

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## Conclusion

Our patient had two separate episodes of significant LV dysfunction and clinical findings consistent with TCM. This patient was interesting in that her clinical presentations were variable. In the first episode, her presenting symptom was dyspnea; while in her second episode chest pain was her presenting and only symptom. Her case is also unique because her first episode was treated with an ACE inhibitor/ARB to resolution, yet she still experienced a recurrence. This finding indicates that treatment of an initial TCM episode with an ACE inhibitor/ARB does not preclude recurrence and raises the question as to whether TCM subjects should be kept on ACE inhibitor/ARB treatment permanently, rather than to resolution of the initial episode, to prevent recurrence.

## References

1. Hefner J, Csef H, Frantz S, et al. (2015) Recurrent Takotsubo cardiomyopathy (TTC) in a premenopausal woman: late sequelae of a traumatic event. *BMC Cardiovasc Disord* 15: 3.
2. Lagan J, Connor V, Saravanan P (2015) Takotsubo cardiomyopathy case series: typical, atypical and recurrence. *BMJ Case Rep* 208741.
3. Gianni M, Dentali F, Grandi A, et al. (2006) Apical ballooning syndrome or takotsubo cardiomyopathy: a systematic review. *Eur Heart J* 27: 1523-1529.
4. Singh K, Carson K, Usmani Z, et al. (2016) Systematic review and meta-analysis of incidence and correlates of recurrence of takotsubo cardiomyopathy. *Int J Cardiol* 174: 696-701.
5. Pathak H, Esses J, Pathak S, et al. (2010) A unique case of recurrent takotsubo cardiomyopathy. *South Med J* 103: 805-806.
6. Opolski G, Budnik M, Kochanowski J, et al. (2016) Four episodes of takotsubo cardiomyopathy in one patient. *Int J Cardiol* 203: 53-54.
7. Brunetti N, Santoro F, Gennaro L, et al. (2016) Drug treatment rates with beta-blockers and ACE-inhibitors/angiotensin receptor blockers and recurrences in takotsubo cardiomyopathy: A meta-regression analysis. *Int J Cardiol* 214: 340-342.
8. Peters, Stefan (2016) Stress-related takotsubo cardiomyopathy despite “optimal” medical therapy. *Int J Cardiol* 218: 284.