



Gastrointestinal Pain Suspected a Stressor Leading to the Onset of Takotsubo Cardiomyopathy: A Case Report

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Authors' contributions

This work was carried out in collaboration between all authors. Author RS designed and overlooked this study, provided the case and images, and performed revisions. Authors WA, DC and MD performed analysis of medical records and literature review and collaborated to write and revise all drafts and author SD is the senior author of the paper. All authors read and approved the final manuscript.

Case Study

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ABSTRACT

Aims: To investigate a case of the mid-ventricular variant of Takotsubo cardiomyopathy (TTC), stress-induced cardiomyopathy, and evaluate if gastrointestinal pain may also contribute to this cardiomyopathy.

Presentation of Case: A 73-year-old female was admitted for severe abdominal pain, found to have positive cardiac biomarkers and ischemic ECG changes and was diagnosed with mid-ventricular TTC after non-invasive and invasive investigation.

Discussion: There are many variants of TTC that was found in a literature review. We demonstrated a unique variant of TTC that occurred of a significant emotional stressor with acute abdominal pain.

Conclusion: Not much detail is known about the variants TTC. Investigators must continue to study TTC so that physicians can more effectively diagnose, treat, and manage patients who present the condition. We suspect that gastrointestinal illness was the physical stressor that contributed to the onset of our patients TTC in a setting of ongoing emotional distress and should be on the differential as an etiology.

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1. INTRODUCTION

Takotsubo cardiomyopathy (TTC), also known as stress-induced cardiomyopathy and “broken heart syndrome” has become an increasingly established diagnosis since it was first documented in Japan about twenty years ago [1]. TTC is a reversible form of cardiomyopathy generally after an emotionally stressful event. The disease is most prevalent in post-menopausal women (classically aged 50-79) and typically occurs after psychological stress; followed by chest pain or dyspnea [2,3]. They present as myocardial infarction, including ischemic ECG changes, positive cardiac biomarkers and severe left ventricle dysfunction.

It has been speculated that the various forms of TTC can be attributed to different combinations and severity of physical and or psychological stress [4]. The classical case of TTC presents clinically as an acute coronary syndrome with left ventricular (LV) systolic dysfunction, hyperkinetic base and hypokinetic apex leading to apical ballooning. Other less common variants of TTC may present with ballooning in the mid-ventricular and antelateral regions [5]. The key differences in presentation among the variant and classical cases is that in mid-ventricular TTC there is a hyperkinetic apex, and in antelateral TTC there is no left ventricle contractile pattern [6,7]. We present an interesting case of a patient with severe abdominal pain with ongoing emotional distress leading to mid-ventricular variant of TTC.

2. PRESENTATION OF CASE

A 73-year-old female with hypertension, dyslipidemia and smoking history presented to emergency department with severe, diffuse non-specific abdominal pain for 5 days. Patient describes the abdominal pain as constant, non-radiating, diffusely throughout abdomen with severe constipation. Upon admission she was found to have ischemic electrocardiogram abnormalities Fig. 1 and elevated troponins. On exam heart was regular, no murmurs appreciated. Her abdomen was soft, but distended; no rebound or guarding. Cardiology was consulted after these findings, however given her severe abdominal pain and hemodynamic stability cardiac work-up was kept on hold. She continued to complain of severe constipation associated with nausea most of the day and was unable to lay still thus postponing further cardiac work up. She was found to have mildly elevated lactic acid and an infectious work-up was initiated. Echo at admission revealed severe systolic dysfunction, with severe segmental impairment and ejection fraction 25-30%. There was severe akinesis of the mid to distal intraventricular septum, anterior and inferior walls. Patient was started on appropriate heart failure medications with beta blockers and ace inhibitor therapy.

GI work up for bleed and infectious etiology was negative; and abdominal ultrasound revealed mild thickening of gall bladder. Her acute GI pain resolved with IV hydration and proper bowel regimen. It was assumed that her GI discomfort may be secondary to chronic constipation given it resolved after conservative management. A heart catheterization was preformed after GI work up was complete because patient continued to have ongoing atypical chest pain. It revealed normal coronaries with mild luminal irregularities, severely impaired left ventricular systolic function and akinesis in the mid ventricle suggesting a mid-variant Takotsubo Figs. 3 and 4. At this time patient was optimized medically for her cardiomyopathy with appropriate cardiac medications. After cardiac catheterization we

further investigated the patients history and she admitted to have a lot of stress at home regarding financial problems with her family that has been ongoing for months. Several weeks later, after being on the appropriate medications a follow up echocardiogram revealed preserved LV systolic function with ejection fraction 55-60%. Her repeat ECG was negative for ischemic changes (Fig. 2). She had recovered from the stress-induced cardiomyopathy.

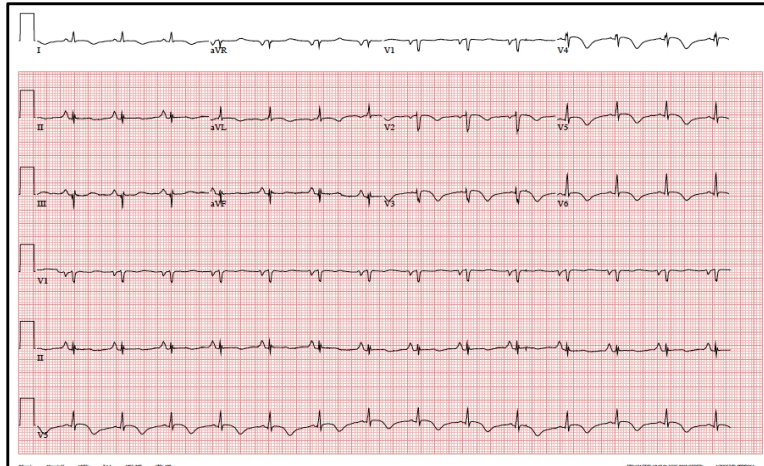


Fig. 1. EKG reveals normal sinus rhythm with diffuse T-wave inversion in anterior and anterolateral leads

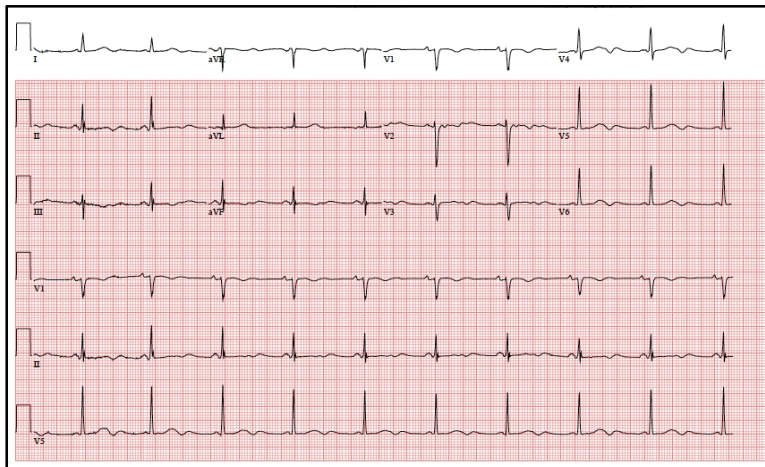


Fig. 2. EKG reveals normal sinus rhythm with ST T wave abnormalities but improved from initial EKG

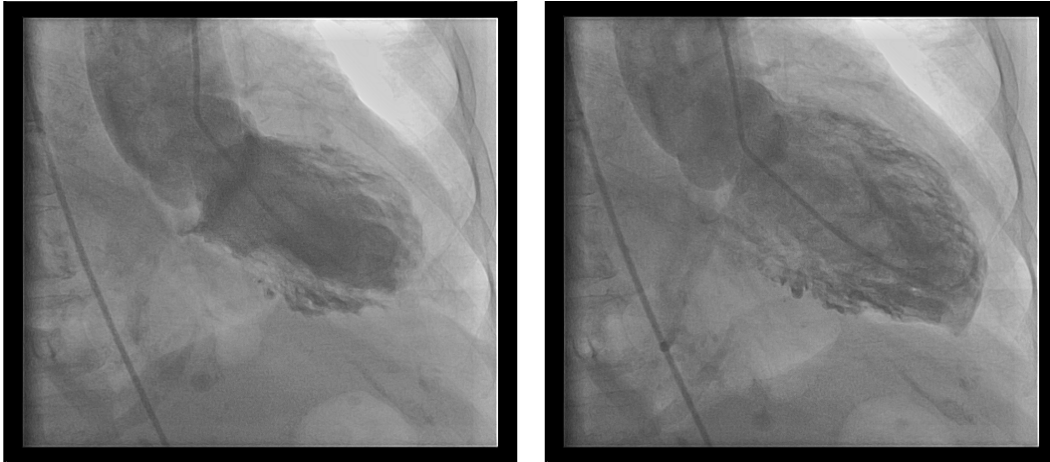


Fig. 3. (on left) Left ventricle during systole, with apical contraction and mid ventricle akinesis. Fig. 4 (on right) Left ventricle during diastolic filling

3. DISCUSSION

The occurrence of TTC in the United States from a data of 2008 found that in women there was .0052% and the chance of developing TTC than in men that was a .0006% chance [3]. TTC can present with various conditions and levels of severity. Fortunately, in most instances TTC is reversible and normalizes after a few weeks [8]. Prior documented clinical trials have reported other variants of TTC including: ballooning has occurred in the postero-basal (1%), basal +mid-ventricular (1%), diaphragmatic (2%), localized apical (2%), antero-lateral (11%), and complete mid-ventricular regions of the left ventricle (29%) [5]. Little is known about the underlying mechanisms that contribute to the variation seen in TTC.

Approximately 85% of TTC cases are correlated with severe physical or emotional stress [9]. In addition to our patient's emotional problems she also presented with severe abdominal pain associated with constipation and nausea. We suspect that her abdominal pain also contributed in the development of TTC. After a literature review we found abdominal pain is a rare stressor but can be the suspected cause of TTC in a setting of underlying emotional distress which was described in our patient [10].

The underlying pathophysiology of TTC is generally unknown. However, patients exhibiting hyperlipidemia, smoking, alcohol abuse, anxiety state, depression, and stress have been found to have significantly increased chances of developing TTC [3]. Typical TTC patients also exhibit significantly elevated levels of catecholamine, which has been associated with myocardial damage [4,11,12]. In animal models, overstimulation of cardiac adrenergic receptors has led to transient left ventricle hypokinesia [11-14]. Although rare, TTC can develop from a wide range of causes, ranging from organ transplantation to severe burns, thus contributing to the unknown pathophysiology of TTC [15].

In order to diagnose a patient with TTC, certain criteria should be met. The criteria typically found in a patient with TTC include transient akinesia or dyskinesia of the left ventricular apical and midventricular segments with regional wall motion abnormalities beyond a single

epicardial vascular distribution. Also, the patient typically will show frequent emotional or physical stress preceding the symptoms, ST segment elevation or inverted T-waves on the ECG, non-critical coronary artery disease on cardiac catheterization [2,16].

Short and long-term prognosis of TTC is generally favorable and death is an uncommon outcome with TTC if managed appropriately [17]. Given that TTC typically normalizes within a few weeks, the specific treatment is not well defined and patients are generally treated conservatively and symptomatically for LV systolic dysfunction. Other treatment options are still in further investigation.

4. CONCLUSION

Our case was interesting because of the specific variant of TTC with both a combination of ongoing emotional stressor and more acute abdominal pain with constipation contributing to the cardiomyopathy. This patient fulfilled all the criteria for TTC for diagnosis. The underlying mechanisms of mid-ventricular TTC are still not well understood but it's assumed to be similar to the typical apical variant of TTC. We believe that significant gastrointestinal pain along with intense emotional distress contributed to our patients TTC.

CONSENT

General consent of the patient was obtained during initial admission.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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