

An Unusual Case of Recurrent Takotsubo Cardiomyopathy in a Patient without Obvious Trigger

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Abstract

We present a 76 years old lady who presented with a total of four episodes of Takotsubo Cardiomyopathy (TC) over the last 15 years. Her first presentation was in 2006 and she had further admissions for the same problem over the next 10 years. Each time she presented with chest pain and ECG changes and had normal coronary angiogram despite having echocardiography and electrocardiogram (ECG) changes. She had raised troponin levels on each presentation. She had coronary angiogram on the previous three occasions and computerized tomography scan of coronary arteries (CTCA) in this admission that was normal. She described her chest pain as 8/10 on severity scale, had elevated troponin of 111 and 152. ECG showed left bundle branch block and biphasic T waves in leads V2-V6. She was treated for Acute Coronary Syndrome (ACS) and had normal CTCA and was diagnosed with fourth episode of takotsubo cardiomyopathy.

Keywords: Computer tomographic coronary angiogram • Left bundle branch block • Acute coronary syndrome • Takotsubo cardiomyopathy

Introduction

Takotsubo also known as stress-induced cardiomyopathy is often caused by emotional stress. It is also known as broken heart syndrome or transient Left Ventricular (LV) apical ballooning syndrome and is a reversible cause of LV dysfunction [1]. Patients with this condition most commonly manifests as acute coronary syndrome and may have significant Electrocardiogram (ECG) changes at presentation. The condition is preceded by intense physical or psychosocial stress and typically recovers fully with conventional management. This condition accounts for 1–2% of patients presentation with possible Myocardial Infarction (MI) and the recurrence is less common. The recurrence rate has been reported as 5–6% at 6 years in only few patients [2,3]. Only a few cases of recurrent Takotsubo cardiomyopathy have been previously reported in literature [4,5]. It is crucial to recognize Takotsubo cardiomyopathy, as long-term therapy is not indicated in this condition as opposed to acute coronary syndrome. We describe key aspects of clinical presentation, diagnostic modalities and management of stress-induced cardiomyopathy.

Case Presentation

A 76 years old woman with a history of takotsubo cardiomyopathy, hypertension, hypothyroidism, overactive bladder and vertigo presented with severe central chest pain lasting for over 24 hours. She was sitting at the time when she developed chest pain and left shoulder pain. Pain was resolved with Glyceryl Trinitrate (GTN) spray and analgesia given in the Emergency Department (ED). She also noticed feelings of heaviness in her chest. She denied any emotional stress or any symptoms of being unwell. She was noted to have Left Bundle Branch Block (LBBB) on her ECG in the ED and was given treatment for Acute Coronary Syndrome (ACS) based on her ECG, raised

troponin and cardiac sounding chest pain. We noted from reviewing her old notes that LBBB was not new.

Her systemic examination was all normal except mild pedal oedema in both lower limbs. Her vital sign included Blood Pressure (BP) 165/80, Heart Rate (HR) 66 beats per minute (bpm), afebrile and oxygen saturation was 99% on room air.

Investigations

The initial investigations included blood, COVID 19 lateral flow and PCR and chest X-ray. Chest X-ray was normal and her ECG showed left bundle branch block (LBBB) and sinus bradycardia. Her initial troponin T level was 111 and repeat troponin T was 152. She had mildly low hemoglobin (Hb) 114 gm/l but her other blood markers were unremarkable. Her C-reactive protein (CRP) was <1. Her troponin on her previous admission for TC was 19 and 22, quite low in comparison to this episode and the previous episode was triggered by emotional stress.

Repeat ECG on day 2 showed biphasic T waves with LBBB and sinus bradycardia. Her echocardiogram showed normal cavity with normal thickness left ventricle (LV) and apical ballooning. She had global hypokinesia of LV and Left Ventricular Ejection Fraction (LVEF) was 45%. She had normal right ventricular systolic function and grade 1 diastolic dysfunction.

She had computerized tomography scan of coronary arteries on 9 of admission that showed focal eccentric calcification in the Left Anterior Descending Artery (LAD) but otherwise non-obstructive coronary artery disease. Left Circumflex Artery (LCx) was dominant artery.

Repeat ECG on day 9 showed of the biphasic T waves and troponin T came down to 41 and repeat focused echocardiogram showed improved LVEF to 50%. Another Transthoracic Echocardiogram (TTE) after a month showed LVEF to be 55% - 60%.

Differential diagnosis

The possible differential diagnosis of takotsubo cardiomyopathy includes acute coronary syndrome, pulmonary embolism and Takotsubo cardiomyopathy.

Acute coronary syndrome can present with chest pain, ECG changes and rise in troponin however the diagnosis is confirmed by presence of CAD on coronary angiogram or CTCA. This patient had non-obstructive coronaries and ruled out acute coronary syndrome.

Another possible differential diagnosis is pulmonary embolism and this

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Received: 23 October 2021, Manuscript No. jccr-21-45408; **Editor assigned:** 26 October 2021, PreQC No. P-45408; **Reviewed:** 20 March 2022, QC No. Q-45408; **Revised:** 25 March, 2022, Manuscript No. R-45408, **Published:** 31 March 2022, DOI: 10.4172/2165-7920.10001491

patient had high D-Dimer however she had a normal CTPA. There was also no evidence of AF or DVT in this patient to increase her DVT risk.

Another possible differential diagnosis is acute pericarditis that can present with ECG changes and raised troponin. Most patients usually have history of viral illness prior to the episode and Echocardiogram may show small pericardial effusion but left ventricular function is always preserved. This patient did not have pericardial effusion on echocardiogram and her LVEF was reduced.

Another possible differential diagnosis is myocarditis and patients usually have preceding viral illness. These patients mostly have mild to moderate LV impairment. Patients with myocarditis usually do not have significantly raised Erythrocyte Sedimentation Rate (ESR) and CRP unlike pericarditis patients who have raised CRP and ESR. They have normal angiogram however the left ventricular function takes slightly longer to recover compared to TC. This patient also did not have any COVID-19 vaccine recently or COVID-19 infection that has been associated with increased risk of myocarditis. This patient also did not meet the European Society of Cardiology (ESC) task force criteria for diagnosis of myocarditis.

The final differential diagnosis is of takotsubo cardiomyopathy, supported by her past medical history, normal CTCA, ECG changes which resolved over a week and improvement in LV function within 10 days [6].

Treatment

This patient was treated for acute coronary syndrome initially and was given aspirin 300 mg stat, clopidogrel 300 mg stat and fondaparinux 2.5 mg for 03 days, bisoprolol 2.5 mg once daily (OD), ramipril 2.5 mg OD and atorvastatin 80 mg once at night (ON). She was also given GTN spray initially for her chest pain and was continued on the other medications and her aspirin and clopidogrel dose was reduced to 75 mg OD. Her chest pain resolved and she was discharged home after the normal CTCA. Clopidogrel was stopped and atorvastatin dose was reduced to 40 mg OD on discharge. She showed good improvement and her LVEF returned back to normal after a month on follow up visit. As she had normal CTCA and her LVEF improved, a diagnosis of recurrent TC in view of her normal coronary arteries, previous episodes and the fact that ECG changes resolved and echocardiogram showed improvement of the LVEF. She was also given GTN spray initially for her chest pain and was continued on the other medications and her aspirin and clopidogrel dose was reduced to 75 mg OD. Her chest pain resolved and she was discharged home after the normal CTCA. Clopidogrel was stopped and atorvastatin dose was reduced to 40 mg OD on discharge. She showed good improvement and her LVEF returned back to normal after a month on follow up visit. As she had normal CTCA and her LVEF improved, a diagnosis of recurrent TC in view of her normal coronary arteries, previous episodes and the fact that ECG changes resolved and echocardiogram showed improvement of the LVEF.

Outcome and follow-up

At her one month follow up visit, she showed significant improvement and remains asymptomatic. Her LVEF has improved to 55- 60% and no regional wall motion abnormality (RWMA) was noted.

Discussion

TCM is also considered a myocardial infarction-like syndrome associated with chest pain with or without shortness of breath following emotional or physical stress and with reversible left ventricular systolic dysfunction of the septum, apical, anterior, posterior and lateral walls; however it has been reported in patients with no obvious trigger. A medication induced TC although rare but is a potential possibility and Zombia induced TC has been reported previously and the likely explanation for this is excessive sympathetic stimulation leading to catecholamine-induced micro vascular spasm or through

to direct myocardial toxicity [7]. ECG during the initial period might show changes consistent with myocardial ischaemia and echocardiography usually shows reduced LVEF and RWMA. Coronary angiogram or CTCA is always normal in these patients although it might show minor irregularities despite elevated troponin levels.

TC is more common in women compared to men and women account for 90% of cases of TC. The average age in these patients is 58-75 years and with only 3% of patients less than 50-years-old. Studies have shown that postmenopausal women are more likely to be affected by the condition due to oestrogen deficiency and altered catecholamine hormonal receptor sensitivity. The most plausible explanation for this sudden decline in LVEF is that intense emotional or physical stressors lead to a surge in catecholamine which can adversely affect myocardial contractility, resulting in transient myocardial dysfunction. The recurrence rate of TC is about 11.4% over four years after the first presentation and genetic predisposition has been reported for this disease as recurrence and occurrence is more common in first degree relatives [8, 9]. There is no obvious treatment for TC however beta blockers and angiotensin converting enzyme inhibitors (ACEI) have been found to be useful [10].

ECG findings can vary from ST segment elevation to diffuse precordial T wave inversion making it difficult to distinguish it from MI and our patient also had diffuse precordial T wave inversions. Echocardiography usually shows preserved LV function at the base and moderate to severe dysfunction in the mid portion and apical akinesia or dyskinesia and our patient had reduced LV function and global hypokinesia. Angiography or CTCA is always normal in these patients and our patient also had normal CTCA.

LV dysfunction usually recovers within few weeks with conservative treatment such as ACEI, beta blockers and diuretics if patients presented with pulmonary oedema. Research has shown that long term treatment with beta blockers, calcium channel blockers or ACEI has not been beneficial. Troponin and B-type Natriuretic Peptide (BNP) is not of prognostic value and cannot be used to accurately predict the short or long term survival in this condition.

Conclusion

Although few fatalities have been reported however the overall prognosis is good and the Left ventricular impairment improves within few weeks to months. Our patient also showed complete recovery only on conservative treatment. Wu HY, et al, 2021 published a case report of 55 years old patient presenting with three episodes of stress induced recurrent TC within the last three years and the patient showed complete recovery each time. The last presentation was stress induced and twelve-lead ECG indicated ST-segment and T-wave dynamic changes in the inferior and anterior leads. The peak troponin I level was 0.81 ng/mL (normal range <0.03 whereas our patient had troponin T instead of troponin I and the peak value was 152 (normal range <14). A TTE showed hypokinesia of the apical and mid-distal segments of the left ventricle with a reduced ejection fraction of 48% and the coronary angiogram showed normal coronary arteries.

In summary, TC should be considered as a possible diagnosis in patients with sudden onset chest pain following physical or emotional stress and it can mimic features of ACS. TTE may show features of LV impairment and hypokinesia in various segments and diagnosis is confirmed by normal coronary arteries on coronary angiogram or CTCA.

Learning Points/Take Home Messages

- Takotsubo cardiomyopathy can mimic the presentation of MI and it's important to correctly diagnose patients as the management is decided by the actual diagnosis.
- Clinicians should be aware of the possibility of recurrent Takotsubo cardiomyopathy in the same patient and to consider it in patients with presenting chest pain or tightness after emotional stress.

- Patients with possible Takotsubo cardiomyopathy should have coronary angiogram or CTCA to exclude CAD.
- Prognosis remains good in patients with recurrent Takotsubo cardiomyopathy and the LV functions return to normal in most patients.
- Recurrence occurs more commonly in severe cases of Takotsubo cardiomyopathy and can happen without emotional stress in rare cases.

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How to cite this article: Khan, Zahid Ullah. "An Unusual Case of Recurrent Takotsubo Cardiomyopathy in a Patient without Obvious Trigger." *Clin Case Rep* 12 (2022): 1491.