

Increased Frequency of Takosubo Cardiomyopathy: Case Series and Atypical Presentation

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Abstract

The epidemiological features of Takosubo cardiomyopathy have changed significantly. Previously, the main risk factor was physical and emotional distress. However, more disparate precipitating factors have been reported recently. TCM has become more prevalent during the past 20 years and physicians are diagnosing this more rapidly and with more confidence.

Keywords: Takosubo; Cardiomyopathy; Left Ventricular; Apical Ballooning

Abbreviations

TCM: Takosubo Cardiomyopathy; ECG: Electrocardiography; MI: Myocardial Infarction; COPD: Chronic Obstructive Pulmonary Disease; CT: Computerized Tomography

Introduction

Takosubo cardiomyopathy (TCM) is a form of acute cardiomyopathy characterized by left ventricular apical ballooning. It was first described in Japan in 1990 by Sato, *et al* [1]. Patients often present with chest pain, ST-segment elevation on electrocardiography (ECG) with elevated cardiac enzyme levels in consistency with myocardial infarction (MI). We report here five cases of TCM which presented to a district general hospital during a period of eight weeks.

Case 1

A 69-year-old gentleman with known chronic obstructive pulmonary disease(COPD) was found unresponsive after an episode of heavy drinking. On examination, his vital signs were normal apart from hypertension at 160/100, Physical examinations were unremarkable. Routine laboratory investigations were normal. The ECG showed diffuse ST elevation and T wave changes in the lateral leads. A repeat ECG after one day showed T wave inversion in lead I, II, V2-V6. His first troponin I(TNI) was 221 ng/L. Second TNI 1085 ng/L (normal range [NR] < 40 ng/mL). Echocardiography demonstrated moderate to severe impaired systolic function with extensive hypokinesia of the mid to apical wall with some residual contraction of the basal inferior, inferior-lateral and basal antero-lateral walls. Angiography revealed non-significant coronary artery disease. Given the echo and ECG findings and associated elevated TNI, the diagnosis of TCM was made. One week later, repeated echo showed normal preserved LV systolic function with no regional wall motion abnormalities. Subsequently, the patient had a Cardiac MRI (CMR) which was normal. The patient was discharged two week later. Follow-up echocardiography 1month post-discharge was normal.

Case 2

A 49-year-old female was referred to hospital with typical cardiac sounding chest pain. She was a known hypertensive and did not smoke. Physical exam was normal, as were her vital signs. Her initial ECG was normal but subsequent ECG's done after 30 minutes showed T wave inversion in the lateral leads. Her first TNI was 3964ng/ml, second TNI of 5605 ng/ml. She was initially diagnosed and treated as Non-St elevation myocardial infarction (NSTEMI). However, subsequent echo showed ballooning of the left ventricular apex with basal preservation elsewhere. Her coronary angiogram showed non-obstructive coronary artery disease. A diagnosis of TCM was made.

Case 3

A 57-year-old lady presented to the emergency department with retrosternal chest pain, defined as “pressure like”. Examination was normal. Her ECG showed T wave inversion in V1 and flat in V2. First TNI 3839 ng/ml, second was 10917 ng/ml, the patient started on an acute coronary syndrome(ACS) protocol. Her echo showed ballooning of the apex, moderate-severely reduced left ventricular function and an ejection fraction (EF) of 35%. Coronary angiography was performed and showed non-obstructed coronary arteries. She was diagnosed as TCM Follow-up echo one month post-discharge showed that her echo abnormalities had resolved.

Case 4

A 60-year-old female was admitted complaining of retro sternal chest pain radiating to both shoulders. According to the patient she was unwell two weeks prior to her presentation with sinusitis and had been under immense emotional stress. Known hypertensive, clinic exam normal. ECG showed normal sinus rhythm with non-specific changes with flat T waves in lateral chest leads. First TNI 277 ng/ml, second TNI4370, Echo demonstrated akinetic apex, with ballooning effect and good basal contraction. ef 35%, no valvular pathology. Coronary angiogram showed non-obstructed coronary arteries. She has made a good recovery. Follow-up echocardiography one-month post-discharge was completely normal and the diagnosis confirmed as TCM

Case 5

A 48-year-old lady was admitted via the accident and emergency department with central chest pain, described as tightness and associated with shortness of breath, sweating, palpitation and occasional radiation to her left shoulder and arm. According to the patient she was experiencing intermittent chest pain for the past 2 - 3 weeks. No past medical history of note apart from depression, on sertraline. She is a smoker and she was under a lot of stress lately. On admission she was mildly hypertensive but otherwise unremarkable. The initial ECG showed hyper acute ST elevation and subsequently a repeat ECG showed T wave inversion in the anterior chest leads, other lab tests were normal except TNI that was 32667 ng/L Echo demonstrated ballooning of the apex, moderately reduced LV function, EF 40%. A coronary angiogram showed minor coronary artery disease, and thus a diagnosis of TCM was established. The patient was discharged home after one week of hospital admission, follow-up echo one month post-discharge was completely normal.

Discussion

The syndrome of TCM constitutes an acute form of cardiomyopathy that is often precipitated by emotional stress and commonly seen in elderly women. The pathogenesis remains unclear but different mechanisms have been suggested such as catecholamine excess, coronary artery spasm and microvascular dysfunction. There may be dynamic mid-cavity or LV outflow tract obstruction that may contribute to apical dysfunction. Triggering factors such as emotional stress plays an important role in the increased sympathetic activity and pathophysiology of TCM which suggests that excessive catecholamine can cause microvascular spasm or dysfunction resulting in stunning of the myocardium [2] or direct cardiotoxicity [3]. A study compared plasma catecholamine level in patients with stress cardiomyopathy vs Killip class III MI [4]. Plasma catecholamine levels were significantly high in patients with former as compared with MI. Another study suggested that, simultaneous multivessel coronary spasm at the epicardial artery or microvascular levels may contribute to the onset of takosubo like left ventricular dysfunction [5].

The purpose and significance of this study to highlighted that TCM occurrence has significantly increased and as it has been presented in our five cases have shown significant features of TCM with slightly different presentative clinical features to the usual ones of TCM, For example in first case presentation, patient has had TCM secondary to a minor head injury with no established intracranial haemorrhage, TCM is well known to occur post major head injury in which the majority of the cases have presented with reduced level of consciousness. These head injuries vary from subdural haematoma, epidural haemorrhage and traumatic sub arachnoid haemorrhage. Where usually most of the patients would require invasive intervention like mechanical ventilations and neurosurgical procedures. In relation to TCM clinical features, usually presents as serious manifestation of myocardial dysfunction, commonly in form of acute, transit and reversible

heart failure, the pathophysiology mechanism still not yet very clear, in the literature review, TCM thought to be likely occurs as a result of sympathetic over stimulation secondary to interaction cascades of neurological injury and catecholamine toxicity where adrenaline attaches to myocardial B2-receptors leading to myocardial protein Gs -to-Gi coupling switch, activated cyclic adenosine monophosphate (CAMP), calcium overloading in the myocytes and contraction -band necrosis eventually resulting in reducing the inotropic efficacy of the myocardium [6].

Conclusion

We report here five cases of TCM. Two of them presented atypically, without any of the previously described emotional stressors. TCM presents classically mimicking acute coronary syndromes, but can present with “non coronary” symptoms and signs, and does not always have a “classical” stress-based presentation. The pathophysiology behind this syndrome remains enigmatic 7. Clinicians should remain vigilant for it. Fortunately, it has a good prognosis with very low recurrence rates.

Conflict of Interest

I would like to declare that there is no financial interest or any conflict related to this manuscript.

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