



## TAKOTSUBO CARDIOMYOPATHY – A REALITY IN TODAY'S ERA IN PEOPLE WITH A STRESSFUL LIFESTYLE...!

### Cardiology

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### ABSTRACT

We present a case of 55 yrs old female with no comorbidities presenting with acute severe chest pain. ECG and cardiac enzymes were suggestive of acute coronary syndrome. However coronary angiography was totally normal. A diagnosis of Takotsubo cardiomyopathy was made. Stress in the form of family dispute was identified as the trigger event. Three weeks after discharge she showed excellent recovery with a normal echo.

### KEYWORDS

Takotsubo syndrome, apical ballooning, stress cardiomyopathy

A 55 years old female was rushed to emergency department with chest pain, sweating and uneasiness since one day. The pain was retro sternal, with increasing severity. She was a housewife and had no history of diabetes, hypertension or ischemic heart disease or any other comorbid condition.

ECG on admission showed deep T wave inversions in leads V1-V6, II III & avF along with QT prolongation. On examination, vital signs were: BP-110/80 mmHg, Pulse-80/min, respiratory rate was 20/min, Spo2 was 97 % on room air. Her physical examination was unremarkable.

On investigations, hemoglobin was 14 gm%, creatinine was 0.9mg/dl serum potassium level was 4.2 mEq/L. Troponin T level was significantly elevated- 586 pg/ml, CPKMB was 12.25 mg/dl. 2D echo revealed hypokinesia in distal septum, LV apex, distal anterolateral and distal inferior segments with reduced ejection fraction (LVEF-30 %). In view of the above findings a diagnosis of acute coronary syndrome was made and patient was started on treatment accordingly. Patient was taken up for coronary angiography which surprisingly revealed totally normal coronary arteries. (fig.2, 3) LV angiography was done and it revealed the true picture. There was LV apical hypokinesia with significant ballooning of the apex. (fig.4,5)

A diagnosis of takotsubo cardiomyopathy was made. On repeated enquiry with the relatives we found out that patient was under some family stress.

The patient gradually improved with relief from symptoms without any need of inotropes. Subsequent stay in the hospital was uneventful. Patient was discharged in a stable condition on beta blockers. A repeat echo performed three weeks later showed an excellent recovery with LVEF of 55% and no wall motion abnormalities.

### Discussion

#### Introduction

Takotsubo Cardiomyopathy (TCM) was first described in Japan in 1990.<sup>1</sup> It is an acute cardiac condition that involves transient left ventricular apical ballooning and systolic abnormalities. It is also known as 'apical ballooning syndrome, or 'stress-induced cardiomyopathy,' and 'broken heart syndrome.' In Japan, "takotsubo" relates to "octopus pot," which is a fishing jar<sup>1</sup> with a narrow neck and wide base used to trap octopus, and describes the visual appearance of the heart on left ventriculography. The presentation is like acute coronary syndrome with significant ST-T changes and modest elevation of cardiac biomarkers however the coronary angiography reveals normal coronaries. An increasingly stressful lifestyle in today's society may be the reason why this disease has gained prominence. The incidence of TCM is around 1.7–2.2% of all patients initially suspected with ACS.<sup>2</sup> It usually has a good prognosis with almost complete recovery in few weeks however mortality is also reported in severe forms. Majority of patients are females and commonly

postmenopausal.

#### Etiology

The syndrome appears to be triggered by emotional or physical stress<sup>2</sup>. Several theories have been proposed regarding the exact pathophysiology of this disease. None of them has proved to be conclusive. The most widely accepted theory is that of stress induced catecholamine release. Proposed mechanisms include: (1) endogenous catecholamine induced myocardial stunning and micro infarction, (2) coronary microvascular dysfunction.

#### 1) Catecholamine release<sup>2,3</sup>:

In severe emotional or physical stress there is excessive secretion of catecholamines. Apical part of left ventricle has a very high concentration of adrenoreceptors, which leads to accumulation of catecholamines here. This causes myocardial stunning and dysfunction. The presentation of such acute catecholaminergic surge may vary from acute coronary syndrome or cardiogenic shock.

#### 2) Microvascular dysfunction<sup>3</sup>

Other school of thought proposes that acute microvascular spasm or occlusive phenomenon in microcirculation may be the cause of transient myocardial depression. Few studies with PET scan have demonstrated perfusion defects at microvascular level.

A strong trigger at emotional or physical level is usually present preceding the event. These stressors have included: bereavement in family, bad financial news, legal problems, car accidents, natural disasters, etc. It is being diagnosed more frequently, possibly because of increasingly stressful times and public attention to ACS. TCM is also associated with neurological or psychiatric disorders<sup>2</sup>. On few occasions the trigger is physical in the form of major surgery, or diagnosis of serious illness.

#### Clinical Features

TCM patients present with symptoms of sudden onset chest pain (75%), dyspnea (25%), palpitations in the background of a stressful event. ECG reveals significant abnormalities ranging from ST elevation, depression or QT segment prolongation.<sup>3</sup> Rarely there have been instances of atrial fibrillation or life threatening ventricular arrhythmias.

During acute phase symptoms are accompanied by significant elevations of cardiac biomarkers. Troponins, CPKMB, NtPro-BNP are variably increased typically mimicking acute coronary syndrome.<sup>3</sup> Severe cases may present with pulmonary edema or cardiogenic shock.

Echocardiography is usually the first modality in diagnosis of TCM. The echo very well demonstrates regional wall motion abnormalities along with apical dilatation of left ventricle.

A peculiar finding however is that the regional wall motion abnormalities extend beyond a territory of single coronary artery<sup>4</sup>. This finding may help in suspecting TCM as the cause of LV dysfunction. Apical ballooning may sometimes be accompanied by left ventricular outflow tract obstruction.

**Coronary Angiography:**

A coronary angiography is required to clinch the diagnosis of TCM. It is also urgently indicated in the setting of ACS/STEMI. Surprisingly the coronary angiography reveals normal coronary arteries with no evidence of thrombus or plaque rupture. So TCM is essentially a syndrome mimicking ACS with paradoxically no obstruction noted in coronary angiography. LV ventriculography demonstrates the apical ballooning very well. Mayo clinic Criteria<sup>5</sup> are widely accepted for diagnosis of TCM. (table 1)

The clinical progression of TCM is variable from milder form to a fulminant cardiogenic shock or even mortality. Acute complications include heart failure, arrhythmias, thrombus formation in LV, or death. Prognosis is good for those who survive the acute episode. Mortality rates have been reported at 1% and 3.2%, respectively<sup>6</sup>.

**Management:**

Management is usually supportive to tide over the acute crisis. Patient should be treated for ACS unless proven otherwise. Serious cases may need ventilator and inotropic support. Recovery time for TCM patients is generally rapid. Marked improvement in ECG findings, cardiac markers, and EF can be seen within days. Complete recovery of LV usually occurs within 1-4 weeks<sup>6</sup>.

**Conclusion:**

Takotsubo cardiomyopathy is a rare but potentially fatal condition, initially indistinguishable from ACS. It is increasingly being observed around the world. Many a times we cannot find a plausible explanation about the exact cause of this illness. Why there is selective affection of LV apex is also not yet fully understood. High index of suspicion should be kept in present times where the stress levels in society have increased due to several reasons.

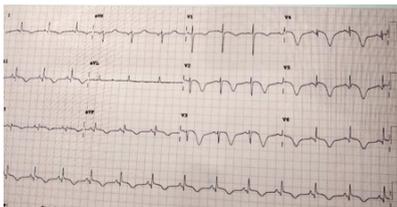


Figure 1-ECG showing significant T wave inversion and QT prolongation



Figure 2-- PA cranial view demonstrating normal LAD artery



Figure 3- Normally filling RCA.

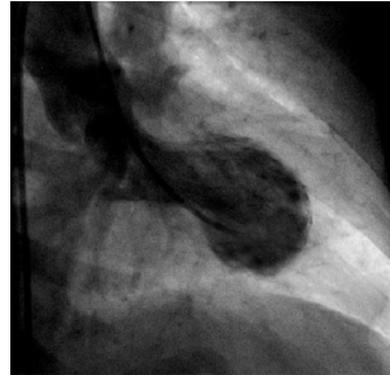


Figure 4-Left ventriculogram in systole showing significant apical ballooning

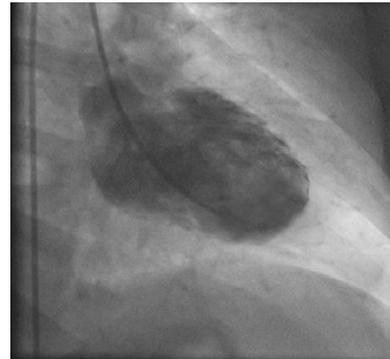


Figure 5- Left ventriculogram in diastole

Table 1- Mayo Clinic Criteria for diagnosis of Takotsubo Cardiomyopathy <sup>5</sup>
Transient hypokinesia, akinesia or dyskinesia of left ventricle segments, the regional wall motion abnormalities extend beyond a single epicardial vascular distribution,
Absence of obstructive coronary artery disease or angiographic evidence of acute plaque rupture
New ECG abnormalities (either ST elevation or T inversion) or modest elevation in troponin
Absence of pheochromocytoma or myocarditis

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