



# The Journal of Multidisciplinary Research (TJMDR)

Content Available at [www.saap.org.in](http://www.saap.org.in)

ISSN: 2583-0317



## TAKOTSUBO CARDIOMYOPATHY (BROKEN HEART SYNDROME)

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Received: 26 Sept 2023 Revised: 04 Oct 2023 Accepted: 14 Nov 2023

### Abstract

Takotsubo cardiomyopathy or takotsubo syndrome (TTS), also known as stress cardiomyopathy, is a type of non-ischemic cardiomyopathy in which there is a sudden temporary weakening of the muscular portion of the heart. This condition is sometimes called "Broken Heart Syndrome". It predominantly affects postmenopausal women, often triggered by acute emotional stressors, physical stressors, or a combination of both. The exact pathophysiological mechanisms remain incompletely elucidated. Diagnosis relies on clinical history, physical examination, ECG and cardiomyopathy from acute coronary syndrome is crucial for management.

**Keywords:** Takotsubo cardiomyopathy, cardiomyopathy.

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DOI: <https://doi.org/10.37022/tjmdr.v3i3.538>

### Produced and Published by

South Asian Academic Publications

### Introduction

Temporary condition of heart develops in response to an intense emotional or physical experience. Otherwise called as broken heart syndrome or stress cardiomyopathy. It causes main blood pumping chamber (left ventricle) to change shape. The wall motion abnormalities are unique as they extend beyond a single vascular territory and are usually localized to the apex of the left ventricle; however, non-apical variants exist [1]. TCM is a heart disease that mimics the symptoms of a myocardial infarction (MI). The exact cause of TCM is unknown. Few theories suggest that cause is due to release of catecholamines in stress conditions.

### Epidemiology

TTC is estimated to be around 2% of all troponin-positive patients. It accounts 1% to 3% acute coronary syndrome and 0.5% to 0.9% of ST-segment elevation myocardial infarction. It occurs predominantly in women, particularly in the post-menopausal period. Stressful events have been identified in two-thirds of takotsubo cardiomyopathy cases. Women over 50 years old account for 80% to 90%

of patients who develop takotsubo cardiomyopathy [6]. Takotsubo cardiomyopathy is usually underdiagnosed, especially in patients who have co-existing coronary artery disease, largely due to the interplay between acute coronary syndrome and takotsubo cardiomyopathy. A systematic review by Singh et al. showed an annual recurrence rate of 1.5% [7]. In patients younger than 50 years, the recurrence rate has been found to be higher than in those older than 50 years, as triggering events are more likely to recur [8].

### Types of TCM

The four types are apical, mid-ventricular, basal and focal TCM. Apical TCM is the most common, found in 81.7% of the total patients followed by mid-ventricular in 14.6% of the patients. Basal and focal types are the least common found in 2.2% and 1.5% of the total TCM patients respectively [5].

### Clinical manifestations

Patients mostly present with chest pain, dyspnea and syncope and less commonly with arrhythmias, cardiogenic shock and cardiac arrest.

physical and emotional stress may also lead to elevation of symptoms. In TCM include ST-elevation, ST depression, QTc prolongation, and T-wave inversions [2].

Left ventricular dysfunction can be observed.

Some patients may develop symptoms and signs of heart failure, tachyarrhythmias, bradyarrhythmias, sudden cardiac arrest or mitral regurgitation [3]. Few may

develop cardiogenic shock. Left ventricular obstruction, induced by left ventricular hyperkinesis. Embolization – stroke or transient ischemic attack may develop [4].

### Diagnosis

The diagnosis of takotsubo cardiomyopathy is typically based on a combination of clinical presentation, imaging studies, and exclusion of other cardiac conditions.

- 1) **Transient left ventricular dysfunction-**  
Often evidenced by ECG or other cardiac imaging techniques, showing the characteristic ballooning or apical ballooning of the left ventricle.
- 2) **Elevated cardiac biomarkers**  
Elevation of troponin.
- 3) **New ECG changes**  
ST segment elevation or T wave inversion.
- 4) **Cardiac MRI**
- 5) **Coronary angiography**

### Pathophysiology –

- 1) **Stress hormone surge**  
The primary trigger appears to be a surge in stress hormones, adrenaline and norepinephrine and norepinephrine, which are released in response to emotional or physical stressors. These activate the sympathetic nervous system, often referred to as the 'fight or flight' response.
- 2) **Microvascular dysfunction**  
May lead to dysfunction in the small blood vessels that supply the heart muscle. This dysfunction impairs ability of heart to function normally.
- 3) **Myocardial stunning**  
Heart undergoes to a special condition called as myocardial stunning a reversible impairment of the heart to contract. It results in ballooning shape.
- 4) **Catecholamine mediated toxicity**  
Adrenaline can have harm effects on heart cells. Include calcium overload within the cells, oxidative stress and damage to the heart's contractile machinery.
- 5) **Coronary artery spasm**  
This may lead to reduced blood flow to the heart in few cases.
- 6) **Neurogenic stunned myocardium**  
Stress hormones can lead to disruption in the communication between the nervous system and the heart, resulting in abnormal heart function. This contributes to weakening of the heart muscle.

### Prognosis

The prognosis of Takotsubo cardiomyopathy, also known as "broken heart syndrome" or stress-induced cardiomyopathy, can vary from person to person. Takotsubo cardiomyopathy is a temporary and reversible condition that typically occurs as a result of intense emotional or physical stress. It mimics the symptoms of a

heart attack but is not caused by blocked coronary arteries. Instead, it's characterized by a sudden weakening of the heart muscle, leading to the ballooning of the left ventricle.

The short-term prognosis for most individuals with Takotsubo cardiomyopathy is generally good. With appropriate medical treatment and management, many people recover fully within days to weeks. Treatment may include medications to manage symptoms, such as beta-blockers and ACE inhibitors, and supportive care.

However, in some cases, there can be complications and a worse prognosis. These can include:

#### 1. Heart failure

In severe cases, patients may experience heart failure, which can be life-threatening if not managed appropriately.

#### 2. Ventricular arrhythmias

Arrhythmias, or abnormal heart rhythms, can occur in some individuals and may require additional medical intervention.

#### 3. Cardiogenic shock

In rare instances, the condition can lead to cardiogenic shock, a life-threatening condition where the heart is unable to pump enough blood to meet the body's needs.

#### 4. Recurrence

Some people may experience recurrent episodes of Takotsubo cardiomyopathy.

#### 5. Long-term effects

Although Takotsubo cardiomyopathy is often reversible, there may be long-term effects on cardiac function and quality of life in some individuals.

It's essential for individuals who experience Takotsubo cardiomyopathy to receive prompt medical attention and follow-up care to monitor their heart health. Your healthcare provider will determine the appropriate treatment plan based on your specific condition and symptoms.

### Management

Based on retrospective analysis, the management relies on optimal measures as follows –

#### Acute management-

TTS is generally transient and can be managed with supportive therapy in most cases. However few patients may develop acute complications such as Cardiogenic Shock (CS) and acute heart failure (HF) that require intensive therapy. The immediate management should be directed towards excluding and treating possible ACS, with the administration of antiplatelet agents, anticoagulation, vasodilators and continuous ECG monitoring, as well as planning towards urgent/semi-urgent coronary angiography. Levosimendan is a calcium sensitizer and should be considered first when transitioning from catecholamine inotropic agents [9]. Intravenous fluid resuscitation and short acting beta-

blocker therapy can be recommended. A combination of Angiotensin enzyme inhibitor (ACEI) or Angiotensin II receptor blocker (ARB), beta blockers±diuretics and nitroglycerin are given to reduce ventricular filling pressures. In patients with left ventricular thrombus formation, the role of anticoagulants plays an important role which should be continued for 3 months at least.

#### Long term treatment

The use of ACEI or ARB in the International Takotsubo Registry demonstrated improved survival at 1-year-follow up and was associated with a lower prevalence. Aspirin and statin therapy should be given for secondary prevention in patients who have co-existing coronary artery disease [10].

#### Conclusion

TTC represents an intersection of emotional and physiological responses. A research progresses, traditional views of cardiomyopathy diseases. Insights into its aetiology and optimal management strategies are anticipated. Deeper understanding of the intricate interplay between the heart and the human experience.

#### Funding

No Funding

#### Author Contribution

All authors are contributed equally.

#### Conflict of Interest

No Conflict of Interest

#### Ethical Considerations

Not Required

#### Acknowledgement

Nil

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