

# Takotsubo Cardiomyopathy and Psychiatric Illness: Redefining the Relationship

Hannah Masoud, MD

St. George's University School of Medicine, Grenada

**Corresponding author:**

2775 Shore Pkwy Apt 3G  
Brooklyn, NY 11223  
336-213-2565  
HannahM786@gmail.com

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Takotsubo Cardiomyopathy (TCM) was first described in Japan in 1990 as an acute cardiac condition that involves transient left ventricular (LV) apical ballooning and dysfunction that mimics the presentation of an acute myocardial infarction (MI). It is also known as “apical ballooning syndrome,” “ampulla cardiomyopathy,” “stress-induced cardiomyopathy,” and “broken heart syndrome.” In Japanese, “tako tsubo” translates to “octopus pot,” which is a jar with a narrow neck and wide base used to trap octopus, and represents the distinct visual appearance of the heart at the end of systole on left ventriculography. The vase-like shape is due to hyperkinetic contraction of the left ventricular basilar segment, which is compensating for the hypokinetic contraction of the midventricular and apical segment of the heart.

Today, there are high report rates of anxiety and depression as well as panic attacks in patients with ACS and TCM<sup>1-16</sup>. Panic attacks are characterized by discrete periods of fear and anxiety that have a rapid onset and include symptoms of chest pain and palpitations. Physicians who encounter patients in the emergency department with chest pain, palpitations, or shortness of breath may often find it difficult to differentiate diagnosis of panic attacks from acute coronary syndrome (ACS) or Takotsubo Cardiomyopathy (TCM) or an atypical mild forme fruste episode of TCM<sup>17</sup>. Past and present medical history, cardiac biomarkers, serial electrocardiograms and echocardiographic findings in the hospital and during follow-up may be helpful tools in differentiation of these diagnoses.

Plasma catecholamine levels such as epinephrine can also be measured. The utility of this measurement, however, is questioned by a recent study on plasma catecholamine levels in 33 TCM patients that showed the majority of patients had normal plasma epinephrine and metanephrine levels, which suggests that the relationship between blood catecholamine levels and TCM is weak and tenuous at best.<sup>18-19</sup> Illnesses are often phenotypically expressed in a wide spectrum of severity, and it is important to consider the role of atypical mild forms of Takotsubo Cardiomyopathy as possible differential diagnoses

It is also important for clinicians to explore whether suspected mild episodes of TCM foreshadow recurrence of acute and more severe episodes of TCM requiring hospital admission.

Questions that remain regarding the overlapping features of these diagnoses are what is the true incidence of TCM in patients with a psychiatric history of anxiety and depression? What is the significance of the role of chronic anxiety and depression in precipitating a TCM episode? A recent study explored the association of chronic depression and chronic anxiety in eliciting the TCM phenotype.

A series of 73 patients were compared with a control group of ACS patients. The authors found that TCM patients had higher levels of chronic anxiety, but not chronic depression, in comparison with ACS patients. After a multivariable adjustment, chronic anxiety but not chronic depression was associated with TCM, and a history of chronic anxiety was associated with TCM status with an emotional trigger<sup>20</sup>.

This implies that clinicians should focus on patients with chronic anxiety and a recent emotional trigger with respect to diagnosis and management of TCM. The question remains in patients with a chronic history of anxiety or depression to what is the relationship of chronic use of psychotropic catecholamine based medications and the development of Takotsubo syndrome?

What is the incidence and pathophysiological relationship of Takotsubo syndrome and depression, anxiety, as well as panic attacks? How do the cognitive style and coping mechanisms related to the personality of the individual patients influence the risk of TCM after a stressful exposure?

Psychological factors such as depression, anxiety, and stress are common modifiable risk factors for developing cardiovascular disease. What is the relationship between the psychiatric history and the cardiovascular history of a patient with respect to development, recovery, or recurrence of TCM? Perhaps there needs to be an increased effort to screen and treat depression and anxiety in those suffering from TCM. It would be important to elucidate whether

treatments for psychiatric disease or cardiovascular disease can optimize the recovery process of TCM. Further clinical practice may include initiating cardioprotective medications (beta-blockers, aspirin, statin, heparin) alongside antidepressants or anxiolytics when TCM is diagnosed. Anesthesiological management of patients with TCM from preoperative preparation to postoperative care may benefit from brief psychotherapy sessions or use of psychotropic cardioprotective medications that minimize stress in the patient and maintain control on respiratory drive.

Further research is recommended on the potential benefits of psychological therapy alone or combined with psychiatric pharmacotherapy on patients with this transient condition. Management of TCM may also include follow-up services with respect to cardiologists as well as psychiatrists in hopes to prevent recurrence. There are, however, reports of previous TCM patients who received psychological support and had recurrences<sup>21</sup>.

What is the optimal management of patients who are currently or remotely experiencing Takotsubo syndrome during and after the episode? Randomized controlled trials would be helpful to establish therapeutic guidelines and optimal management. The large number of case reports on TCM as an isolated occurrence does not contribute substantially to our current knowledge as this syndrome has been found to be increasingly more common than previously realized.

This article suggests the utility of registries of TCM patients as opposed to case reports from which we can extrapolate new diagnostic and therapeutic insights related to development of this syndrome in order to better advance our understanding of this condition.

Typical patients such as postmenopausal elderly women with a psychiatric history, emotionally cumbersome event, or physical stress or pain who present with chest pain, dyspnea, or palpitations should be monitored closely for TCM in any clinical setting with increased utilization of echocardiogram showing regional wall motion abnormalities that are absent in subsequent echocardiograms as well as serial electrocardiograms during and after the episode (T wave inversion and QTc interval prolongation).

This article suggests increased use of echocardiogram in acute medical units for potential TCM patients. Consideration of the use of hand-held portable echocardiogram devices may be considered as more feasible options in ambulatory settings, and if used appropriately can provide a limited but very reliable echocardiographic assessment of TCM patients<sup>22</sup>. The use of new technology, such as portable echocardiogram devices, has the potential of improving the standards of practice and is an important part of the evolution of modern medicine.

The influence of psychiatric illness on the pathogenesis of TCM may be an underestimated association. Mental health screening and therapy may need to accompany treatment of TCM. Redefining and understanding the pathophysiological relationship of psychiatric illness including anxiety, depression, or panic attacks and Takotsubo Cardiomyopathy may help clinicians implement a more effective and beneficial model of care for an affliction that is being found to be increasingly more common in today's age.

### Declarations of Interest

I declare that I have no commercial, financial, or other relationship related to the subject of this article that might create potential conflict of interest. Funding and Support None.

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I had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

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