Takotsubo Cardiomyopathy

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By Cynthia R. Bascara, APN-C, MSN, CCRN

Objectives:

At the end of session, the participation will be able:

1. To define and state etiology of Takotsubo Cardiomyopathy.
2. To differentiate manifestations of Takotsubo Cardiomyopathy with classic myocardial infarction.
3. To define Mayo Clinic's proposed diagnostic criteria for Takotsubo Cardiomyopathy.
4. To verbalize the complications of Takotsubo Cardiomyopathy.
5. To state the similarity and difference between the treatment of Takotsubo Cardiomypathy and myocardial infarction.
6. To state the nursing care of patients diagnosed with Takotsubo Cardiomyopathy.

Definition

Takutsobo Cardiomyopathy is spontaneous reversible form of cardiomyopathy that is often induced by emotional or physical stress. It is characterized by transient apical left ventricular (LV) dysfunction in the absence of significant coronary artery disease (CAD). The LV abnormality reverses spontaneously in days or weeks.

Other terminologies used are:

- Stress-induced cardiomyopathy
- Stress-related cardiomyopathy
- Apical ballooning syndrome (ABS)
- Ampulla cardiomyopathy
- Neurogenic myocardial stunning

Pathophysiology:

There are still on-going research studies to find out the true etiology of Takotsubo Cardiomyopathy. However the following are theories that may be associated with the condition:

- Excessive exposure to catecholamines mediated by exaggerated sympathetic response. On the role of catecholamines, is it the high levels of epinephrine, norepineprine and dopamine or is the patient's higher sensitivity to cathecholamine that contribute to the condition are the questions the researchers are still trying to find out.
- Coronary artery spasm which can cause ischemia in the absence of obstructive coronary artery disease (CAD).
- Transient occlusion by atherosclerotic plaque. Takotsubo Cardiomayopathy is sometimes called "an aborted myocardial infarction". In Takotsubo Cardiomayopathy, the area of affected myocardium is much larger than the normal distribution of a single coronary artery.
- Higher prevalence in women predominantly in post menopausal: mean age: 68 years old. The following research questions and studies come up with this theory:
    - Does a difference exist between the sexes in the psychological response to stress that triggers an abnormal physiological change? See Table 1.
    - Is the cardiovascular system of women physiologically or anatomically more sensitive than that of men to catecholamines?
    - Sex hormones may influence the sympathetic nervous system and may affect vasoreactivity or the tendency to spasm.
    - Perhaps endothelial dysfunction, known to worsen after menopause (because of lowered estrogen levels) further increases vulnerability to sympathetically mediated myocardial stunning.

Table I. Emotional and physical stressors associated with Takotsubo Cardiomyopathy
Emotional stressors
Unexpected death of relative or friend
Domestic abuse

Confrontational argument
Catastrophic medical diagnosis
Armed robbery
Gambling losses
Surprise party
Surprise reunion
Car accident
Fear of procedure
Fear of choking
Court appearance
Public performance
Physical stressors
Exacerbated systemic disorders
Noncardiac invasive procedures
Exhausting physical effort
Asthma attack
Pneumothorax
Ventricular fibrillation
Cold Exposure

Proposed Diagnostic Criteria (Mayo Clinic)

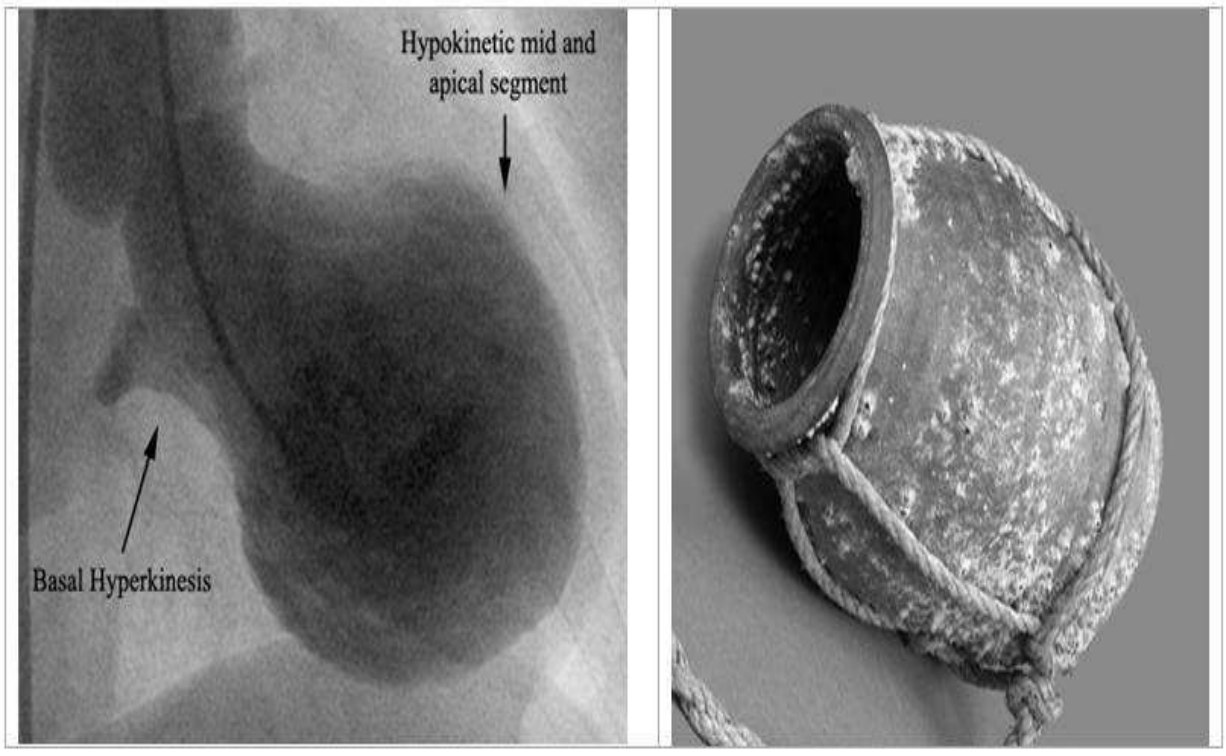
- Transient hypokinesis, akinesis, or dyskinesis of the left ventricular mid segments with or without apical involvement
- Absence of obstructive coronary disease or angiographic evidence of acute plaque rupture

- New electrocardiographic abnormalities (either ST-segment elevation and/or T wave inversion) or modest elevation in cardiac troponin
- Absence of pheochromocytoma or myocarditis

Clinical Findings to assist in Diagnosis

- Sudden onset of chest pain or shortness of breath
- Precipitant physical or emotional stress
- Electrocardiographic changes suggestive of acute MI
- Mild to moderate elevation of cardiac biomarkers
- Typical octopus pot morphology on echocardiogram or left ventriculogram
- No evidence of obstructive CAD on cardiac catheterization
- Complete resolution of LV dysfunction weeks after event

Hypokinesis of Left Ventricle **Octopus Trap in Japanese (Tako-tsubo)**



(ISPUB.com, 2011)

Reported complications:

- LV failure with or without pulmonary edema
- Cardiogenic shock
- LV outflow tract obstruction (LVOT). LVOT is the path that blood takes along the septal wall as the blood is being ejected from the left ventricle through the aortic valve. LVOT obstruction is caused by exaggerated contraction of the base of the ventricle when hypokinesis occurs leading to unbalanced contraction; reduction of outflow tract size; accelerated blood flow through this pathway during systole and decrease in pressure above neighboring mitral valve. These changes cause suctioning effect of anterior mitral valve (MV) leaflet toward septum (systolic anterior motion of the MV leaflet) leading to more LVOT obstruction causing hypotension.
- MR from "systolic anterior motion"
- Ventricular arrythmias
- Transient complete AV block
- LV mural thrombus
- LV free wall rupture
- Death

Treatment

Initial management is largely supportive, including hydration and attempt to alleviate triggering physical or emotional stress. Some may need use of standard medications for heart failure due to systolic dysfunction. In patients who present with a picture of ST-elevated myocardial infarction (STEMI), the patients may need urgent catheterization and Percutaneous Coronary Intervention (PCI) or with fibrinolytic therapy

For stable patients diagnosed with Takotsubo Cardiomyopathy, following are recommended:

- Beta blocker
- Patients with LVOT, ace inhibitor or an angiotensin receptor blocker
- Patients with heart failure who do not have LVOT, diuresis
- Aspirin in presence of coexisting coronary atherosclerosis

If diagnosis is made, ASA can be discontinued unless CAD or Peripheral Vascular Disease (PVD) is concomitant. Beta Blockers may be continued long-term to protect against catecholamine sensitivity which may predispose to this syndrome. Heparin

and Coumadin should be used if atypical thrombus is present, or a severe apical defect makes thrombus formation likely.

For patients with hypotension and shock, recommendations will also be discussed. The causes of hypotension and shock in Takotsubo Cardiomyopathy are severe systolic dysfunction and LVOT obstruction. Urgent echocardiography is necessary to determine presence of LVOT.

- In patients with hypotension, whether with or without significant LVOT obstruction, if no significant pulmonary congestion is present, cautious fluid resuscitation is recommended (Grade 2C)
- In patients with hypotension who do not have significant outflow obstruction, intravenous inotropes such as dopamine
- In patients with hypotension and moderate-to-severe LVOT obstruction, inotropic agents are not recommended because they can worsen the degree of obstruction (Grade 2C).
- In patients with hypotension and moderate-to-severe LVOT obstruction, beta blockers are recommended. Beta blockers can improve hemodynamics by causing resolution of the obstruction (Grade 2C). For patients who cannot tolerate or do not adequately respond to beta blockers, an alpha agonist may be added with caution and close monitoring.

Nursing Care

- Health care providers should be prepared to provide education and counseling for those patients who exhibit signs and symptoms of acute coronary syndrome but appear to be at low risk for coronary artery disease; especially if a stressful event occurred before the onset of signs and symptoms.
- Nursing care involves hemodynamic monitoring, providing supportive measures, and watching for complications.
- Nurses need a thorough understanding of the syndrome and what distinguishes it from classic myocardial infarction.
- Patients and families should also be educated about the syndrome's reversibility, low rate of recurrence, and general expectation for a full recovery.
- Nurses need to assess patient's effective coping mechanism especially if there is a significant stressor before the onset of signs and symptoms and provide psychological support

- Importance of follow-up for repeat echocardiography to confirm resolution of the syndrome needs to be emphasized.
- Patient should be counseled on risk-factor modification if mild or moderate coronary artery disease was detected during angiography.

Prognosis

Generally, without significant co-morbidity, prognosis for patients with takotsubo cardiomyopathy is good once the acute phase has passed. Recommendations for follow-up include echocardiography at approximately 4 to 6 weeks after discharge to document normalization of left ventricular function. Usually complete resolution of contractile abnormalities happen within weeks. So if the contractile abnormalities persist, more diagnostic tests need to be done to rule out other conditions.

According to Prasad (2007), recurrence of takotsubo cardiomyopathy is considered rare and has been reported in no more than 10% of cases. Gianni et al (2006) identified 4 studies documenting a mean recurrence rate of 3.5%. However, the syndrome has been documented for a relatively short time, and so the natural history remains largely unknown. Patients should be followed up regularly as outpatients.

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