TAKOTSUBO DISEASE

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ABSTRACT

Tako-tsubo cardiomyopathy, a novel heart syndrome with peculiar variant of left ventricular dysfunction, characterized by preferential apical dyskinesis and basal hyper contractility has been described on numerous occasions especially in persons without obstructive coronary artery disease. It is considered of reversible etiology and seems to have increased predisposition in elderly, stress-ridden females. Although Tako-tsubo cardiomyopathy was described initially in patients of Japanese origin, its existence in white populations in both Europe and the US have recently been documented. Simultaneous multivessel coronary spasm of the epicardial coronary microvessels is believed to be a major contributor. However, this pathophysiologic basis for this phenomenon has not been validated universally throughout literature. Another potential mechanism of events that seems to be responsible for this phenomenon is the transient myocardial stunning associated with hypersensitivity to catecholamine. The clinical presentation usually simulates that of an acute ST- elevated myocardial infarction but the coronary angiography by definition shows no critical lesions. Patients surviving acute episode usually recover fully in few weeks. Acute onset of cardiogenic shock in a person without coronary risk factors should raise the possibility of this rare type of entity but should not withhold the acute treatment. Prognosis generally varies and has largely been good. Takotsubo though largely benign may be fatal sometimes.

Key Words: Takotsubo disease, stress induced cardiomyopathy, normal coronary.

INTRODUCTION

Takotsubo disease is a novel heart disease of mostly uncertain mechanism with reversible left ventricular systolic dysfunction that is usually and mostly triggered by stress and illnesses. It is more popularly known by the cardiologists as stress induced cardiomyopathy or stress heart syndrome or broken heart syndrome or ampulla cardiomyopathy due to its relations to acute medical illnesses or physical or emotional stress. It is not very uncommon as was once thought by many to be a topic of discussion only in the literatures or books. It bears its name from the Japanese word for octopus trap (tako- tsubo), the shape with which it resembles. This name was coined in Japan for its similarity of LV apical ballooning in configuration to an octopus trap.[1]

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Takotsubo disease as is being known to the cardiologists and physicians around the globe is being increasingly reported from different parts of the world. This is a syndrome characterized by transient dysfunction of the usually apical portion of the left ventricle with compensatory hyperkinesis of the basal walls thus producing ballooning of the apex with systole in the absence of any significant coronary artery disease.

INCIDENCE AND OCCURRENCE

Takotsubo disease was first described in Japan. Nowadays this disease is known to occur in non-Asian populations as far as Europe and America.[2,3] This shows it not to be related to any particular race. However, this has been increasingly reported in women than in men. Postmenopausal women are more known to have this disease than men with unknown reasons and to be as high as 82-100% of cases with a mean age of 62-75 years.[4] In the ICU setting this was found in 36% of cases without cardiac diagnosis of left ventricular dysfunction.[5] We have also seen this disease to be present in middle aged men as young as 49. Its prevalence in the general population is not known and may increase as more cases are reported. Increased awareness among the cardiologists and high index of suspicion is required especially in middle aged people to recognize this syndrome.

PATHOPHYSIOLOGY

Multiple studies since its inception as an independent heart syndrome have been carried out to understand the mechanism of heart dysfunction. MRI and Doppler studies consistently reveal reversible systolic dysfunction of the predominantly left side of the heart. Predilection especially to the left side of the heart and mechanism of its causation is largely unknown.

Microvascular dysfunction caused by hypersensitivity to catecholamine, microvascular spasm, or endothelial dysfunction has been proposed to be a mechanism of the disease, the real pathogenesis of it is not completely resolved yet.

ETIOLOGY

This has been described as reaction of the heart to fail to cope with physical and emotional stress imposed upon it. As the name suggests this is triggered by acute medical illness or severe physical stress or intense emotional trauma. Sudden life events like death of relatives especially if unexpected, domestic abuse, arguments between spouses and catastrophic medical and psychological diagnoses or devastating natural, financial or political losses can lead to this syndrome.[6-11] Due to its early years of occurrence into the medical field, the pathogenesis of the disease is ill understood and has been likened as fatigue of the heart to deal with acute illnesses, physical or psychological.

CLINICAL FEATURES

The clinical presentation usually simulates that of an acute ST- elevated myocardial infarction but the coronary angiography by definition shows no critical lesions.[12,13] Such presentations are also found in acute subarachnoid or intracerebral hemorrhage particularly due to catecholamine excess.[14] So some even propose the theory of diffuse catecholamine induced micro-vascular spasm or dysfunction resulting in myocardial stunning.[15] Most commonly people state they had substernal chest pain associated with dyspnea, shock and electrocardiographic abnormalities. Acute complications of Takotsubo disease may be tachyarrythmias like ventricular tachycardia or fibrillation, bradyarrrhythmias, pulmonary edema, and cardiogenic shock. These people may require vasopressors and even intra-aortic balloon counterpulsation. Left ventricular outflow tract obstruction caused by left ventricular basal hyperkinesis can cause shock or even severe mitral regurgitation or murmur of hypertrophic cardiomyopathy. These people may not only simulate acute coronary syndrome but may even show rise in biochemical markers of myocardial infarction. Acute onset of cardiogenic shock in a person without coronary risk factors should raise the possibility of this rare type of entity but should not withhold the acute treatment.

ECG CHANGES

Electrocardiographic changes are the most common findings. ST segment elevations are the most common findings in as many as 90% of cases usually in the anterior precordial leads. Howevere ST elevation in other leads have been widely seen .Other findings are ST segment depression, T wave inversion, QT prolongation,[17] and abnormal Q waves. Cardiac biomarkers are frequently elevated. Thus the syndrome is usually difficult to differentiate clinically alone. Transient complete atrio- ventricular block has also been reported.[18]

LEFT VENTRICULOGRAPHY OR ECHOCARDIOGRAPHY

Left ventriculography and echocardiography typically shows apical ballooning with akinesis or dyskinesis of the apical portion of the left ventricle. Left ventricular systolic function is greatly reduced and reported LVEF has been in the range of 20-49%. Reversible perfusion abnormalities and MRI findings of LV segmental wall motion abnormalities in multiple coronary territories.[16,19,21]

DIAGNOSIS

The diagnosis rests on a high degree of clinical suspicion especially in a postmenopausal woman with acute coronary syndrome after intense psychologic stress that shows ECG and clinical manifestations out of proportions to the degree of elevation of cardiac enzymes. Coronary angiography reveals no critical coronary lesions. Echocardiography and left ventriculography may be suggestive. However, ST segment elevation can be seen in other conditions in the absence of coronary artery disease and should be excluded including cocaine abuse, variant (prinzmetal's) angina, cardiac syndrome X.[20] Thus largely the diagnosis of the syndrome rests on the exclusion of the common cardiac conditions. So few guidelines have been highlighted which will help physicians to diagnose it in clinical settings.

To diagnose Takotsubo disease the four following criteria must be met-[4]

I. Transient akinesis or dyskinesis of the apical and mid ventricular segments in association with regional wall motion abnormalities that extend beyond single epicardial vessel. (Echocardiographic or left ventriculographic criteria)
II. Recent ST segment elevation or T wave inversion on ECG. (ECG Criteria)
III. Absence of significant obstructive coronary artery disease or evidence of acute plaque rupture. (Coronary angiographic criteria)
IV. In the absence of significant head trauma, intracranial bleeding, pheochromocytoma, myocarditis, or hypertrophic cardiomyopathy.

The most important issue is how to diagnose Takotsubo disease while evaluating acute coronary syndrome.

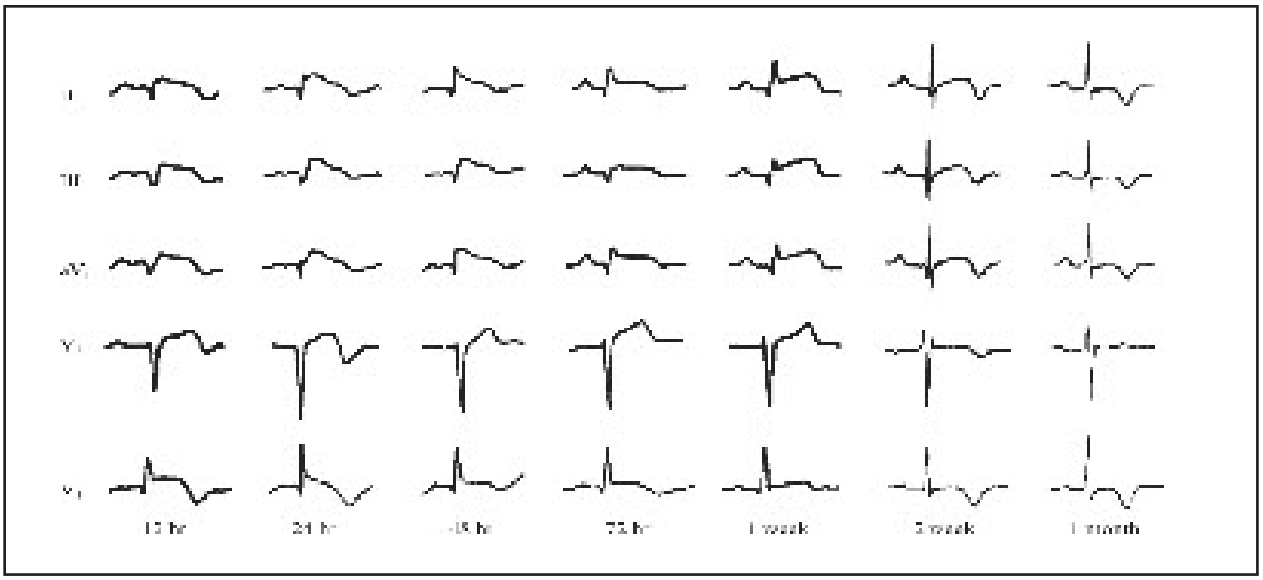

Fig.1: ECG changes – ST elevation in II, III, AVF in Takotsubo disease

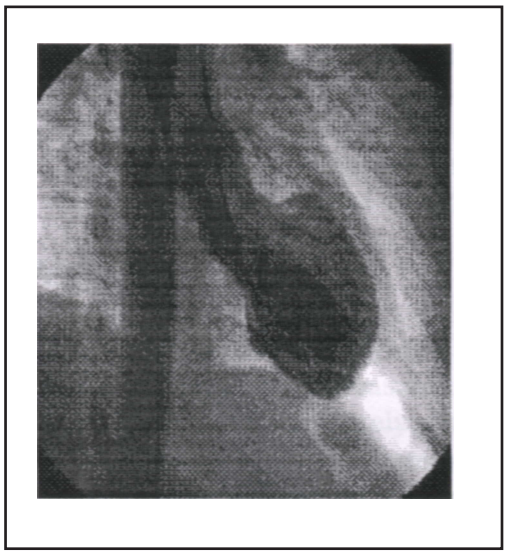

Fig.2: Left ventriculogram - apical ballooning (Systole)

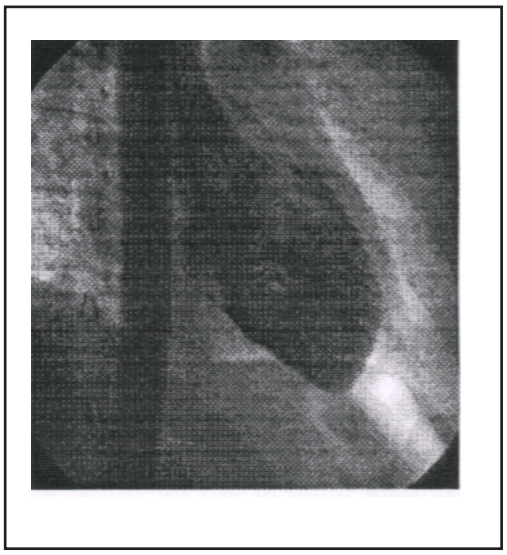

Fig.3: (Diastole)

a. If the patient presents early and is being treated by primary PCI, the findings at angiography will be non-significant coronary disease and apical ballooning.
b. If the patient is being treated with thrombolytic therapy, just having suspicion of Takotsubo is not just the reason to withhold thrombolytic therapy as majority of cases are due to critical coronary disease.
c. Patients who present without ST elevation will usually fit into high risk category due to elevated cardiac biomarker, hemodynamic instability, ECG changes and significant left ventricular dysfunction. So they will need cardiac catheterization in majority of cases and would suggest the correct diagnosis.

TREATMENT

Despite the treatment of underlying physical illness Takotsubo disease rarely requires any specific therapy except supportive measures. So it is a transient disorder of reversible nature with usually a benign course. Once the diagnosis is established, therapy is usually based on patient's overall clinical condition. Till now we don't have any 'A' level evidence to guide the clinician the optimal medical regimen. Generally it is managed with drugs that are available for systolic dysfunction of the heart including beta blockers, ACE inhibitors, and diuretics. If there is significant akinesis or dyskinesis or intracardiac thrombus, anticoagulation may be required.[21] Though there is no coronary lesion some advocate use of aspirin. As this is a transient disorder the appropriate duaration of therapy depends on the clinical condition of the patient and individual judgement. If the patient is in shock appropriate fluid resuscitation, inotrope agents or even IABP has been advocated depending on the availability and the expertise of the treating physician.

PROGNOSIS

Prognosis generally varies and has largely been good. Takotsubo though largely benign may be fatal sometimes. In hospital mortality varies from 0- 8%. Patients surviving acute episode usually recover fully in few weeks. However late sudden death and recurrent disease have occurred in few patients.[22] Though this is usually rare and majority recovers completely without any residual effects. However there have been some reports of death due to rupture of myocardium.[23]

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