

**MYOCARDIAL INFARCTION & ISCHEMIA THERAPY UPDATE**

## “Broken Heart Syndrome”: What Women Should Know

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**ABBREVIATION**

BHS = “broken heart” syndrome

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**ABSTRACT**

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The Takotsubo syndrome or apical ballooning, also known as “broken heart syndrome” (BHS) among a variety of suggested names, was first described by Sato et al in the Japanese population approximately 20 years ago. Since then, it has been increasingly recognized in other countries and in 2006 it was classified as a type of stress cardiomyopathy among acquired cardiomyopathies. The prevalence of the BHS is estimated to be 1-2% of patients presenting with an acute coronary syndrome but higher rates have been reported lately, due to a wider recognition of the syndrome. One of the hallmarks of the BHS is a strict predilection for postmenopausal women (over 90% in most series), whereas men account for less than 10% of cases. It has also been reported that among BHS patients, 43% had a preceding acute medical condition and 27% had a severe emotional or physical stressor associated with a “fight or flight” hypersympathetic response.

The presenting features of BHS are similar to those of myocardial ischemia during an acute coronary syndrome; patients may have chest pain with an angina-like feature (70% to 90%), dyspnea (20%), pulmonary edema, cardiac arrest or cardiogenic shock while serious ventricular arrhythmias rarely occur. Electrocardiographic findings vary at presentation with ST-segment elevation presenting in almost one-third of patients (anterior leads most commonly involved) but deep T-wave inversion, nonspecific ST wave changes or prolongation of the QT interval may also be seen and resolve during the ensuing weeks or months. Most, if not all, patients present with modest elevation of cardiac biomarkers, disproportionately low for the extensive regional wall motion abnormalities characterizing BHS.

The typical picture of the left ventricle in the BHS, resembling a Japanese octopus fishing pot, can be obtained with echocardiography, contrast ventriculography or magnetic resonance imaging. Transient hypokinesis or akinesis of the mid and apical segments of the left ventricle are classically observed. A rare variant presents with hypokinesis of the basal segments of the heart and preserved apical function described as “inverted Takotsubo” or “squid” syndrome. The right ventricle may also reveal wall motion abnormalities in 30% of patients who present with congestive heart failure. Patients with BHS usually have angiographically normal coronary arteries or mild atherosclerosis and the wall motion abnormalities typically extend beyond a single coronary vascular territory. Certain criteria have been proposed by the Mayo Clinic for the diagnosis of BHS and have been modified throughout the years, e.g. apart from pheochromocytoma and myocarditis, a recent significant head trauma or intracardiac bleeding should also be excluded before diagnosing BHS. The optimal therapy for the

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BHS has not been established yet; since it is a catecholamine-induced clinical syndrome, beta-blockers should be kept on board and angiotensin converting enzyme inhibitors should be provided until the recovery of cardiac function, usually within 2-4 weeks from the onset of symptoms.

The underlying pathogenetic mechanisms of such a rare and odd cardiac dysfunction have not yet been clearly elucidated and remain an active area of research. Catecholamine surge appears to play a significant role; it has been reported that norepinephrine, epinephrine and dopamine levels are approximately 2 to 3 times higher in patients with BHS than in patients with left ventricular dysfunction due to acute

myocardial infarction. The increased incidence of the BHS in women has been attributed to different mechanisms; it can be hypothesized that the adrenergic innervation is different between males and females or, males are throughout the centuries biologically better protected against stress-induced cardiotoxicity of catecholamines. A deficiency in estrogen activity, associated with decreased release of nitric oxide and endothelial dysfunction, may also play a role. The decreased use of hormonal replacement therapy in recent years may be linked to increased reports of BHS, while attenuation of Takotsubo cardiomyopathy by estrogen supplementation was demonstrated in an animal model.