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Psychiatric history, post-discharge distress, and personality characteristics among incident female cases of takotsubo cardiomyopathy: A case–control study

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ABSTRACT

Background: The role of psychological factors in the onset of takotsubo cardiomyopathy (TC) is still controversial. Associations with previous psychiatric conditions are registry-based; associations with personality characteristics and psychological sequelae of TC have been largely unexplored. This case–control study sought to study pre-admission psychiatric morbidity, personality traits, and post-discharge distress in incident cases of TC.

Methods: TC cases (Mayo clinic criteria) and acute myocardial infarction (MI) controls were recruited among women admitted to two Emergency Departments in New England. Healthy controls (HC) were recruited from a volunteers' registry. Preadmission psychiatric history (DSM-IV-TR) was abstracted from the medical record. PTSD symptoms (Impact of Events Scale); distress (Hospital Anxiety and Depression Scale); perceived stress (PS scale) and personality traits (optimism; hostility, type D personality) were collected via phone interview one month after discharge.

Results: From March 2013 through October 2015, 107 participants (45 TC, 32 MI and 30 HC) were enrolled. The prevalence of preadmission anxiety disorders was 24.4% in TC, 9.4% in MI, and 0 in HC ($p = 0.007$) while that of mood disorders was similar across groups. TC had higher psychological distress, perceived stress, and PTSD symptoms post-discharge vs. MI and HC. In adjusted models, PTSD symptoms remained higher in TC vs. MI ($b = 0.55$, $p < 0.05$) and vs. HC ($b = 0.92$, $p < 0.01$). Optimism and hostility scores were similar across groups, while type D (social inhibition) scores were higher in TC and MI vs. HC.

Conclusions: Preadmission anxiety, but not depression, was associated with the occurrence of TC. High distress and PTSD symptoms post-discharge indicate that TC women may be at risk for poor psychological adjustment.

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Introduction

Takotsubo cardiomyopathy (TC),[1] also known as stress cardiomyopathy, broken heart syndrome, or apical ballooning syndrome, is an increasingly recognized condition characterized by acute, but reversible, left ventricular dysfunction accompanied by electrocardiographic changes (i.e., ST elevation or negative T waves in the precordial leads with a prolonged corrected QT interval) and cardiac enzyme elevation (typically, troponin and CPK) in the absence of significant coronary artery disease.[2–5] Although initially considered a rare clinical syndrome more recent data suggest that TC accounts for 1–3% of all admissions for acute coronary syndromes[6] and for nearly 8% among women.[7–9] Postmenopausal women appear uniquely at risk for TC as 90% of cases are diagnosed in this population.[8,10] Physical or emotional stressors have been found to precipitate TC in 40–70% of cases.[4,8,10] Findings of high levels of plasma catecholamines and contraction-band necrosis on endomyocardial biopsy[11] as well as reports of cases precipitated by the administration of I.V. catecholamines and beta-receptor agonists[12] support the central role of an exaggerated sympathetic stimulation in the pathogenesis of this syndrome.[13,14] Severe complications, including heart failure and pulmonary edema, cardiogenic shock, and life threatening arrhythmias have been reported during hospitalization, with in-hospital mortality reaching 5%.[10,15] The long-term prognosis of TC was initially considered favorable[8,10,16–20]; recent studies, however, have shown higher rates of adverse cardiovascular and non-cardiovascular events during follow-up.[10,16,21]

Given the clinical significance of TC understanding factors that may predispose to its occurrence is crucial for the development of preventive strategies and comprehensive disease management. Recent reports have suggested that a history of psychiatric conditions may increase susceptibility to TC.[10,22–24] Such evidence, however, stems mostly from case series or registries with retrospective data collection and using historical control groups. Thus, it is yet unclear whether a history of psychiatric disorders may predispose individuals, especially middle-aged and elderly women, to the development of TC. The psychological conditions of TC survivors are also poorly understood despite the inherent high risk for psychological disruption of this condition. It is also unknown whether women with negative personality traits may be more susceptible to the development of this syndrome. Pessimistic women, for example, have a higher risk of future cardiovascular events and pessimism has been associated with higher levels of inflammation.[25,26] Individuals with type D personality have a tendency toward experiencing negative emotions combined with introversion and social inhibition; this trait has been linked with a worse cardiac prognosis.[27]

The objectives of this study were (1) to evaluate whether a documented pre-admission history of psychiatric disorders is a predisposing factor for the occurrence of TC and (2) to assess whether TC is associated with negative personality traits and higher psychological distress post-discharge. Our working hypothesis was that women with TC would be more likely to have a history of pre-admission psychiatric disorders and would show higher post-discharge psychological distress and negative personality traits compared to controls.

Methods

Design and population

We chose a case–control design to study associations between TC occurrence and pre-admission history of psychiatric disorders while a cross-sectional design was used to study post-discharge psychological symptoms and personality characteristics. Given that the vast majority of TC patients are female, and that the lower number of male patients with this condition (<10%) limits the power to conduct subgroup analyses by gender, only females were enrolled in this study.

TC cases

To be eligible, *TC cases* had to a) be ≥21 years old; b) have a first diagnosis of TC fulfilling Mayo Clinic diagnostic criteria (presence of a transient abnormality in left ventricular wall motion beyond a single epicardial coronary artery perfusion territory, absence of obstructive coronary artery disease or angiographic evidence of acute plaque rupture, new electrocardiographic abnormalities or elevation in cardiac troponin levels[28]); c) be able to understand and speak English; d) have access to a telephone. TC cases were ineligible if they a) were unable or unwilling to give informed consent; b) had a history of pheochromocytoma, myocarditis, or hypertrophic cardiomyopathy; c) had dementia or cognitive impairment (from medical record); d) were clinically unstable.

Controls

The control groups were women admitted with a confirmed diagnosis of acute (both ST elevation and non-ST elevation) myocardial infarction (MI) as well as a group of healthy female controls (HC). Eligibility criteria for MI controls were a) age ≥ 21; b) a diagnosis of MI meeting current diagnostic criteria[29]; c) ability to understand and speak English; d) access to a telephone. Exclusion criteria were a) a prior diagnosis of TC; b) inability or unwillingness to give informed consent; c) had dementia or cognitive impairment (from medical record); d) clinical instability. Eligibility criteria for HC women were a) age >21; b) ability to understand and speak English; c) access to a phone; d) no previous diagnosis of stress cardiomyopathy or chronic conditions (any cancer other than non-melanoma skin cancer; cardiovascular disease; liver failure; renal failure); e) no history of dementia or cognitive impairment. Eligibility criteria were confirmed by a trained physician abstractor blinded to the study outcomes. Since intracranial bleeding or head trauma are associated with various levels of cognitive deficits that impair the ability to complete psychological assessments, women with these conditions were excluded from the study.

Recruitment

TC cases and MI controls were recruited among consecutive, incident cases[30] of TC and MI presenting at the emergency departments of UMass Memorial Medical Center in Worcester, MA and of Hartford Hospital in Hartford, CT from March 2013 to October 2015. Participants were identified through the daily review of computerized listings from cardiac catheterization labs, echo labs, emergency departments, and via physicians' referral. HC were recruited from the Conquering Diseases database, a registry of research volunteers at the University of Massachusetts Medical School. Invitation letters were sent to women in the registry and eligible women were enrolled on a first come, first serve basis.

After a preliminary determination of eligibility through a review of the medical record, participants received a letter inviting them to participate in the study and a fact sheet describing study procedures. To avoid selection bias (i.e. the exclusion of more severe cases who did not survive or were too ill to undergo a coronary angiogram), TC cases who did not undergo an angiogram (but otherwise met all other diagnostic criteria) were also enrolled, and we over-recruited among TC women in order to guarantee a sample of at least 30 TC cases with an angiogram-confirmed diagnosis. Once the