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Self-reported symptoms 8 weeks after discharge: A comparison of takotsubo syndrome and myocardial infarction

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ABSTRACT

Background: Takotsubo syndrome is a form of acute, reversible heart failure that has gained increasing attention. It affects mostly postmenopausal women, and its acute onset and symptoms mimic acute myocardial infarction. The distinct feature of takotsubo syndrome is the ballooning of a ventricle, but the complete pathophysiological mechanisms are not fully understood. Both short-term and long-term survival are affected, but little is known about the illness experience and self-reported residual symptoms after discharge from hospital.
Aim: To measure and compare self-reported residual symptoms between patients with takotsubo syndrome and those with acute myocardial infarction.
Method: Questionnaire data measuring self-reported symptoms were collected from 48 patients with takotsubo syndrome and 79 patients with acute myocardial infarction 8 weeks after discharge. A multivariate adjusted complete case regression model was used to compare the frequency and severity of symptoms.
Results: Self-reported symptoms 8 weeks after discharge differed little between patients with takotsubo syndrome and those with acute myocardial infarction. Both groups reported symptoms, including pain, fatigue, breathlessness, and sleep disturbance. At onset there were significant differences between the groups concerning previous diabetes mellitus, cardiac troponin T, ejection fraction and Killip class. There were no significant between-group differences in frequency or severity of symptoms after adjusting for these differences.
Conclusion: Patients with takotsubo syndrome experience residual symptoms after discharge. Symptoms in several cardiovascular diseases predict quality of life, re-admission, and mortality. Symptom management should be integrated into follow-up care for patients with takotsubo syndrome. One way of achieving this is through person-centered care.

1. Introduction

Symptoms are defined as self-reported experiences connected to an illness, whereas signs are defined as biological changes caused by a disease. Symptoms are always subjective, whereas signs are considered objective [1,2]. Symptom experience is influenced by psychological and social factors [3] and the response to a symptom is based on a person's reality [1]. Disease severity and pathophysiological changes are poorly correlated with suffering caused by symptoms [4,5]. Therefore, symptoms are a good indication of subjective health and quality of life, and treating symptoms can improve health [2].

Takotsubo syndrome (TS) is a form of acute reversible heart failure, which has been increasingly recognized during the last 25 years. Its most distinct clinical signs are ballooning of one of the ventricles, usually the left, and regional wall motion abnormalities [6,7]. It affects mostly postmenopausal women, but cases of both sexes and all ages have been recorded [6,7]. In the acute phase, TS mimics acute myocardial infarction (AMI) with similar signs, such as ST elevation and electrocardiogram (ECG) changes. Clinical presentation is similar between TS and AMI and comprises chest pain, dyspnea, lipothymy, and malaise [8–11]. TS is often preceded by a psychological or physical stressor, but in approximately one-third of cases, no stressor can be identified [7]. TS was previously considered a benign condition characterized by fast recovery and a survival similar to that of the general population, but recent studies have changed this view [7]. Wall motion abnormalities take up to 3 months to return to normal, and ECG changes and N-terminal pro b-type natriuretic peptide (NT-proBNP) levels may take 6–12 months to return to normal [6]. Furthermore, short-term

Abbreviations: TS, takotsubo syndrome; AMI, acute myocardial infarction; ECG, electrocardiogram; NT-proBNP, N-terminal pro b-type natriuretic peptide; EF, ejection fraction; TNT, cardiac troponin T; HRQoL, health-related quality of life.

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all-cause mortality and long-term all-cause mortality for TS patients are equal to or worse than for AMI patients [12,13].

Residual symptoms, such as pain and breathlessness, are a known feature of AMI and they affect quality of life [14]. The sparse research on residual symptoms after TS indicates a wide array of symptoms [15] and pain is present long after discharge [16]; however, quantitative studies that measure a wider array of self-reported residual symptoms are still lacking.

2. Objective

The aim of the study was to measure and compare self-reported residual symptoms between patients with TS and those with AMI.

3. Methods

3.1. Patients and settings

All patients were included after angiography at Sahlgrenska University hospital in western Sweden. Patients with TS were included from May 2012 to October 2015. The inclusion criteria for the TS group were 1) diagnosis of TS; 2) ability to speak Swedish; 3) ability to fill in the questionnaires; and 4) predicted survival of more than 6 months. There are general age and sex differences between the two diseases that may influence the symptom experience; therefore, a control group was included based on the sex and age distribution of the TS group. The inclusion criteria for the AMI group were 1) diagnosis of AMI; 2) ability to speak Swedish; 3) ability to fill in the questionnaires; 4) predicted survival of more than 6 months; and 5) same sex and age ± 2 years as participants with TS. The inclusion period lasted from September 2012 to February 2016 and was terminated when the groups were adequately balanced regarding sex and age.

In total, 97 patients with TS were identified during the study period. Of those, 29 declined participation, 10 had a predicted survival of less than 6 months, 5 did not speak Swedish or were otherwise unable to fill in the questionnaires, 2 were participating in another incompatible research study, 2 died, and 1 accepted participation but did not return the questionnaires despite being reminded. The remaining 48 patients with TS were included in the study. As only the identified patients with AMI who matched one of the included participants with TS were asked to participate, no acceptance rate data for this group was recorded.

3.2. Instruments

Six questionnaires measuring self-reported symptoms were used. All were standardized, widely used measures that had been validated in Swedish and had shown good internal and external validity. The McGill Pain Inventory-Short Form comprises 15 adjectives that describe the sensory and affective dimensions of pain. It has been used to assess the pain experience of several different types of patients [17]. The Multidimensional Fatigue Inventory is a 20-item questionnaire assessing five dimensions of fatigue [18]. The Perceived Stress Scale is a 14-item self-rating questionnaire that measures current stress [19]. The Hospital Anxiety and Depression Scale is a simple 14-item self-assessment form designed for use in somatic care and primary care. It measures patients' anxiety and depression [20]. The Somatic Health Complaints Questionnaire asks respondents to rate how often they experience 13 symptoms commonly experienced by cardiac patients [21].

3.3. Data collection

All potential participants were asked to participate in connection with their hospital stay, either at hospital or by telephone after discharge. Informed consent was collected at this point. The questionnaires and a return envelope were mailed to all participants 8 weeks after discharge. If the questionnaires were not returned within 2 weeks, telephone reminders were given. Data about previous diseases, medications, and care were retrieved from participants' medical records.

3.4. Statistical analysis

The primary model for analysis was a multivariate adjusted complete case regression. Continuous data are expressed as mean (range) and categorical data as proportions (%). Descriptive statistics were used to calculate baseline characteristics. To compare the two groups, an independent samples t-test was used for continuous variables and a Pearson chi-square test for independence for categorical variables. The independent samples t-test compares the mean score of a continuous variable for two different groups of people. For dichotomous variables, Yates' correction for continuity was used to compensate for the tendency of chi-square overestimation in dichotomous variables. Propensity scores were calculated to enable adjustment for differences between groups regarding confounding variables, such as risk factors, background, and previous diseases. For the propensity score calculations, the dependent variable was TS or AMI and the independent variables were sex, age, civil status, previous AMI, previous stroke, diabetes mellitus, current and previous smoking, hypertension, ejection fraction (EF), cardiac troponin T (TNT), and Killip class. To calculate the propensity score, missing data was imputed using ad hoc imputation. Linear regression was used for variables consisting of several questions combined to a total score. An ordinal regression model or a polytomous universal model, which is an extension of the general linear model to ordinal categorical data, was used for single-item questions on an ordinal scale. Binary regression was used to test between-group differences in dichotomous variables. Missing data were not imputed. A value of $p < 0.05$ was considered significant and 95% confidence intervals were calculated. Equal variance was calculated using Levene's test; if $p > 0.05$, equal variance was assumed and if $p < 0.05$, the 95% confidence intervals were used to compensate for lack of homogeneity of variance. Statistical analyses were performed using SPSS 22 (SPSS Inc.; Chicago, Illinois).

3.5. Ethics

The investigation conforms with the principles outlined in the Declaration of Helsinki [22]. The study was approved by the Regional Ethics Board at the University of Gothenburg with Dnr 275-11 and amendments T693-11 and T580-12. All participants gave their written approval before inclusion in the study.

4. Results

In total, 48 patients with TS and 79 with AMI participated in the study. Regarding age, sex distribution, risk factors, and medical history, the TS group was similar to larger cohorts [6,23] so the sample should have been representative of the whole population. The TS and AMI

Table 1
Patient characteristics and baseline medical background.

	TS n = 48	Missing n (%)	AMI n = 79	Missing n (%)	*p*-Value
Women (%)	45 (93.8)	0 (0)	69 (87.3)	0 (0)	0.393
Age mean (range)	67.5625 (39–86)	0 (0)	69.3671 (49–87)	0 (0)	0.319
Married/co-habitant (%)	27 (56.3)	0 (0)	46 (58.2)	0 (0)	0.973
Previous AMI (%)	3 (6.3)	5 (10.4)	13 (16.5)	2 (2.5)	0.211
Previous stroke (%)	2 (4.2)	3 (6.3)	5 (6.3)	2 (2.5)	0.947
Smoking (%)	7 (14.6)	5 (10.4)	15 (19.0)	7 (8.9)	0.835
Previous smoker (%)	17 (35.4)	5 (10.4)	27 (34.2)	7 (8.9)	0.835
Diabetes mellitus (%)	1 (2.1)	3 (6.3)	16 (20.3)	0 (0)	0.011*
Hypertension (%)	28 (58.3)	2 (4.2)	46.0 (58.2)	3 (3.8)	1.000
EF mean (range)	43.5 (28–63)	4 (8.3)	52.4 (30–65)	3 (3.8)	0.000***
TNT mean (range)	570 (24.3–1370)	4 (8.3)	1372.5910 (10.2–10,000)	1 (1.3)	0.002**
Killip class					
I	34 (70.8)	1 (2.1)	74 (93.7)	3 (3.8)	0.000***
II	10 (20.8)	1 (2.1)	1 (1.3)	3 (3.8)	0.000***
III	3 (6.3)	1 (2.1)	1 (1.3)	3 (3.8)	0.000***
IV	0 (0)	1 (2.1)	1 (1.3)	3 (3.8)	0.000***

TS: takotsubo syndrome; AMI: acute myocardial infarction; EF: ejection fraction; TNT: cardiac troponin T.
* $p < 0,05$.
** $p < 0,01$.
*** $p < 0,001$.