

ORIGINAL RESEARCH

Echocardiographic Correlates of Acute Heart Failure, Cardiogenic Shock, and In-Hospital Mortality in Tako-Tsubo Cardiomyopathy

Rodolfo Citro, MD,*† Fausto Rigo, MD,‡ Antonello D'Andrea, MD,§ Quirino Ciampi, MD,||
Guido Parodi, MD,¶ Gennaro Provenza, MD,# Raffaele Piccolo, MD,** Marco Mirra, MD,††
Concetta Zito, MD,‡‡ Roberta Giudice, MD,†† Marco Mariano Patella, MD,§§
Francesco Antonini-Canterin, MD,||| Eduardo Bossone, MD,† Federico Piscione, MD,††
Jorge Salerno-Uriarte, MD,* on behalf of the Tako-Tsubo Italian Network Investigators
Varese, Salerno, Mestre, Naples, Benevento, Florence, Potenza, Messina, Terni, and Pordenone, Italy

OBJECTIVES The purpose of this study was to determine clinical and echocardiographic correlates of acute heart failure, cardiogenic shock and in-hospital mortality in a large cohort of tako-tsubo cardiomyopathy (TTC) patients.

BACKGROUND Despite good long-term prognosis, life-threatening complications due to hemodynamic instability can occur early in TTC patients.

METHODS The study population consisted of 227 patients (66.2 ± 12.2 years of age; females, 90.3%) enrolled in the Tako-tsubo Italian Network, undergoing transthoracic two-dimensional echocardiography on admission and at short-term follow-up (4.3 [4 to 6] weeks). Patients were divided into two groups according to the presence or absence of major adverse events, a composite of acute heart failure, cardiogenic shock, and in-hospital mortality.

RESULTS Major adverse events occurred in 59 patients (25.9%). The variables for elderly patients ≥ 75 years of age (42.4% vs. 23.8%; $p = 0.011$): left ventricular (LV) ejection fraction ($35.1 \pm 5.9\%$ vs. $38.4 \pm 4.6\%$, $p < 0.001$), wall motion score index (1.9 ± 0.2 vs. 1.7 ± 0.2 , $p < 0.001$), E/e' ratio (13.5 ± 4.3 vs. 9.9 ± 3.3 [where E/e' is ratio of mitral E peak velocity and averaged e' velocity], $p < 0.001$), LV outflow tract obstruction (23.7 vs. 8.9%, $p = 0.006$), pulmonary artery systolic pressure (47.4 ± 12.3 mm Hg vs. 38.0 ± 9.2 mm Hg; $p < 0.001$), right ventricular involvement (28.8 vs. 9.5%; $p < 0.001$), and reversible moderate-to-severe mitral regurgitation (49.1 vs. 11.9%; $p < 0.001$), were significantly different between groups and were associated with adverse events. At multivariate analysis, LV ejection fraction (HR: 0.92; 95% CI: 0.89 to 0.95; $p < 0.001$), E/e' ratio (HR: 1.13; 95% CI: 1.02 to 1.24; $p = 0.011$), reversible moderate to severe mitral regurgitation (HR: 3.25; 95% CI: 1.16 to 9.10; $p = 0.025$), and age ≥ 75 years (HR: 2.81; 95% CI: 1.05 to 7.52; $p = 0.039$) were independent correlates of major adverse events.

CONCLUSIONS Echocardiographic parameters provide additional information compared to other variables routinely used in clinical practice to identify patients at higher risk of hemodynamic deterioration and poor in-hospital outcome, allowing prompt institution of appropriate pharmacological treatment and adequate mechanical support. (J Am Coll Cardiol Img 2014;7:119–29) © 2014 by the American College of Cardiology Foundation

Tako-tsubo cardiomyopathy (TTC) is typically characterized by transient left ventricular (LV) systolic dysfunction with morphological features of apical ballooning, although other variant forms (e.g., midventricular ballooning) have also been described (1–3). It occurs most often in post-menopausal women and is usually triggered by emotional or physical stress, with complete recovery of LV systolic function within a few days or weeks (4,5). Despite its favorable long-term prognosis and very low mortality, TTC is not considered a benign condition, because of the occurrence of

The diagnosis of TTC was based on the following Mayo Clinic criteria (5):

- Transient akinesia or dyskinesia of LV apical and/or midventricular segments;
- No angiographic evidence of $\geq 50\%$ coronary artery stenosis, or plaque rupture, or intracoronary thrombus formation;
- New ECG abnormalities (dynamic ST-T changes or T-wave inversion);
- Absence of intracranial bleeding, pheochromocytoma, and myocarditis.

Patients with a poor acoustic window (suboptimal visualization of endocardial borders) were excluded. All participants provided informed written consent, and the study was approved by the local ethics committee.

Data collection. Clinical variables were recorded on a standardized form that included information on patient demographics (sex, age, heart rate, systolic and diastolic blood pressure), signs and symptoms at presentation, medical history, trigger events, ECG ST-segment changes and presence of prolonged QTc interval on admission, and clinical observations during hospitalization (including major cardiac events). Emotional or physical triggers were identified as previously described (8). Venous blood was collected every 3 hours to measure troponin I concentration in the acute phase, and collection continued until a peak value was observed. All patients underwent coronary angiography and left ventriculography within 24 hours of symptom onset.

Definition of major adverse events due to hemodynamic instability. Major adverse events were defined as a composite of acute heart failure, cardiogenic shock, and in-hospital mortality. In particular:

- Acute heart failure was defined as the presence of pulmonary edema, dyspnea, and/or oxygen desaturation requiring drug therapy and/or mechanical support;
- Cardiogenic shock was defined as systolic blood pressure < 90 mm Hg with signs of tissue hypoperfusion requiring inotropic agents and/or fluid therapy;

See page 130

ABBREVIATIONS AND ACRONYMS

BNP	= brain natriuretic peptide
CMR	= cardiac magnetic resonance
EF	= ejection fraction
LA	= left atrial
LV	= left ventricular
LVOTO	= left ventricular outflow tract obstruction
MR	= mitral regurgitation
sPAP	= pulmonary artery systolic pressure
RV	= right ventricular
TAPSE	= tricuspid annular plane systolic excursion
TTC	= tako-tsubo cardiomyopathy
WMSI	= wall motion score index

life-threatening complications during the acute phase, related to hemodynamic instability (e.g., acute heart failure, cardiogenic shock) in a substantial proportion of patients (6–8). Owing to its widespread use in critical care settings, echocardiography has become the noninvasive imaging modality of choice for assessing TTC (2,9). However, the combination of clinical, electrocardiographic (ECG), laboratory, and echocardiographic measures routinely used in clinical practice for TTC patients experiencing major adverse events due to hemodynamic instability have not yet been well described. The aim of this study was to identify the clinical and echocardiographic determinants of major adverse events, a composite of acute heart failure, cardiogenic shock, and in-hospital mortality, in a large cohort of TTC patients.

METHODS

Study population. The study population consisted of 227 patients enrolled in the Tako-Tsubo Italian Network, undergoing comprehensive transthoracic 2-dimensional echocardiography on admission and at short-term follow-up (4.3 [4 to 6] weeks) (8,10).

From the *Department of Heart Sciences, Circolo Hospital and Macchi Foundation, University of Insubria, Varese, Italy; †Heart Department, University Hospital San Giovanni di Dio e Ruggi d'Aragona, Salerno, Italy; ‡Department of Cardiology, Dell'Angelo Hospital, Mestre, Italy; §Department of Cardiology, Second University of Naples, Naples, Italy; ||Department of Cardiology, Fatebenefratelli Hospital, Benevento, Italy; ¶Division of Cardiology, Careggi Hospital, Florence, Italy; #Division of Cardiology, Civic Hospital, Villa d'Agri, Potenza, Italy; **Department of Clinical Medicine, Cardiovascular Sciences and Immunology, Federico II, University of Naples, Naples, Italy; ††Department of Medicine and Surgery, University of Salerno, Salerno, Italy; ‡‡Division of Cardiology, University of Messina, Messina, Italy; §§Division of Cardiology, S. Maria Hospital, Terni, Italy; and the ||||Division of Cardiology, S. Maria degli Angeli Hospital, Pordenone, Italy. The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Manuscript received July 6, 2013; revised manuscript received August 27, 2013, accepted September 5, 2013.

Download English Version:

<https://daneshyari.com/en/article/2938170>

Download Persian Version:

<https://daneshyari.com/article/2938170>

[Daneshyari.com](https://daneshyari.com)