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CLINICAL RESEARCH

Trends in Short- and Long-Term Outcomes for Takotsubo Cardiomyopathy Among Medicare Fee-for-Service Beneficiaries, 2007 to 2012

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ABSTRACT

OBJECTIVES The aim of this study was to assess trends in hospitalizations and outcomes for Takotsubo cardiomyopathy (TTC).

BACKGROUND There is a paucity of nationally representative data on trends in short- and long-term outcomes for patients with TTC.

METHODS The authors examined hospitalization rates; in-hospital, 30-day, and 1-year mortality; and all-cause 30-day readmission for Medicare fee-for-service beneficiaries with principal and secondary diagnoses of TTC from 2007 to 2012.

RESULTS Hospitalizations for principal or secondary diagnosis of TTC increased from 5.7 per 100,000 person-years in 2007 to 17.4 in 2012 (p for trend < 0.001). Patients were predominantly women and of white race. For principal TTC, in-hospital, 30-day, and 1-year mortality was 1.3% (95% confidence interval [CI]: 1.1% to 1.6%), 2.5% (95% CI: 2.2% to 2.8%), and 6.9% (95% CI: 6.4% to 7.5%), and the 30-day readmission rate was 11.6% (95% CI: 10.9% to 12.3%). For secondary TTC, in-hospital, 30-day, and 1-year mortality was 3% (95% CI: 2.7% to 3.3%), 4.7% (95% CI: 4.4% to 5.1%), and 11.4% (95% CI: 10.8% to 11.9%), and the 30-day readmission rate was 15.8% (95% CI: 15.1% to 16.4%). Over time, there was no change in mortality or readmission rate for both cohorts. Patients ≥85 years of age had higher in-hospital, 30-day, and 1-year mortality and 30-day readmission rates. Among patients with principal TTC, male and nonwhite patients had higher 1-year mortality than their counterparts, whereas in those with secondary TTC, mortality was worse at all 3 time points. Nonwhite patients had higher 30-day readmission rates for both cohorts.

CONCLUSIONS Hospitalization rates for TTC are increasing, but short- and long-term outcomes have not changed. At 1 year, 14 in 15 patients with principal TTC and 8 in 9 with secondary TTC are alive. Older, male, and nonwhite patients have worse outcomes. (J Am Coll Cardiol HF 2016;4:197–205) © 2016 by the American College of Cardiology Foundation.

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ABBREVIATIONS AND ACRONYMS

AMI = acute myocardial infarction

CAD = coronary artery disease

CI = confidence interval

ICD-9-CM = International Classification of Diseases-Ninth Revision-Clinical Modification

LOS = length of stay

TTC = Takotsubo cardiomyopathy

Takotsubo cardiomyopathy (TTC), also known as stress cardiomyopathy or apical ballooning syndrome, is a rare but increasingly recognized cardiac syndrome that mimics acute myocardial infarction (AMI) (1). It is frequently triggered by an acute medical illness or intense emotional or physical stress, predominantly affecting older women. TTC is usually characterized by transient systolic dysfunction of segments of the left ventricle in the absence of angiographic evidence of obstructive coronary artery disease (CAD) or acute plaque rupture (2).

Our knowledge regarding outcomes of patients with TTC is largely limited to case series because of the rarity of the disease (3–5). These studies suggest that the short-term prognosis for this enigmatic condition is favorable, with most patients surviving the acute episode and experiencing recovery of ventricular function. However, wide variation (0% to 8%) in in-hospital mortality rates has been reported (6), and there is a paucity of nationally representative data. Furthermore, little is known about longer-term clinical outcomes, including mortality and readmission, after TTC, or trends in hospitalizations and outcomes.

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Accordingly, we assessed trends in hospitalization rates and outcomes for TTC in the United States among Medicare fee-for-service beneficiaries between 2007 and 2012. We evaluated in-hospital, 30-day, and 1-year mortality; 30-day readmission; and risk-adjusted trends in these outcomes. We also evaluated trends in length of stay (LOS) and discharge disposition. Finally, we assessed differences in outcomes by subgroups of age, sex, and race.

Because TTC can present as an acute coronary syndrome or occur in conjunction with an acute medical illness, we reported outcomes separately for principal and secondary diagnoses of TTC. We reasoned that hospitalizations with principal diagnoses of TTC more likely represent primary coronary presentations of TTC, whereas hospitalizations with secondary diagnoses of TTC more likely represent cases in which a significant acute medical illness was the primary reason for admission, and TTC was precipitated by the acute medical illness. This distinction is important because outcomes for secondary diagnosis of TTC are likely to be driven by the primary reason for hospitalization.

METHODS

STUDY POPULATION. We used Medicare inpatient claims data and Medicare enrollment data from the Centers for Medicare & Medicaid Services to identify all Medicare fee-for-service beneficiaries ages 65 years and older hospitalized with principal or secondary diagnoses of TTC in acute care hospitals in the United States from January 1, 2007, to December 31, 2012, using the International Classification of Diseases-Ninth Revision-Clinical Modification (ICD-9-CM) code 429.83. Because the specific ICD-9-CM code for TTC was introduced in October 2006, we used only data from 2007 onward. Although there is no worldwide consensus on the diagnostic criteria for TTC, most criteria for diagnosing TTC require the absence of obstructive CAD or angiographic evidence of acute plaque rupture (2,7). Thus, we included only those patients in our study sample who underwent coronary angiography (ICD-9-CM codes 37.22, 37.23, 88.55, 88.56, and 88.57) and did not receive revascularization therapy (i.e., percutaneous coronary intervention [ICD-9-CM codes 36.01, 36.02, 36.05, 36.07, 36.09, and 00.66] or coronary artery bypass grafting [ICD-9-CM codes 36.1x]). This method has been used previously (8). For the hospitalization analysis, the unit of analysis was at the Medicare fee-for-service beneficiary level; for reporting patient characteristics and the outcome analysis, the unit of analysis was at the patient level. Thus, if a patient had >1 admission for TTC during the year, we randomly selected 1 hospitalization. Institutional review board approval was obtained from the Yale University Human Investigation Committee.

PATIENT CHARACTERISTICS. We examined patients' age, sex, and race (white, black, or other) as well as common comorbidities and trends in the demographic and clinical profiles separately for patients with principal and secondary diagnoses of TTC. Comorbidities included those used in risk adjustment models of 30-day mortality measures for AMI and heart failure (9,10). They were identified from secondary discharge

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