Takotsubo in This Case

Takotsubo cardiomyopathy, characterized by transient left ventricular systolic dysfunction, is a disorder that predominantly affects women, and should be especially considered when a female patient presents with signs and symptoms of ACS.

Patient Profile

Initials: KK
Age: 45
Sex: Female
Occupation: Unemployed
Living Situation/Marital Status: Lives at home with 4-year-old son, single
Substance use: Former smoker, quit in 2006. Denies alcohol use. Denies drug use.
Past Medical History: Type 2 diabetes mellitus, hypercholesterolemia, hypertension, peripheral vascular disease
Medications: Atorvastatin, insulin, lisinopril
Surgeries: Right foot amputation and left great toe amputation (secondary to peripheral vascular disease), cholecystectomy
Family history: Multiple family members with type 2 diabetes, no other relevant family history

Patient presented to the ED with a 3-day history of left-sided “squeezing” chest pain radiating down the left arm. She also reported associated shortness of breath and diaphoresis. Chest pain was constant but with intermittent episodes of more severe pain, seemingly not associated with a specific trigger.

Evaluation

On physical exam, patient was in moderate pain distress. Heart and lung exam were normal. Lower extremities had evidence of chronic peripheral vascular disease and prior amputations but without acute change. EKG showed ST elevations in the inferolateral leads and T wave inversion in III. Initial troponin was 1.53.

ED Course/Management

Code STEMI was activated given ST elevations on EKG. Transthoracic echocardiogram was consistent with possible LAD territory ischemia versus stress cardiomyopathy, and the patient was taken to the cath lab. Cath was negative for evidence of obstructive coronary disease.

Diagnosis

Takotsubo (stress) cardiomyopathy

Discussion

Takotsubo cardiomyopathy (TC), also known as stress cardiomyopathy, is characterized by transient systolic dysfunction of the left ventricle in the absence of coronary artery obstruction. Definitive diagnosis also requires new EKG abnormalities, such as ST elevation or T wave inversion, or an elevated troponin.[1] TC predominantly affects postmenopausal women; systematic review has shown 82-100% of cases are in women, with an average age of 65-72.[2] It occurs in approximately 1-2 percent of patients in whom ACS is suspected and troponin is elevated.[3]

The pathogenesis of TC is not well-understood, but several mechanisms have been proposed. It is thought that catecholamine excess may result in myocardial stunning or direct myocardial toxicity.[4,5] This may account for sex differences, as adrenergic receptors, of which there are increased density in left ventricular apical myocardium, have been shown to be more sensitive in women.[6,7] Other proposed mechanisms include coronary artery vasospasm and microvascular dysfunction, as well as mid-cavity or left ventricular outflow tract obstruction resulting in apical dysfunction.[8] There is an identifiable stress-related trigger in 27% of cases.[4]

TC should be treated much like ACS. When the EKG is concerning for STEMI, management includes cardiac catheterization, beta blockers, aspirin, and heparin.[9] Overall prognosis is favorable with a low complication rate.

In this case, sex differences regarding the evaluation of chest pain were not actively considered, though this did not seem to detract from the patient's care. This is likely because the patient had several traditional risk factors for ACS in conjunction with ST elevations, making the decision to go to the cath lab straightforward. However, because the presentation was consistent with a possible STEMI, attention was focused on that, and takotsubo cardiomyopathy was not actively considered in the differential diagnosis. Luckily, because the treatment for STEMI and TC overlap, this patient still received appropriate care. In a less straightforward case, such as one without ST elevations, not including TC in the differential could lead to inadequate treatment and, as a result, poorer outcomes.

References:

1. Hachamovitch R, Chang JD, Kuntz RE, et al. Recurrent reversible cardiogenic shock triggered by emotional distress with no obstructive coronary artery disease. Am Heart J 1995; 129.
2. Bybee KA, Kara T, Prasad A et al. Systematic review: transient left ventricular apical ballooning: a syndrome that mimics ST-elevation myocardial infarction. Ann Intern Med 2004;141(11):858-65.
3. Prasad A, Dangas G, Srinivasan M, et al. Incidence and angiographic characteristics of patients with apical ballooning syndrome (takotsubo/stress cardiomyopathy) in the HORIZONS-AMI trial: an analysis from a multicenter, international study of ST-elevation myocardial infarction. Catheter Cardiovasc Interv 2014; 83:343-8.
4. Gianni M, Dentali F, Grandi AM, et al. Apical ballooning syndrome or takotsubo cardiomyopathy: a systematic review. Eur Heart J 2006;27:1523-9. 5.
5. Nef HM, Möllman H, Kostin S, et al. Tako-Tsubo cardiomyopathy: intraindividual structural analysis in the acute phase and after functional recovery. Eur Heart J 2007;2456-64. 6.
6. Kneale BJ, Chowienczyk PJ, Brett SE, Coltart DJ, Ritter JM. Gender differences in sensitivity to adrenergic agonists of forearm resistance vasculature. J Am Coll Cardiol 2000;36(4):1233-8. 7.
7. Mori H, Ishikawa S, Kojima S et al. Increased responsiveness of the left ventricular apical myocardium to adrenergic stimuli. Cardiovasc Res 1993;27(2)192-8. 8.
8. Wittstein IS, Thiemann DR, Lima JA, et al. Neurohumeral features of myocardial stunning due to sudden emotional stress. N Engl J Med 2005;352(6):539-48.
9. Bybee KA, Prasad A. Stress-related cardiomyopathy syndromes. Circulation 2008;118(4):397-409.