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Visual Case Discussion

Provoked seizure with stress cardiomyopathy

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1. Discussion

This case examines a 55-year-old woman who presented with reported seizure like activity and associated loss of consciousness, fall, and scalp laceration. Her review of systems and physical exam revealed no concerning features suggesting a cardiac etiology of her loss of consciousness, though she experienced transient and asymptomatic hypotension during her ED evaluation. Her ECG showed normal sinus rhythm without ischemic features, however diagnostic lab studies showed an elevated serum cardiac troponin T (cTnT) level. Cardiology evaluated her in the ED given her elevated troponins, polysubstance abuse, single episode of loss of consciousness with reported extremity posturing, and confusion without aura/pre-syncopal symptoms. A bedside focused TTE noted apical ballooning wall motion abnormality and the patient was admitted to the CCU for further evaluation including comprehensive echocardiogram and left heart catheterization. Her troponins down-trended to normal upon admission. Her comprehensive echocardiogram and subsequent left heart catheterization demonstrated minimal non-obstructive cardiac atherosclerosis, reduced left ventricular ejection fraction, and apical ballooning consistent with stress (Takotsubo) cardiomyopathy. Her loss of consciousness may represent a drug provoked seizure and her stress cardiomyopathy may represent emotional stress with polysubstance abuse as an exacerbating factor.

2. Visual case discussion

A 55-year-old woman arrived to the emergency department with witnessed seizure-like activity occurring earlier that day while standing in the kitchen. Witnesses described 5 min of altered consciousness with flexing and extending of the upper extremities followed by transient confusion. She denied memory of the event and pre-syncopal symptoms, and had no history of seizures, syncopal events, or cardio-pulmonary pathology. She reported current polysubstance abuse including inhaled cocaine the day prior and nasally inhaled heroin three days prior after 9 years clean. She adamantly denied chest pain, shortness of breath, dyspnea, nausea, vomiting, headache, and vision changes throughout her stay. A provider handoff occurred simultaneously with the patient going to the CT scanner in the ED. After returning, she became transiently hypotensive though the patient remained asymptomatic. Electrocardiography (ECG) showed sinus rhythm without evidence of ischemia/injury. Head, C-spine, and chest angiography CTs revealed only a right parieto-occipital scalp hematoma without intracerebral hemorrhage. A urine drug screen confirmed her reported heroin and cocaine use and also revealed benzodiazepine use. Diagnsotic labs showed no electrolyte derangements, a normal complete blood count, elevated cardiac Troponin T level (cTnT) at 0.888 ng per mL, and elevated B-Type Natriuretic Peptide (BNP) at 1,206 pg per mL. A point of care focused echocardiogram demonstrated global hypokinesis and apical akinesis concerning for stress cardiomyopathy. Cardiology admitted the patient to the CCU and performed a comprehensive transthoracic echocardiogram, Fig. 1a and b, followed by left heart catheterization. The patient had no obstructive coronary artery disease, an ejection fraction of 30–35% by US and 41% by quantitative analysis, and wall motion abnormality during both studies consistent with apical type stress (Takotsubo) cardiomyopathy, Fig. 2a–c. Additional history revealed daily 20 mg Xanax use and the patient experienced benzodiazepine withdrawal requiring transfer to the medical

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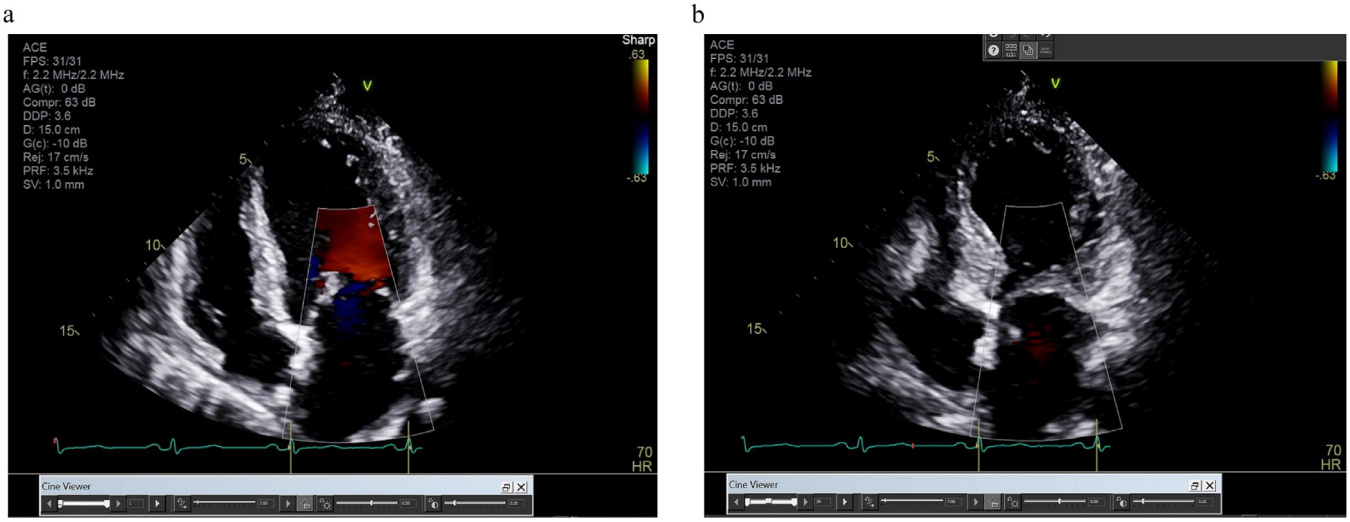

Fig. 1. (**a**). TTE image of atrial systole and ventricular diastole. (**b**). TTE image of ventricular systole showing apical ballooning wall motion abnormality.

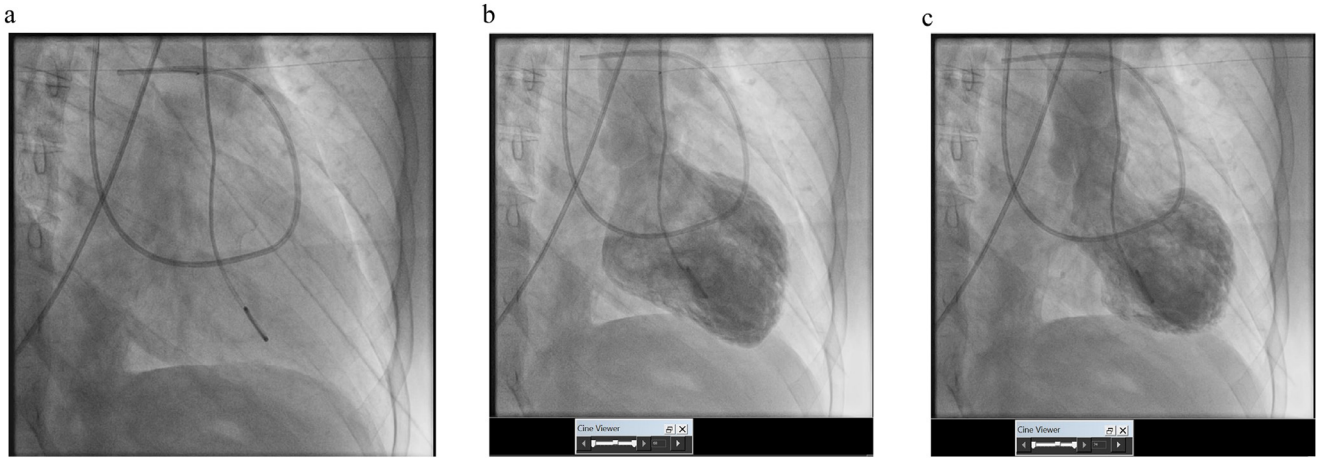

Fig. 2. (**a**). Intra-catheter image pre-dye of the cardiac silhouette. (**b**). Intra-catheter image post-dye showing ventricular diastole. (**c**). Intra-catheter image post-dye showing ventricular systole and apical ballooning wall motion abnormality.

ICU. Following her withdrawal symptoms, she discharged home with planned follow up in cardiology for her stress cardiomyopathy, polysubstance abuse counseling/treatment, and no further work up with neurology. Her stress cardiomyopathy and elevated cardiac troponins are likely manifestations of her polysubstance abuse given her otherwise normal cardiac and neurologic evaluation. Stress cardiomyopathy first appeared in medical literature as 'Tako-Tsubo-like' cardiomyopathy in Japan in 1990.[1] Multi-territorial cardiac wall motion abnormality (e.g. apical akinesis, mid-ventricular akinesis, etc.) and elevated serum troponins characterize this cardiomyopathy.[2,3] Takotsubo cardiomyopathy is associated with stress, including emotional distress and substance abuse. The clinical presentation can mimic acute coronary syndrome.

Questions

1. What is the incidence of stress (Tako-tsubo) cardiomyopathy in patients presenting with clinical manifestations of ACS?
   a 2%
   b 8%
   c 14%
   d 18%
   e 21%
2. What is the most common ventricular wall motion abnormality in stress (Tako-tsubo) cardiomyopathy?
   a Basal Type
   b Mid-Ventricular Type
   c Apical Type
   d Focal Type

Answers

1. 2%. Explanation: Y-Hassan and Tronvall note in their 2017 paper that the prevalence of Tako-Tsubo is underestimated and has steadily increased in reported incidence since its description by Sato et al. in 1990. Current estimates show nearly 90% of affected patients are women. If excluding men, the estimated epidemiology is closer to 10% of patients presenting with manifestations of ACS.[3]
2. Apical Type. Explanation: Templin et al. analyzed the International Takotsubo Registry's data from 1998–2014 covering 1,750 reported cases. The apical type represented 81.7% of cases, while the mid-ventricular type accounted for an additional 14.6%. The basal type and focal type combined represented 3.7% of cases.[2]

Declaration of Competing Interest

ICMJE COI Form completed by the author (Darron K. Fritz) and submitted with this manuscript.

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