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Point of Care Ultrasound Utility in the Setting of Chest Pain: A Case of Takotsubo Cardiomyopathy

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Abstract

Chest pain is a frequently encountered chief complaint in the Emergency Department and entails a broad differential. Point-of-care ultrasound (POCUS) can be utilized to guide diagnostic decision making and initial triaging. Takotsubo cardiomyopathy presents similarly to acute coronary syndrome and has characteristic findings on echocardiogram. This case presentation details a scenario of ST segment elevation on electrocardiogram and elevated high sensitivity troponin levels, worrisome for a ST elevation myocardial infarction (STEMI). Apical hypokinesis to akinesis and apical ballooning were appreciated on echocardiogram, raising suspicion for Takotsubo cardiomyopathy, subsequently confirmed by coronary angiogram. A cardiac focused point-of-care ultrasound assessment can provide valuable information to aid in diagnostic accuracy.

Case Presentation

A 72-year-old woman with a known history of chronic obstructive pulmonary disease (COPD) presented to the hospital for progressively worsening dyspnea in the previous few days along with new onset chest discomfort in the past one day. Patient was found to have an oxygen saturation of 87% on room air, pH of 7.25 and a pCO2 of 98 on venous blood gas, and was admitted for acute on chronic hypoxic and hypercapnic respiratory failure in the setting of a COPD exacerbation. Patient was intubated for respiratory distress and worsening acute encephalopathy. Chest radiograph was grossly unremarkable for consolidations or opacities. A bedside point-of-care ultrasound (POCUS) assessment revealed clear lung zones bilaterally without apparent B lines; however, minimal pleural sliding was appreciated on the left anterior lung zones. Cardiac focused assessment identified marked hypokinesis to akinesis of the entire mid-distal left ventricle with apical ballooning, raising the suspicion of Takotsubo cardiomyopathy (Videos 1-2).



Video 1. Subcostal view with identification of a hyperkinetic basal segment and hypokinetic apex. Apical ballooning is also clearly identifiable in this view. (Click here to view the video in a separate window)



Video 2. Parasternal short axis identifying a hyperkinetic basal segment near the level of the mitral valve with subsequent hypokinetic apical view. The image plane is being panned from base to apex and back. (Click here to view the video in a separate window).

High sensitivity troponin level was elevated at 42 ng/L with an increase to 540 ng/L on repeat testing. Electrocardiogram (ECG) was

initially grossly unremarkable for signs of acute ischemic changes, however, repeat ECG revealed ST elevation in the anterior leads. The patient was taken urgently to the catheterization lab where intervention identified mild non-obstructive disease in a right dominant circulation and the diagnosis of Takotsubo cardiomyopathy was confirmed.

Discussion

Chest pain is among the most common chief complaints of patients presenting to the Emergency Department. The differential diagnoses of chest pain remain broad which includes a variety of pathological processes. POCUS has emerged as an indispensable tool for diagnostic accuracy and for aid with initial triaging before considering further confirmatory testing. An emerging consideration is its utility in the acute setting, specifically when trying to differentiate between cardiac and non-cardiac chest pain. Comprehensive echocardiography, usually completed in a formal setting upon request, provides valuable information that can be indicative of ischemic states, including regional wall motion abnormalities, decreased systolic movement, decreased myocardial thickening, valvular function abnormalities, inter-ventricular shunts, and acute papillary muscle dysfunction (1). Alternatively, bedside POCUS in acute settings for assessment of cardiac function and structural abnormalities provides timely objective data but holds greater limitations mainly due to inferior ultrasound quality, variable operator skillsets, and time constraints, of

In our case, we utilized POCUS in an unresponsive, intubated patient, noting discrete regions of hypokinesis-akinesis the left ventricle with apical ballooning, prior to ECG showing elevated ST segments in the anterior leads and a rising troponin level on serial lab tests. Our initial impression based on the POCUS findings was concerning for Takotsubo cardiomyopathy. Given the urgency of the troponin and ECG abnormalities, a Code STEMI was called. Cardiology urgently took the patient to the catheterization lab which confirmed the diagnosis of Takotsubo cardiomyopathy after identifying no obstructive coronary artery disease.

Takotsubo cardiomyopathy often presents very similarly to acute coronary syndrome with elevated markers of myocardial ischemia and ST changes on ECG (2). Hallmarks of this clinical entity include apical hypokinesia and basal segment hyperkinesia on echocardiogram and no obstructive coronary artery disease on coronary angiography. Given the acuity of these findings, this case presentation portrays the importance of utilizing a cardiac focused **POCUS** assessment to help tailor differential diagnoses and raise index of suspicion not only to acute coronary syndromes, but also to mimicking clinical diseases.

References

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