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Ultrasound in Emergency Medicine

POINT OF CARE ECHOCARDIOGRAPHY IN AN ACUTE THORACIC DISSECTION WITH TAMPONADE IN A YOUNG MAN WITH CHEST PAIN, TACHYCARDIA, AND FEVER

Kristin Carmody, MD, Michael Asaly, MD, and Uché Blackstock, MD

Department of Emergency Medicine, New York University School of Medicine, New York, New York
Reprint Requests: Kristin Carmody, MD, Department of Emergency Medicine, New York University School of Medicine, 462 First Avenue, New York, NY 10016

□ **Abstract—Background: Although thoracic aortic dissections are uncommon in young patients, they must be considered in the differential diagnosis in the presence of chest pain and abnormal vital signs. Although computed tomography angiography is the test of choice for thoracic dissection in the emergency department, point of care (POC) transthoracic echocardiography has a high specificity in the diagnosis of this disease. It is especially helpful in patients with proximal ascending dissections in the presence of a pericardial effusion. Case Report: This case report illustrates a young patient presenting with chest pain, persistent tachycardia, and fever with a presumed upper respiratory infection who had an ascending thoracic dissection with tamponade discovered on POC echocardiography. Why Should An Emergency Physician Be Aware of This?: POC echocardiography should be an important part of the algorithm in young patients presenting with chest pain and abnormal vital signs that do not improve with supportive measures. Definitive care in patients who present with a thoracic aortic dissection in the presence of cardiac tamponade diagnosed on POC echocardiography should not be delayed in order to wait for other imaging methods to be performed. POC echocardiography may expedite care and treatment in young patients presenting with this deadly disease. Published by Elsevier Inc.**

□ **Keywords—echocardiography; point of care; tamponade; thoracic aortic dissection; ultrasound**

INTRODUCTION

Thoracic aortic dissection is an uncommon but deadly disease. Patients may present with classic symptoms, such as chest pain in the setting of hypertension, but sometimes may have atypical presentations that are not easily recognized in the emergency department (ED). Because of the high morbidity and mortality of this disease, this diagnosis must be considered, even in younger patients.

CASE REPORT

A 21-year-old man from Ecuador with a history of hypertension presented to the ED complaining of "pressure-like" chest pain (CP) that worsened when lying flat and when he took deep breaths. He had also had subjective fevers for 2 days. He had been evaluated in another ED 1-week earlier with similar complaints and was diagnosed with an upper respiratory tract (URI) infection and discharged.

His presenting vital signs were as follows: temperature 38.7°C; blood pressure 151/105 mm Hg; heart rate 131 beats/min; and oxygen saturation 98% on room air. The physical examination revealed a comfortable, non–toxic-appearing young man who had clear lungs bilaterally, tachycardia without an appreciable cardiac murmur,

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a soft, nontender abdomen, no edema, and strong peripheral pulses. An electrocardiogram revealed sinus tachycardia without other changes, and all laboratory tests were normal. The preliminary diagnosis was a viral URI; additional orders included a chest radiograph (CXR), intravenous normal saline, and acetaminophen.

The patient remained tachycardic and had no resolution of the CP or fever despite supportive measures of intravenous saline and acetaminophen. Because of a lack of improvement, the ED team decided to perform bedside echocardiography at 5:00 PM to evaluate for a possible pericardial effusion. Echocardiography revealed a dilated thoracic aortic root measuring 7.53 cm with an intraluminal dissection flap (Figure 1). In addition, a significant circumferential pericardial effusion was seen causing right ventricular free wall collapse during diastole, consistent with tamponade (Figure 2). A cardiothoracic surgeon was consulted, and the patient was started on an esmolol infusion. A CXR was not performed until after echocardiography had been completed and was interpreted as an enlarged cardiac silhouette with normal mediastinal contours (Figure 3).

Despite the echocardiographic findings, a computed tomography angiography (CTA) scan of the aorta was requested before taking the patient to surgery. He was taken to receive the CTA scan at 6:50 PM and then to the preoperative area to await surgery. The CTA scan confirmed the presence of a dilated aortic root with dissection (Figure 4). On arrival to the preoperative area at 7:11 PM, he was found to still have an elevated blood pressure at 147/109 mm Hg, despite a systolic blood pressure goal of <130 while on the esmolol drip. At 7:17 PM, the esmolol drip was increased at a repeat pressure of 151/110 mm Hg. At 7:24 PM he was given a labetolol 20 mg bolus because of the esmolol drip increase being unsuccessful. At 7:46 PM, the patient's blood pressure dropped to 112/77 mm Hg, his heart rate to 45 beats/min, and he became unresponsive and required manual respiratory intervention with a bag valve mask. At 7:50 PM, the patient began to vomit while being ventilated, started breathing spontaneously, and moved all

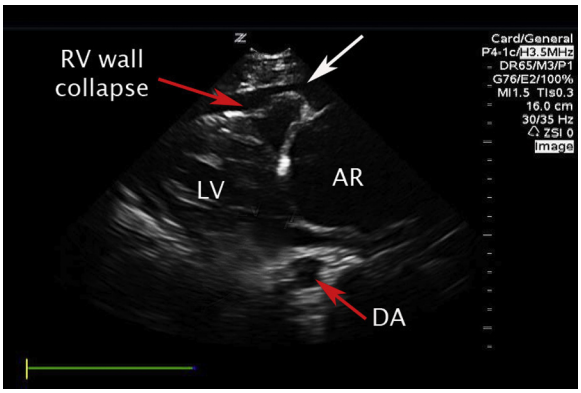

Figure 2. Parasternal long axis view of the heart showing an anechoic circumferential pericardial effusion (white arrow) causing right ventricular (RV) free wall collapse in diastole. AR = aortic root; DA = descending aorta; LV = left ventricle.

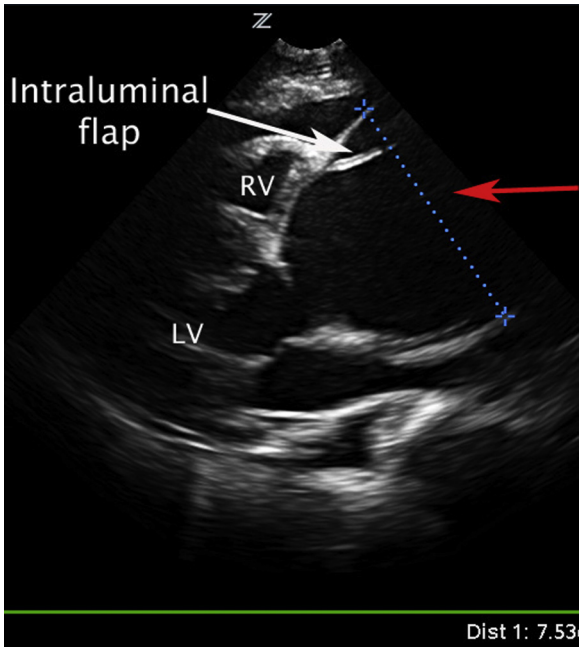

Figure 1. Parasternal long axis view of the heart showing a dilated aortic root (red arrow) measured at 7.53 cm (seen at right lower corner of image) with a visualized intraluminal flap. LV = left ventricle; RV = right ventricle.

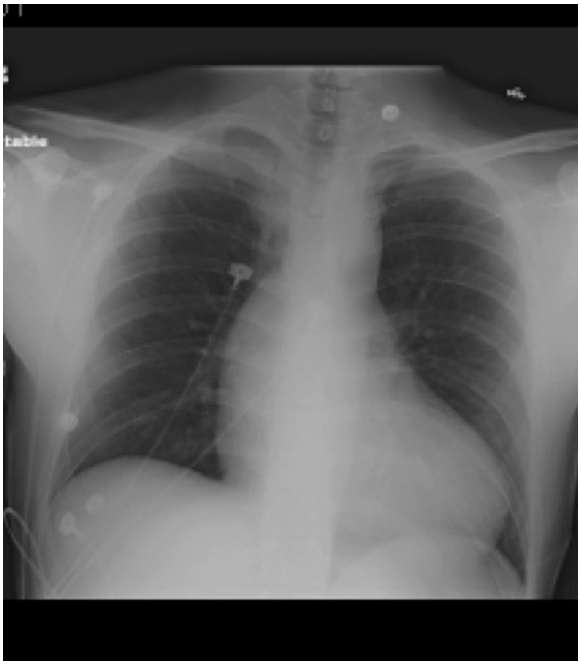

Figure 3. Portable chest radiograph showing enlarged cardiac silhouette and normal mediastinal contours.