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IMAGES IN EMERGENCY MEDICINE

Cardiovascular

A unique cause of severe chest pain in the emergency department

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KEYWORDS
acute aortic syndrome, aortic dissection, chest pain, intramural hematoma

1 | PATIENT PRESENTATION

A 55-year-old woman presented to the emergency department (ED) by ambulance after sudden onset of chest pain while riding her horse. The pain reached maximum intensity within minutes and radiated to the back. She also complained of diffuse numbness and tingling in the hands and feet. Her vital signs were blood pressure 160/85 mmHg and pulse 68 beats/min. She appeared very uncomfortable, was diaphoretic, and was unable to stay still. Lung sounds were clear. Heart sounds were normal. The abdomen was soft and non-tender. She received medication for pain and labetalol to decrease her blood pressure and heart rate for possible aortic dissection. Chest radiograph (Figure 1) and computed tomography (CT) of the chest, abdomen, and pelvis, with angiography were obtained (Figures 2–4).

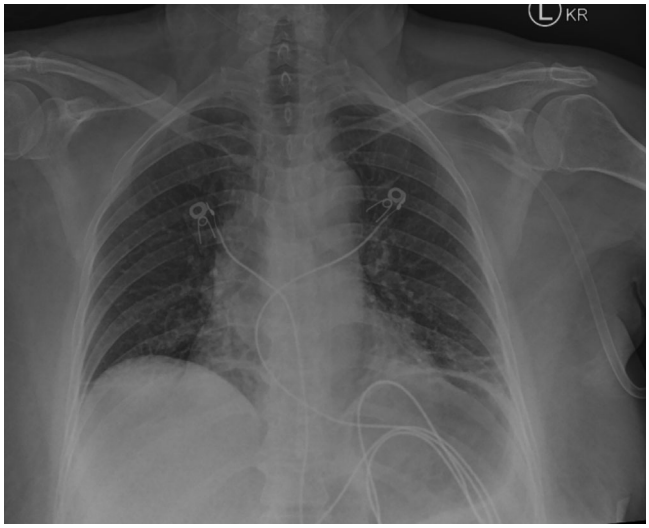

FIGURE 1 Plain radiograph of the chest (anterior posterior view) showed widening of the mediastinum and an indistinct aortic knob.

2 | DIAGNOSIS

2.1 | Intramural hematoma of the aorta (Stanford type A)

The CT scan was initially read as showing no aortic dissection. While the ED team was pondering the next step, radiology called with the corrected report: acute IMH involving the ascending aorta, aortic arch, and descending thoracic and abdominal aorta. There was no dissection flap or involvement of the great vessels. The emergency medicine team consulted the cardiothoracic surgery service for definitive management. The cardiothoracic surgery team took the patient emergently to the operating room for vascular repair. She was discharged from the hospital 13 days later without neurologic sequelae.

Aortic syndromes include aortic aneurysm, aortic dissection, and aortic IMH. Unlike aortic dissection, resulting from an intimal tear, creating a false lumen, IMH occurs when there is bleeding within the media, the middle layer of the aortic wall, without formation of an intimal flap. Aortic intramural hematoma (IMH) is estimated to occur in fewer than 5%–25% of acute aortic syndromes. Aortic IMH may be more difficult to identify on imaging than dissection, partly because

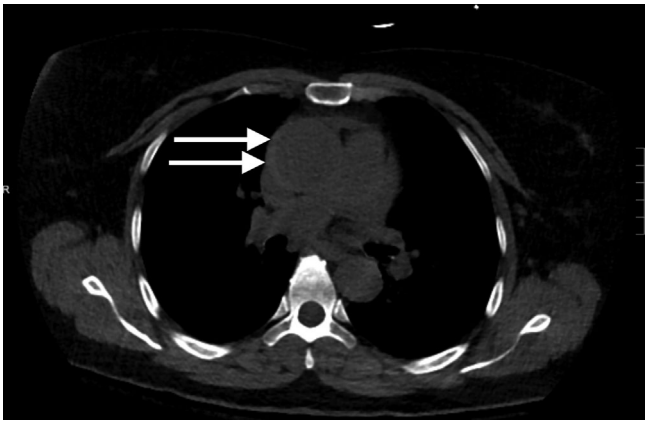

FIGURE 2 Computed tomography of the chest showed a crescent-shaped area with relative hyperattenuation in the ascending aorta.

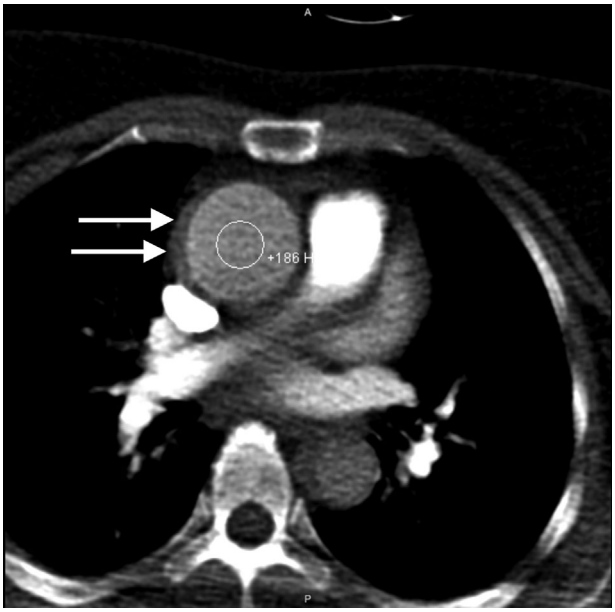

FIGURE 3 Computed tomography of the chest with angiography showed a crescent-shaped area in the ascending aorta that did not enhance after intravenous contrast.

there is no dissection flap. The diagnosis of aortic IMH can easily be missed because it is relatively uncommon and CT findings can be subtle.[1]

The most common cause of aortic IMH is thought to be spontaneous rupture of the vasa vasorum, the tiny blood vessels that nourish the thick-walled aorta.[2] Microscopic tears in the intima, aortic ulcerations, and thoracic trauma are other less common causes.[3] Risk factors include hypertension and atherosclerosis. IMH occurs most commonly in the seventh through ninth decades of life. Like aortic dissection, IMH can be classified as Stanford type A, when the ascending aorta is involved (usually managed surgically), or Stanford type B, when only the descending aorta is involved (managed medically).[3]

As with aortic dissection, 80% of patients with aortic IMH present with severe chest pain, often with back pain.[3] Elevated blood pressure

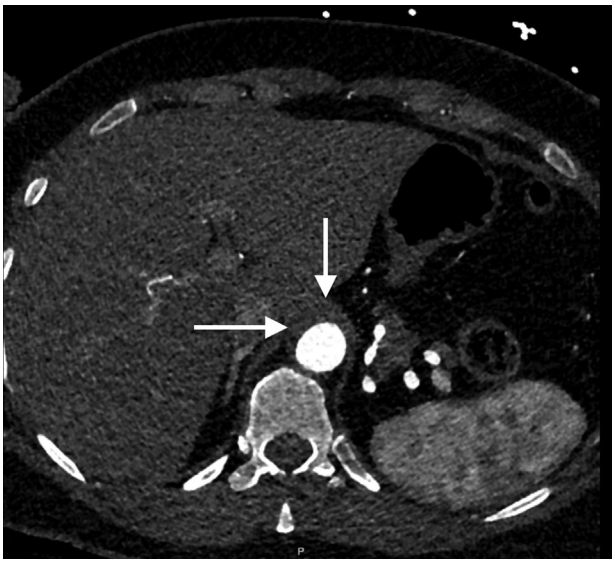

FIGURE 4 Computed tomography of the abdomen with angiography showed a crescent-shaped area in the descending aorta that did not enhance after intravenous contrast.

is common. Complications of aortic IMH include pericardial effusion with tamponade, acute aortic regurgitation, and acute myocardial infarction. These conditions may obscure the underlying diagnosis.[2] Although IMH may reabsorb, as many as 88% progress to aortic dissection and approximately 20% result in aortic rupture.[1]

Non-contrast CT often shows crescent-shaped areas of relative hyperattenuation along the aortic wall, without an intimal flap (Figure 2). Because it is separated from the intima, the area of interest fails to enhance after intravenous contrast (Figures 3 and 4). Several conditions may appear similar to IMH on CT imaging, including atherosclerotic plaques, aortitis, or an aortic aneurysm with mural thrombus. IMH has a smooth inner margin and aortic thickening beneath the bright intima, whereas a mural wall thrombus or plaque often appears as an irregular inner margin above the intima.[4] Trained sonographers may also be able to use ultrasound to diagnose an IMH, although CT is preferred.[4]

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