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Case Report

False positive computed tomographic angiography for Stanford type A aortic dissection

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ABSTRACT

Background: Computed tomographic angiography (CTA) has emerged as the defacto imaging test to rule out acute aortic dissection; however, it is not without flaws. We report a case of a false-positive CTA with respect to Stanford Type A aortic dissection.

Case: A 52 year-old male presented with sudden onset shortness of breath. He denied chest pain. Due to severe hypertension and an Emergency Department bedside ultrasound suggesting an intimal flap in the aorta, CTA was requested to better assess the ascending aorta and was interpreted as consistent with Stanford Type A aortic dissection with thrombosis of the false lumen in the ascending aorta. However, intra-operative imaging (TEE and epi-aortic scanning) did not identify an intimal flap or dissection, and neither did definitive surgical inspection of the aorta. The suspected aortic dissection and thrombosed false lumen were not visualized on repeat CTA two days later.

Discussion: False positive diagnosis of Stanford Type A aortic dissection on CTA can be the result of technical factors, streak artifacts, motion artifacts, and periaortic structures. In this case, non-uniform arterial contrast enhancement secondary to unrecognized biventricular dysfunction resulted in the false positive CTA appearance of an intimal flap and mural thrombus. Intra-operative TEE and epi-aortic scanning were proven correct in excluding aortic dissection by the standard of definitive surgical inspection of the aorta.

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Introduction

Acute aortic dissection is the most common catastrophic condition involving the thoracic aorta and in most cases of proximal aortic dissections, if undiagnosed, has a fatal outcome. Various noninvasive imaging modalities exist to evaluate aortic dissection including transthoracic echocardiography, transesophageal echocardiography, contrast-enhanced chest computed tomographic angiography (CTA), contrast-enhanced electrocardiogram (ECG)-gated cardiac and/or chest computed tomography, and magnetic resonance angiography [1,2].

With widespread availability, a purported sensitivity of 100% and a specificity of 98%, a short acquisition time, and a superior ability to evaluate branch vessel involvement, CTA has evolved to be the defacto imaging test of choice to identify or exclude thoracic aortic dissection [2]. However, it is not without flaws. There are a handful of documented cases in radiologic and surgical literature describing false positive diagnosis of acute thoracic aortic dissection using CTA. This case adds to the literature.

Case history

A 52-year-old Asian male presented to a community hospital emergency department with sudden-onset shortness of breath after 2-3 days of fever, chills, and productive cough. He denied any chest pain at the time of presentation. He had no significant coronary risk factors and was not on any medications. On examination, he had severe hypertension (220/160 mm Hg). An emergency department bedside ultrasound was interpreted as intimal flap in the aortic arch (Fig. 1). CTA was subsequently performed, which was interpreted as consistent with Stanford type A aortic and a thrombosed false lumen in the ascending aorta (Fig. 2 and 3).

The patient was then transferred to our institution, where he underwent emergency surgery and had a moment of respiratory arrest with pulseless electrical activity just after the induction of anesthesia. He was put on immediate cardiopulmonary bypass and given inotropes postoperatively. The pericardium and pleura were filled with straw-colored fluid without blood. Intraoperative transesophageal echocardiographic findings did not confirm aortic dissection. Significant right and left ventricular systolic dysfunction were present. An intraoperative epiaortic ultrasound depicted a normal ascending aorta (Fig. 4 and 5), contradicting CTA findings as did the intraoperative transesophageal echocardiogram (TEE). Definitive surgical inspection of the aorta was performed at the mid ascending aorta, and the entire ascending aorta was examined down to the level of the aortic valve. The surgical appearance of the aorta was normal and without apparent intimal disruption or clot. The previously suspected type A dissection with thrombosed false lumen is not visualized according to electrocardiogram-gated coronary computed tomography angiography performed 2 days postoperatively (Fig. 6).

Discussion

CTA has become the defacto imaging test to diagnose acute aortic dissection and other acute aortic syndromes. After injection of iodinated contrast, 2 distinct lumens divided by an intimal flap should be visualized to make the diagnosis [2]. Helical and multisectional CT have the advantage of shorter acquisition time, high diagnostic accuracy, and are more accurate than magnetic resonance imaging and transesophageal echocardiography at detecting branch vessel involvement [1]. More accurate delineation of a proximal intimal flap in relation to the aortic valve and coronary arteries is made possible using ECG-gated CT and is evolving to be the more common protocol for CTA for suspected aortic dissection [2,3].

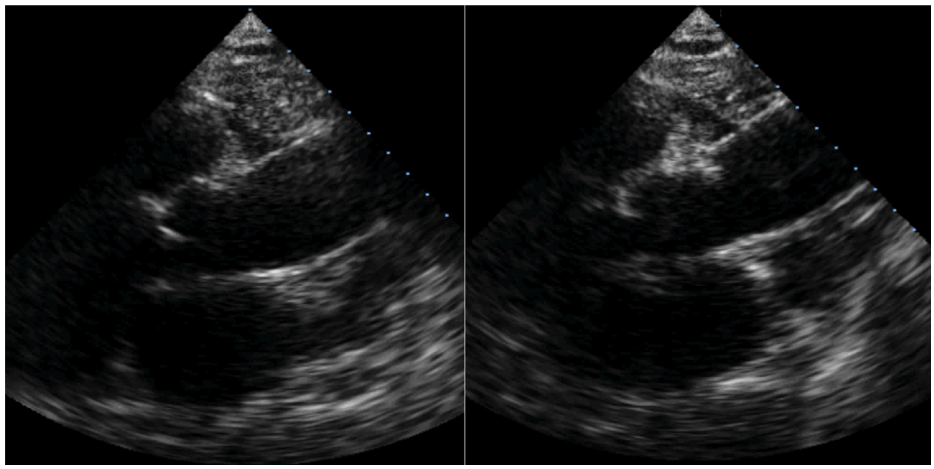

Fig. 1 – Transthoracic images of the ascending aorta, parasternal long axis (left image), and high parasternal long axis (right image). On the left image, the appearance of the ascending aorta is normal in so far as dimension, shape, and the absence of intimal flap or thickened wall. On the right image, there is a faint linear entity in the ascending aorta, thinner than a usual intimal flap, of more uniform radius with respect to the image sector than the usual intimal flap, and with appearance typical of a reverberation artifact.