

# PENETRATING ATHEROMATOUS ULCER AS A PRECURSOR OF AORTIC DISSECTION

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## INTRODUCTION

Acute aortic syndromes include a range of life-threatening conditions with the most well-known being aortic dissection. However, variants of aortic dissection also include intimal tear without hematoma, aortic intramural hematoma, and lastly penetrating aortic ulcer. Penetrating aortic ulcers (PAU) occur when the ulceration of an aortic atherosclerotic lesion penetrates the internal elastic lamina into the media in varying degrees, over which there may or may not be an overlying thrombus<sup>1</sup>. PAUs may be associated with a hematoma within the media and may progress to perforation or aortic dissection, and are known to be the initiating lesion in <5% of all aortic dissections ever since they were first described<sup>2</sup>. Most penetrating aortic ulcers are located in the descending thoracic aorta (85-95%)<sup>3</sup>, and are rarely located in the ascending aorta or arch.

## CASE PRESENTATION

We report a case of a 77 year old male with significant PMH for paroxysmal atrial fibrillation (on Xarelto and amiodarone), AAA (s/p repair in 2012), right iliac artery aneurysm (s/p repair in 2018), COPD, HLD, PVD, HTN who presented with a chief complaint of intermittent right-handed weakness. Patient had unrevealing findings on CT for acute abnormalities or any hemodynamically significant stenosis on carotid US. Echo revealed severe concentric LVH and EF of 55-60% with moderate diastolic dysfunction. CT angiogram of head/neck revealed an irregular mural hypoattenuation of the lateral aspect of the mid to distal ascending aorta and to which contrast extended. CT angiogram of the chest with and without contrast was then performed which demonstrated contrast extension into the anterior lateral aspect of the ascending thoracic aorta which likely represented a penetrating atheromatous ulcer measuring 0.9x0.4x1.3cm with no definite dissection flap identified. At this point, decision was made to transfer patient to a center of higher level care for further management.

## IMAGING



Note: Contrast extension into anterior lateral aspect of ascending thoracic aorta representing PAU measuring 0.9 x 0.4 x 1.3 cm.

## CLINICAL COURSE

Patient was evaluated for surgical repair of PAU. Surgery was initially planned for ascending aortic replacement via minimally invasive sternotomy, however given >6% risk of MACE, significant smoking history, previous AAA rupture repair, and increased risk for surgical complications, more detailed imaging was obtained via CT-TAVR with gated technique to rule out change in size of PAU necessitating surgery. This study redemonstrated a focal PAU in the anterolateral ascending thoracic aorta unchanged in size. Left heart cath showed nonobstructive CAD with aneurysmal RCA. Patient was then managed medically and started on dual antiplatelet therapy and high-dose statin with optimization of blood pressure control. Patient was discharged with recommendation to obtain serial CT scans. The first scan 4 weeks later and a second scan 3 months later both showed unchanged focal outpouching of ascending aorta concerning for penetrating ulcer. Patient will continue to obtain serial CT scans to monitor progression of ulcer and to determine if a change in size necessitates surgery.

## DISCUSSION/CONCLUSION

Penetrating aortic ulcers account for 2-7% of acute aortic syndromes, and thus it is crucial to recognize the predisposition of an aortic dissection upon a patient's presentation. Atheromatous ulcers develop in patients with advanced atherosclerosis. Initially, the lesions are confined to the intimal layer however they can penetrate through elastic intima and into the media. Once a penetrating atheromatous ulcer (PAU) is formed, the ulcer may remain quiescent or progress to acute processes like dissection or aneurysm formation. PAU's also tend to have a scarcity of symptoms which is in contrast to the classic symptoms associated with dissections including severe back or chest pain or aortic regurgitation<sup>4</sup>. Given this patient's risk factors and history of abdominal aortic aneurysm, right iliac artery aneurysm, hypertension, and hyperlipidemia, the threshold for further workup became even lower for this patient. The risk of aortic rupture is significantly higher in patients with PAU, and medical management often is ineffective in ascending aortic pathology and surgery is often indicated. Thus, PAUs are considered precursors of life-threatening aortic dissections, and are rarely located in the ascending aorta.

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