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Case Report

Incidental Penetrating Aortic Ulcer of the Ascending Aorta: Case Report

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Abstract

Penetrating aortic ulcer is part of the acute aortic syndromes; it represents 2 - 7% of this acute disease. It is frequently located in the descendant aorta; it's rarely found in the ascending aorta. It's generally seen in the elderly individuals who are usually poor candidates for conventional surgery due to advanced age and the presence of comorbidities. It is a unique entity, given its multiple clinical presentations, its different and unforeseeable complications, as well as the diversity of its treatment options. As a result of the development of multidetector CT scans, the detection of penetrating atherosclerotic ulcer has increased, and it is frequently identified as an incidental finding on different imaging tests.

We report a case of an incidental penetrating aortic ulcer of the ascending aorta in an asymptomatic patient admitted to the cardiology department of the university hospital of Casablanca for a hemorrhagic accident due to vitamin K antagonist. After the objection to surgery, the patient received conservative medical therapy consisting of antihypertensive therapy and beta blocker.

Keywords: *Aortic Disease; Penetrating Atherosclerotic Ulcer; Ascending Aorta; Asymptomatic Penetrating Aortic Ulcer*

Introduction

Penetrating aortic atherosclerotic ulcer (PAU) is a poorly understood aspect of acute aortic syndromes (AAS) that may clinically mimic other causes of this syndrome but which has imaging characteristics that are very different. Due to the development of multidetector computed tomography (MDCT), the radiological diagnosis of PAU has increased, and it is frequently identified as an incidental finding at CT performed in elderly patients for unrelated conditions. Little is known about the natural history of PAU and the significance of its detection, especially in asymptomatic patients, is debatable and no consensus exists on the appropriate management of this group of patients [1].

PAU is mostly seen in elderly individuals with hypertension and atherosclerosis and usually affects the descending thoracic aorta. PAU in ascending aorta is a very rare condition and very few cases are reported in literature, which implies that treatment indications and natural history of this disease process remain unclear [2,3].

Aim of the Study

The aim of this article is to report a case of an incidental PAU of the ascending aorta in a patient admitted to our department for a hemorrhagic accident due to vitamin K antagonist.

Case Summary

An 85 year old female patient was admitted to the cardiology department of Casablanca's university hospital. She had a 10 year history of arterial hypertension, treated with an angiotensin II receptor blocker, and a cerebrovascular accident as a result of atrial fibrillation diagnosed 9 months prior to her admission, treated with acenocoumarol and aspirin. The patient presented a hemorrhagic accident, in the form of 3 weeks rectorrhagia episodes, due to vitamin K antagonist. No traumatic chest injury and/or chest pain were reported.

On clinical examination, the patient was pale, aphasic with a left facial palsy, with no exacerbation of her neurological deficit according to her family. Her blood pressure was 129/73 mmHg, and her heart rate was 93 beats/minute, with normal heart sounds on auscultation.

Her laboratory tests showed an anemia with hemoglobin level at 2.4 g/dl, normal platelet count at 184000, INR > 12. A brain CT scan showed a chronic appearing frontal stroke.

The patient received 10 mg of vitamin K and was transfused with 4 blood transfusion bags. Her hemoglobin level rose to 8.3 g/dl, INR was at 1.4 and prothrombin ratio was at 50%.

A transthoracic echocardiography (TTE) was carried out on the patient after her stabilization. It revealed a normal size left ventricle with moderate wall hypertrophy, no segmental wall abnormalities, and a good ejection fraction of 60%. The left atrium was dilated. There was a moderate mitral and aortic regurgitation. Right ventricle was within normal limits. The ascending aorta was dilated, it measured 41 mm. Near the posterior wall of the left coronary cusp, a parietal outpouching was discovered, measuring 22 mm long axis (Figure 1).

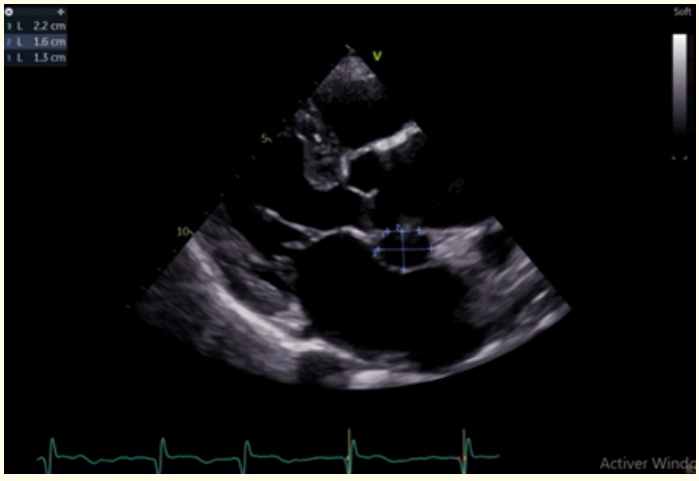

Figure 1: *Parasternal long axis view demonstrating a parietal outpouching near the posterior wall of the left coronary cusp, measuring 22 mm long axis, evoking a penetrating aortic ulcer of the ascending aorta.*

A computed tomography (CT) angiogram demonstrated an aneurysmal dilation of the ascending aorta which measured 42 mm and the aortic arch at 30 mm, the presence of saccular aneurysm at the level of the sinus of valsalva, it was of 18 mm in diameter and its neck measured 31 mm. Diffuse aortic calcifications and atherosclerosis was also present, it was located on the upper and lower abdominal aorta and its branches without obvious signs of stenosis (Figure 2).

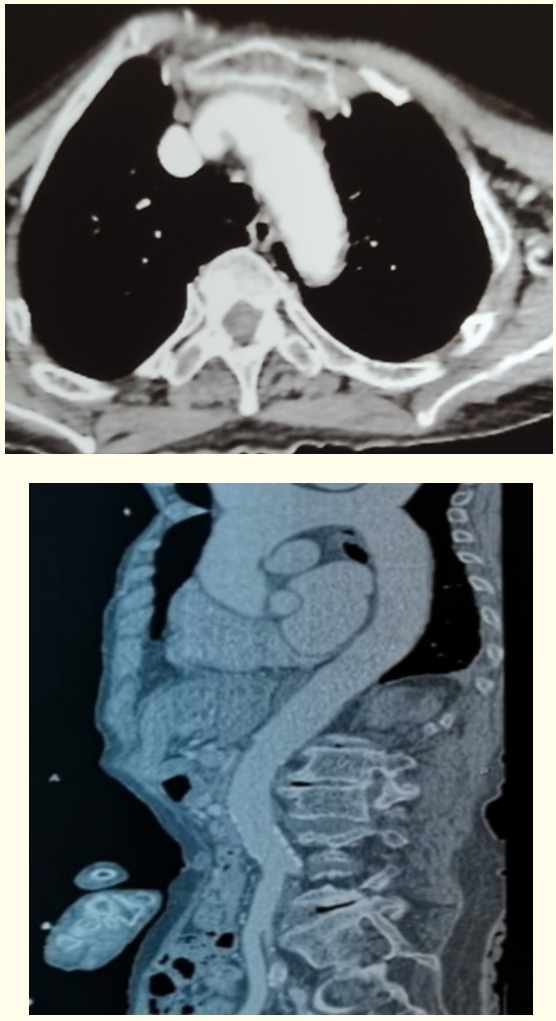

Figure 2: *Axial and sagittal thoracic CT images demonstrating a saccular aneurysm of the sinus of valsalva associated to a penetrating aortic ulcer.*

After these findings, the patient and her family refused surgery after they were informed about the possible complications and prognosis of PAU. The patient was put on medical therapy, antihypertensive therapy with beta blocker. Anticoagulation and antiplatelet therapy was disrupted. The patient was referred to the gastroenterology department for further investigations of her intestinal bleeding.

Discussion

Penetrating atherosclerotic ulcer is part of the spectrum of acute aortic syndromes, consisting of acute aortic dissection (AAD), intramural hematoma (IMH), and penetrating ulcers, ruptured or contained ruptured aortic aneurysms.

PAU was first identified by Shennan in 1934. In 1986, it was further described by Stanson., *et al*. as an ulcerating atherosclerotic lesion that penetrates the elastic lamina and is related to the development of hematoma within the media of the aortic wall [4,5].

The true incidence of PAU in the population remains unknown. PAU affects the elderly, usually in their seventh decade of life or older, with coexistence of severe atherosclerosis involving the aorta and multiple co-morbidities, such as hypertension, diabetes, coronary artery disease, chronic obstructive pulmonary disease (COPD), cardiac and renal failure, which make them poor candidates for treatment. In the absence of atherosclerosis, PAU can arise in a younger patient with connective tissue disorder or after mycotic plaque rupture. The incidence of PAU in patients presenting with acute aortic syndrome is estimated between 2.3 - 7.6% [1,6].

PAU is typically a less deadly condition compared to AAD and IMH. Nevertheless, patients may show up to the emergency department for severe chest or back pain, so therefore careful evaluation is needed. More commonly however, PAUs are discovered incidentally on angiographic CT, or MRI imaging studies of the chest and abdomen that are performed for other indications [7].

The true incidences of both symptomatic and asymptomatic PAU are unknown due to the paucity of studies carried out to answer this question.

PAU is generally located in the middle and lower descending thoracic aorta. Less frequently, PAUs are located in the aortic arch or abdominal aorta (Type B PAU), while its occurrence in the ascending aorta is rare (Type A PAU). It may appear in normal size aorta, but most often it is found in a dilated aorta [6,8].

Coady., *et al*. retrospectively reviewed the images of 198 patients who were initially diagnosed with aortic dissection and concluded that 15 of them actually had PAU, of which only 2 of the ascending aorta [4].

Troxler described in a review article, that only 6 patients presented PAU in ascending aorta out of 130 patients with the same condition [8].

Complications of PAU include creation of (localized) intramural hematoma due to the erosion of aortic vasa vasorum by the ulcer, (pseudo)aneurysm formation, progression to overt aortic dissection, or rupture in up to 40% of patients [9].

Symptomatic patients presenting with AAS as a result of PAU have a worse prognosis than those who are asymptomatic with incidental PAU findings on axial imaging [9].

Management of PAU depends on many factors including the existence of symptoms, location of ulcer, its extent and size, and presence of IMH [10].

Considering the different complications, symptomatic penetrating aortic ulcers should be treated surgically, following similar principles of aortic dissections.

Asymptomatic PAUs are often treated surgically in case of progression of the disease during follow up imaging. According to ESC guidelines, it has been suggested that ulcers with a diameter > 20 mm or neck >10 mm represent a higher risk for disease progression and may be candidates for early intervention. However, these indications are not supported by other observations. The FDG-positron emis-

sion tomography/CT are currently being used to study the degree and extension of lesion inflammation which can be indicators of aortic instability and provide guidance for therapy options [6,11].

According to its location, the management of PAU is unique. Ascending aorta PAU is at increased risk of complications [2]. Therefore, surgery should be considered for Type A PAU according to European and American guidelines.

The choice between open and endovascular repair depends on the patient's age, comorbidities, technical factors including lesion morphology and anatomical variations, available prosthesis and centers expertise. A few number of series tested endovascular repair for arch and Type A PAU. A European registry revealed an 86% overall 30-day survival rate after endovascular approach for arch and type A PAU. A small number of studies evaluated endovascular repair of Type A PAU compared to Type B PAU and, less technology was available previously for Type A endovascular repair. Therefore, more studies comparing the outcomes of this approach in these patients are necessary [12,13].

In our case, the patient refused surgical treatment and received medical therapy, consisting of antihypertensive therapy and beta blocker. There are no studies evaluating conservative medical treatment or radiological surveillance of asymptomatic type A PAU.

Conclusion

Penetrating aortic ulcer is a rare disease, it's a part of the acute aortic syndromes, it's commonly seen in elderly patients with hypertension and atherosclerosis and it's usually located in the descending thoracic aorta. PAU in ascending aorta is uncommon and has a higher incidence of aortic rupture. It's generally an incidental finding on CT imaging exams. The management of this entity isn't well outlined, since it concerns a rather unique condition and vulnerable portion of the population with much comorbidity.

Conflict of Interest

The authors declare that they have no competing interests.

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