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Case report

Staphylococcus aureus aortitis and retroperitoneal fibrosis: A case report and literature review

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ABSTRACT

An infected aortic aneurysm is a process with high mortality rate. Survival is dependent on an early diagnosis and surgical management. This case report details a rare presentation of aortitis with persistent methicillin-sensitive *Staphylococcus aureus* (MSSA) bacteremia, which initially presented as retroperitoneal fibrosis and was ultimately fatal.

Introduction

Aortitis is a pathologic term related to inflammatory changes that affect the wall of the aorta. It includes both noninfectious conditions (which are most common) and infectious conditions [1]. Infectious aortitis is an inflammatory process induced by infectious agents. In the pre-antimicrobial era *Streptococcus* and *Treponema pallidum* was the more prevalent agents. Once antibiotics were discovered and used, the most common agents were *Salmonella spp*,*Staphylococcus aureus* and *Streptococcus spp*. [2]. Other less common microorganisms include *Listeria monocytogenes*, *Bacteroides fragilis*, *Campylobacter fetus*, *T. pallidum*, and *Clostridium spp*. [1].

Infectious processes can occur from bacteremic seeding, direct bacterial infection from trauma, a local infective focus such as paravertebral abscess, spondylodiscitis, or lymph node, aortoenteric fistula, and septic embolization from endocarditis [3]. Infectious aortitis is more commonly complicated with aneurysms, being rare nonaneurysmal infections [4]. We present a case where a febrile patient was first diagnosed with retroperitoneal fibrosis and *Staphylococcus aureus* bacteremia, suffering aortic rupture that was ultimately fatal.

Case report

A 62-year-old man was admitted to hospital with a seven day history of lumbar back pain and a fever in excess of 38.5'C. His past medical history included chronic, congestive heart failure, hypertension, diabetes mellitus, peripheral arterial disease and atrial fibrillation.

On physical examination he was found to be hemodynamically stable with no acute signs of worsening cardiac or lung function. His abdomen was diffusely tender on palpation with no signs of peritoneal inflammation. A non-contrast computed tomography scan showed a confluent mass of periaortic soft tissue with a density consistent with retroperitoneal fibrosis and aortic calcifications (Fig. 1). Urgent laboratory tests revealed abnormal acute phase inflammatory markers including 12.280/mmc leukocytes (96% neutrophils) and a C-reactive protein (CRP) of 225 mg/L (normal range: 0–12 mg/mL). Magnetic resonance imaging (MRI) of the dorsal and lumbar spine did not show spondylodiscitis. No cardiac vegetations were seen on transthoracic echocardiogram.

Intravenous meropenem and vancomycin were started empirically. Blood cultures were positive for methicillin-sensitive *Staphylococcus aureus* (MSSA) and treatment was changed to

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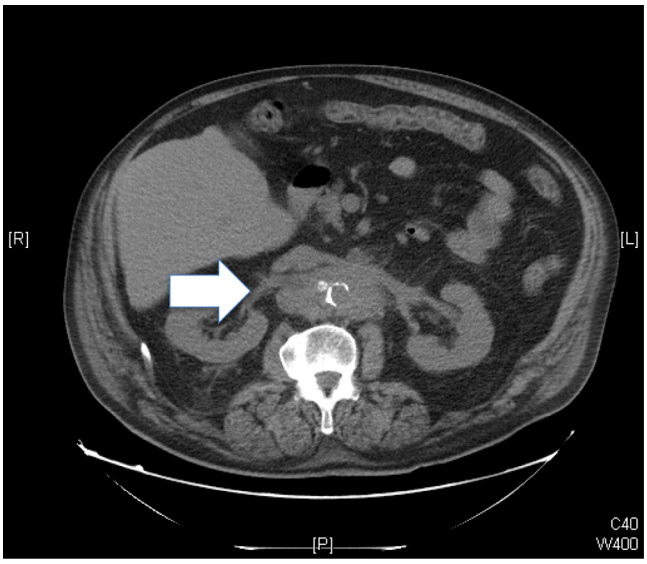

Fig. 1. Non-contrast CT of the abdomen and pelvis showing mural aortic calcifications, surrounded by sub-circumferential soft-tissue density (arrow) compatible con retroperitoneal fibrosis.

intravenous cloxacillin. Seven days after admission, the patient developed new onset syncope and shock alongside progressively worsening lumbar pain. Repeat abdominal CT scan showed a retroperitoneal collection of blood with an aortic rupture at the level of the left renal artery (See Fig. 2). Angiography confirmed the CT findings and an aortic balloon was inflated above the superior mesenteric artery to occlude the vessel (See Fig. 3). An endovascular aortic cuff was emergently placed at the level of the renal arteries, below the superior mesenteric artery, and the patient was transferred to the Intensive Care Unit (ICU).

Twenty-four hours later, a repeat abdominal and pelvis CT scan showed a small leak to the right renal artery, with patency of celiac trunk, SMA, right renal and inferior mesenteric artery. Three days later the patient was operated on again and right, transverse and left colon ischemia was identified and resection performed. A week

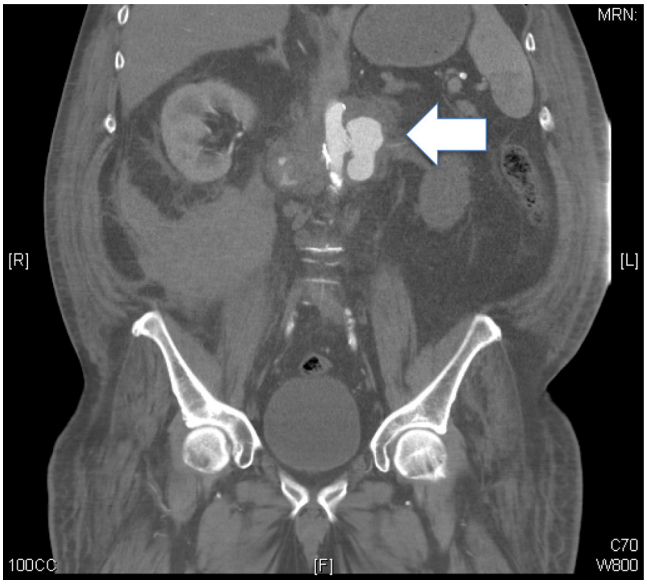

Fig. 2. Contrast CT of the abdomen and pelvis showing aortic lumen, eccentric periaortic tissue, pseudoaneurysm/saccular aneurysm (arrow) that depends of left renal artery, and rupture of the right side of the infrarenal abdominal aorta with blood leakage and retroperitoneal hematoma.

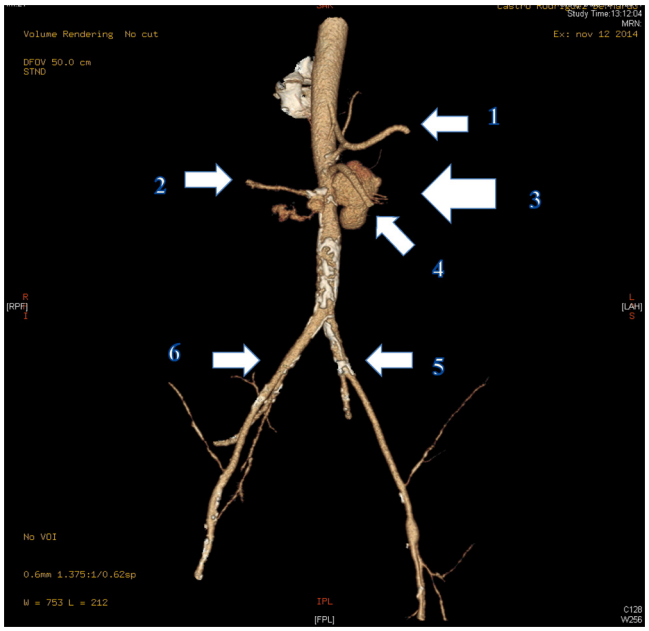

Fig. 3. Abdominal aortic reconstruction. 1: splenic artery, 2: right renal artery, 3: pseudoaneurysm/saccular aneurysm that depends of 4: left renal artery, 5: left common iliac artery, 6: right common iliac artery.

later, after two "second look" operations a repeat abdominal CT scan revealed no endoleak and patency of all the splachnic arteries except the left renal. During patient's admission in ICU he remained dependent on vasopressor and inotropic support, mechanical ventilation and hemodialysis.

Prior to surgery the patient was treated with intravenous vancomycin and cloxacillin, which were continued post-operatively due to the persistence of MSSA bacteremia. Despite aggressive medical intervention and support, the patient expired 17 days after admission. Autopsy revealed a mycotic, thrombosed abdominal aneurysm (5.5 cm × 4 cm) situated between the mesenteric superior artery and renal arteries, with necrosis of left aortic wall and thrombosis of the left renal artery. There was no aortic rupture. The aortic wall was heavily infiltrated with neutrophils and gram positive cocci were present in the sections. No endocardial or valvular vegetations were present. No fibrotic tissue was found on peritoneum. Multiple abscess of peritoneal fat with bacterial and yeast, with vascular invasion were found.

Discussion

Infected aortic aneurysms have a high mortality (some series report a mortality rate of 55%) without surgical intervention [5]. Series of cases reported that risk factors of mortality were extensive periaortic infection, sepsis, female gender, advanced age, *S. aureus* infection, aneurysm rupture, suprarenal aneurysm location, no surgery and aneurysm rupture [5]. Survival depends on an early diagnosis and correct and timely surgical management [3].

Symptoms are nonspecific, often consisting of fever and lumbar or abdominal pain. Rupture of the aneurysm and aortic dissection are the final stages of the disease [2].

Due to the insidious clinical presentation, diagnosis is often delayed. Leukocytosis and elevated CRP are commonly found. Blood cultures are necessary to isolate the microorganism, but the diagnosis is usually made by imaging.

A contrast-enhanced CT scan is the initial diagnostic method of choice. Images show aortic wall thickening, periaortic fluid or soft-tissue inflammation, a rapidly progressing saccular aneurysm or

pseudoaneurysm, and air within the aortic wall [3]. Other methods include magnetic resonance imaging and angiography. At the early-stage, differential diagnosis includes retroperitoneal fibrosis, periaortic hemorrhage from contained bleeding, syphilitic or tuberculous aortitis, lymphomatous tissue, or adenopathies [6]. In a later stage, the infected aorta develops a saccular pseudoaneurysmal dilatation, with characteristically absent mural calcifications. Further complications are obstructive hydronephrosis, abscess formation, aortoenteric fistula formation and retroperitoneal rupture [1].

Treatment requires prolonged antimicrobial therapy and surgical intervention [7]. Classic, and accepted, surgical treatment includes resection of the aortic segment involved with substitution by prosthetic or biologic grafts and extensive debridement of periaortic tissue. In recent years endovascular treatment has gained acceptance with several reports showing favorable short and mid-term results. Long-term antimicrobial therapy, for at least 6–12 months appears to be mandatory for successful endovascular treatment [8].

Our patient was first diagnosed radiographically with symptomatic retroperitoneal fibrosis. Retroperitoneal fibrosis is a rare disease characterized by a fibro-inflammatory tissue around the infra-renal portion of the abdominal aorta and may develop around an undilated or a dilated aorta [9]. Secondary forms can be related to drugs, infections, radiation or malignancies. Infections usually spread from local or a contiguous focus or remote infections. Retroperitoneal fibrosis as a consequence of aortitis remains uncommon [10].

In retrospect, our patient had risk factors of infectious aortitis. The cause of the bacteremia was never determined. We believe that retroperitoneal fibrosis was a consequence of the initial stage of aortic infection followed by aortic rupture with subsequent vascular complications and fatal outcome.

To the best of our knowledge, this is the first report of an infectious aortitis with radiologic signs of retroperitoneal fibrosis, produced by persistent MSSA bacteremia with a rapid progression to aortic rupture without any response to antimicrobials. An early diagnosis is key to preventing the devastating complications such as uncontrolled sepsis and rupture. An appropriate antimicrobial treatment based on susceptibility testing plus complete surgical removal of infected tissue and aneurysm repair are essential for survival.

Consent section

We don't have the signed consent from the deceased patient. Although the head of our medical team (Dr Juan Losa) takes responsibility that exhaustive attempts have been made to contact the family and that the paper has been sufficiently anonymised not to cause harm to the patient or their family.

Conflict of interest statement

The authors declare no conflicts of interest.

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