RAPID PROGRESSION OF MULTIPLE MYCOTIC AORTIC ANEURYSMS IN A PREVIOUSLY HEALTHY LADY DIAGNOSED WITH AORTITIS: A CASE REPORT AND REVIEW OF LITERATURE

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ABSTRACT

We present an interesting case of a 66 year-old lady who was diagnosed with aortitis and associated multiple thoracic and abdominal mycotic aortic aneurysms. The patient was treated with intravenous antibiotics, antifungal agents and underwent successful endovascular repair of her thoracic aneurysms. Post-operatively she responded well to antimicrobial therapy but developed other medical complications. Her presentation and management is discussed; we give an overview of mycotic aneurysms and emphasise the importance of suspecting this rare, but often fatal condition.

INTRODUCTION

Aortitis defined as inflammation of the aorta, is an intrinsically difficult condition to diagnose, often presenting with complications. The development of mycotic aortic aneurysms as a result of aortitis is rare but may progress to rupture and death unless early diagnosis and appropriate treatment is instituted [1].

CASE REPORT

A 66 year-old lady known to have hypertension and hypercholesterolaemia, who smoked 15 cigarettes per day for the past 40 years, attended her GP and local A&E Department with a 4 day history of increasing abdominal and back pain, with associated nausea and vomiting. She was diagnosed with constipation and treated with laxatives. She represented the following day to her local A&E Department with an increase in severity of her symptoms. Laboratory tests revealed grossly elevated inflammatory markers; WBC count of 21,000/µL and C-reactive protein

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(CRP) concentration of 341 mg/L. A provisional diagnosis of appendicitis was made and she was admitted for further management.

On admission, she complained of lower back pain. She was apyrexic (36.9oC) with a blood pressure of 147/74 mmHg, pulse of 89 bpm and oxygen saturations of 96%. Physical examination elicited bibasal crepitations in the lungs, mild tenderness in her right lower quadrant and flank but no evidence of peritonism. No mass was palpable.

Plain abdominal x-ray was unremarkable. Renal, liver function and urine analysis were normal. A CT scan of the abdomen and pelvis showed a cuff of inflamed tissue around the infra-renal aorta in which intramural thrombus was present. The maximum diameter of the aorta was 2.3 cm. No other significant pathology was noted. An isotope-labelled white cell scan and SPECT/CT scan confirmed an inflammatory process involving the aorta at the level of L2-L4 vertebrae (Figure 1). A provisional diagnosis of aortitis was made. The patient was commenced on empirical intravenous antifungal therapy with Fluconazole and intravenous Cefuroxime and Metronidazole on the advice from Microbiology.

Serial blood cultures were negative for bacterial and fungal organisms. An immunology screen was negative as well. A transthoracic echocardiogram showed left ventricular ejection fraction of 65% with no evidence of valvular vegetations.

The patient remained in hospital and serum inflammatory markers responded slowly. However, a follow-up CT scan three weeks later revealed

Fig 1: Labelled white cell scan with SPECT CT examination of the abdominal aorta; Normal uptake is noted at the iliac crest and liver. Abnormal uptake is shown at the abdominal aorta (arrowed)
aneurysmal dilatation in multiple segments of the thoracic and abdominal aorta. The largest aneurysm, which measured 4.7cm in diameter, was in the lower descending aorta. Another more proximal descending thoracic aneurysm measured 3.7cm, while the infrarenal aneurysm measured only 3.4cm. The appearances were felt to be in keeping with mycotic aneurysms.

In view of the speed of dilatation of the thoracic aneurysms, the patient underwent urgent endovascular stenting distal to the origin of the left subclavian artery using the ‘Valiant’ system (Medtronic Inc, Santa Rosa, CA) with access via the right common femoral artery. However, the infrarenal abdominal aneurysm was considered too small for intervention. She was commenced on high-dose oral steroid therapy with Prednisolone 60mg OD to cover the possibility of an inflammatory aneurysm, on the advice of Rheumatology colleagues.

![Fig 2a: 3-D CT reconstruction; Sagittal view of stented thoracic aneurysms. Note the abdominal aneurysm does not enhance on this image](image-url)

![Fig 2b: Sagittal CT; The abdominal aorta appears aneurysmal (max AP diameter 5.9cm) pushing the SMA anteriorly. However, transverse sections reveal the true aneurysm only 3.3cm in max AP diameter, draped with a periaortic soft tissue inflammatory mass, typical of aortitis](image-url)
Post-operatively she developed supraventricular tachycardia. This was successfully treated medically. CT angiogram demonstrated no further dilatation of the aneurysms and no endoleak. She developed multiple small bilateral pulmonary emboli. The patient was discharged home on therapeutic warfarin.

A further follow-up CT scan 4 months after her admission demonstrated resolution of the bilateral emboli, good closure of the aortic wall around the thoracic stent, but an increase of the infra-renal abdominal aortic aneurysm to 4.4cm diameter. Inflammatory markers had decreased to normal. The patient continued on her oral steroids for 12 months reducing slowly until stopped. At this stage a repeat CT scan demonstrated that although the infra-renal aneurysm had enlarged slightly to 4.6cm, it appeared stable and did not require intervention. Inflammatory markers were also normal at this time. She is currently asymptomatic and continues with regular imaging of the residual aneurysm.

**DISCUSSION**

Osler first described a mycotic aneurysm in 1885 in a patient who died of sepsis and was found at post-mortem to have aortic valve vegetations and four aneurysms of the aortic arch covered with “fungal vegetation” [2]. Since then, other authors have used the term in a more general sense [3,4,5,6,7]. Brown *et al* defined a mycotic aneurysm as ‘either a Gram stain or aneurysm wall culture positive for organisms, or a clinical picture consistent with bacteraemia and persistent infection in the presence of a newly diagnosed aneurysm’. [8] The commonest site for mycotic aneurysms is in the abdominal aorta (42.4%), with 39.4% affecting both thoracic and abdominal aorta [9].

Although our patient did not yield any positive blood cultures, her clinical presentation, high CRP concentrations, and the findings of the isotope-labelled white cell scan and CT scan were suggestive of a mycotic cause for her aneurysms. The negative blood culture may be due to the nine days of empirical intravenous antibiotic therapy before blood was taken for culture and sensitivity analysis. 20% of patients with proven mycotic aneurysm do not have leucocytosis and elevated CRP concentrations, with over 50% suffering no pyrexia.[9]

Staphylococcus aureus (28% of patients) is the most commonly cultured organism from mycotic aneurysms, followed by Salmonella (28%) and Streptococcus (10%). In 25% of cases, no organisms are identified. Therefore, our patient is not unique. A source of infection was not obvious in this patient, who gave no history of trauma or any form of recent vascular intervention. This is in contrast to a review (n=243), which revealed arterial trauma was responsible as the primary aetiology in 42% cases, with endocarditis implicated in 16%. There was no identifiable source of infection in 25% cases [8].
An accepted treatment for aortitis is empirical intravenous antibiotics and antifungal agents. However, if aneurysmal dilatation develops, urgent surgical intervention is warranted. The exact form of surgical intervention and postoperative therapy should always be tailored to the patient. Brown and colleagues suggested recommendations based on their experience of mycotic aneurysms[8]:

- Abdominal aneurysms with a negative Gram stain and without pus should be repaired with an in situ Dacron® graft and commenced on 6-8 weeks of oral antibiotics.
- A positive Gram stain or pus in an infrarenal aortic aneurysm necessitates an extra-anatomical bypass and prolonged oral antibiotics.
- If the aneurysm is at the level of the renal arteries, regardless of pus or a positive Gram stain, in situ Dacron® should be used and the patient placed on lifelong antibiotic therapy.
- Aneurysm of the superior mesenteric artery should be replaced using vein as the conduit.
- Femoral artery aneurysms should be excised and an extra-anatomical bypass performed since simple ligation and excision frequently results in ischaemic complications.

However, these suggestions are now outdated with the advent of the endovascular (EVR) technique of repairing aneurysms. A recent meta-analysis carried out by Kan et al of EVR for mycotic aortic aneurysms showed a 30-day survival rate of 90% and a 2-year survival rate of 82%. They demonstrated that aged 65 years or older, rupture of the aneurysm, fistula formation and fever at the time of operation, predicted poor outcome. Preoperative use of antibiotics for longer than 1 week and an adjunct procedure, such as soaking stents in antibiotics or receiving drainage cannula, when combined with EVAR were identified as significant protective factors against persistent infection [10].

This case highlights the difficulty in diagnosing aortitis, which may contribute to delays leading to mycotic aneurysm formation. This carries a high mortality rate, as rupture is often the mode of presentation. Aortitis should be suspected even in the absence of an obvious source of sepsis. Repeated imaging with CT scan is therefore advisable and aneurysm development should be anticipated.

REFERENCES