

An ascending aortic mass infected with *Citrobacter koseri* in a young woman

Authors: Deacon Lee,^A Rebecca Godfrey,^B Jonathan Hyde^C and Rachael James^D

ABSTRACT

Background

Isolated aortic infection is rare and is typically associated with an underlying aortic aneurysm or a prosthetic aortic graft.

Case summary

A 38-year-old woman was admitted with symptoms of left upper limb ischaemia and had imaging findings suggestive of thrombus extending from the ascending aorta into the subclavian and brachial arteries. She underwent evacuation of the aortic masses and replacement of the ascending aorta. *Citrobacter koseri* was isolated from the excised tissue and the patient received 6 weeks of appropriate antibiotic therapy.

Discussion

This is an unusual case of acute upper limb ischaemia due to a mass infected with *Citrobacter koseri* in the ascending aorta without heart valve involvement.

KEYWORDS: Aortic mass, *Citrobacter koseri*, infective endocarditis, echocardiography, cardiac CT

Introduction

Infective endocarditis is an endovascular infection of intracardiac structures which typically affects the heart valves but can also involve the great vessels and prosthetic material inside the heart. We present a rare case of an isolated ascending aortic mass infected with *Citrobacter koseri* in a young woman.

Case presentation

A 38-year-old woman was admitted to hospital with intermittent left forearm pain, tingling and numbness, over the previous few weeks, worsening over the previous 3 days. She had presented to the emergency department a few days prior with similar symptoms affecting the left foot. She described feeling generally

unwell over the preceding few months and had lost weight. She denied any fevers or other focal symptoms. There was no history of recent foreign travel.

Her past medical history included depression and a previous miscarriage. There was no family history of thromboembolism or vasculopathy. There was a history of smoking and alcohol excess.

On presentation, the woman was afebrile and haemodynamically stable with a pulse of 90 beats per minute, blood pressure of 114/76 mmHg and oxygen saturations of 100%. Cardiorespiratory examination was unremarkable with no peripheral stigmata of infective endocarditis. The left hand was cool to touch with bluish discoloration of the fingers and there was a prolonged capillary refill time of 4 seconds on the left compared to 2 seconds on the right. Radial and brachial pulses were absent on the left and she was unable to actively extend her fingers on her left hand. The right upper limb and both lower limbs were neurovascularly intact.

Investigations

Blood tests on presentation showed a white blood cell count of $18.9 \times 10^9/L$ (neutrophils $15.8 \times 10^9/L$, eosinophils $0 \times 10^9/L$), C-reactive protein of 12 mg/L and haemoglobin of 157 g/L. Clotting screen was normal. HIV and viral hepatitis serology were negative.

12-lead electrocardiography showed normal sinus rhythm.

On vascular assessment, there was no Doppler signal in the left brachial, radial or ulnar arteries. Doppler arterial signals were normal in the right arm.

Cardiac and aortic computed tomography (Fig 1) demonstrated a 5 cm curvilinear filling defect suggestive of thrombus in the ascending thoracic aorta extending from the sinotubular junction near the left coronary cusp. There was a small segment of non-occlusive thrombus at the ostium of the left subclavian artery and a separate occlusive thrombus in the left brachial artery at the level of the humeral neck. Thoracic aorta was of normal size with no coarctation, ulceration, dissection flap or calcification seen. Coronary and pulmonary arteries were normal and there was no atrial or ventricular septal defect.

Transthoracic echocardiography raised suspicion of a mobile structure in the aortic arch (Fig 2) and subsequent transoesophageal echocardiography (Fig 3) confirmed a large mobile mass in the ascending aorta, extending into the arch, suggestive of significant thrombus. Heart valve and biventricular function were normal.

Authors: ^Aspecialty registrar in cardiology, Brighton and Sussex University Hospitals NHS Trust, Brighton, UK; ^Bcore medical trainee, Brighton and Sussex University Hospitals NHS Trust, Brighton, UK; ^Cconsultant cardiac surgeon, Brighton and Sussex University Hospitals NHS Trust, Brighton, UK; ^Dconsultant cardiologist, Brighton and Sussex University Hospitals NHS Trust, Brighton, UK

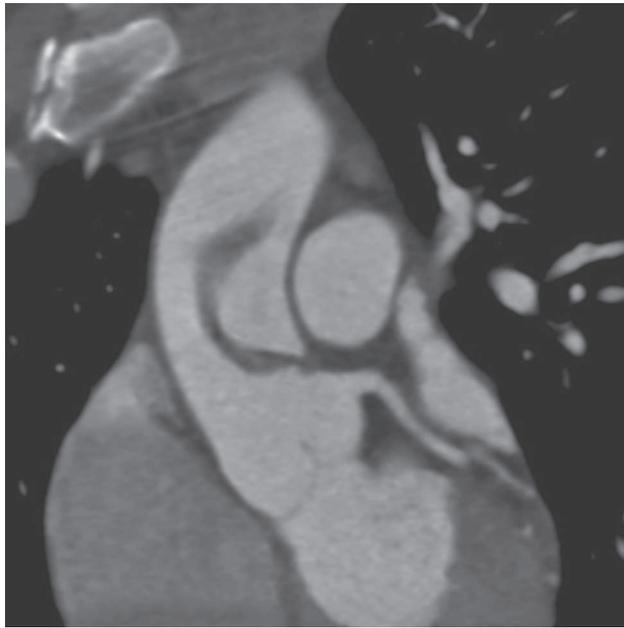


Fig 1. Cardiac and aortic computed tomography demonstrating a 5 cm curvilinear filling defect suggestive of thrombus in the ascending thoracic aorta extending from the sinotubular junction near the left coronary cusp.

Autoimmune screen, antinuclear antibody, antineutrophil cytoplasmic antibodies, paroxysmal nocturnal haemoglobinuria, JAK2, beta-2 glycoprotein and double-stranded DNA were negative. Rheumatoid factor was just above the upper limit of normal.

In the absence of fever or heart valve involvement, blood cultures had not been sent on presentation.

Differential diagnoses

Differential diagnoses included aortic ulceration with overlying thrombus, aortic vegetation or aortic thrombus with or without superimposed infection.

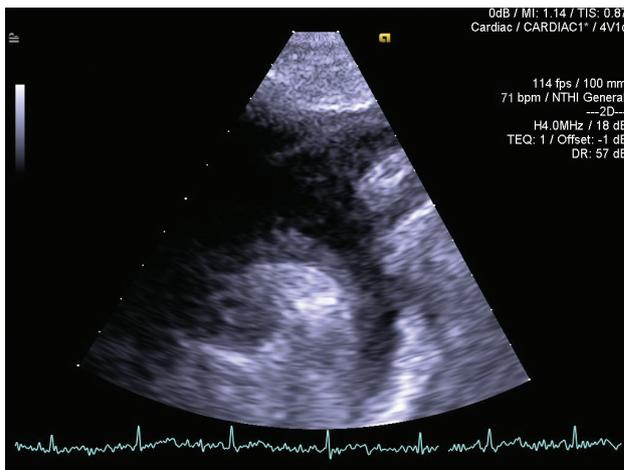


Fig 2. Transthoracic echocardiography suggesting a mobile structure in the aortic arch.



Fig 3. Transoesophageal echocardiography showing a large mobile mass in the ascending aorta, extending into the arch, suggestive of significant thrombus.

Treatment

The patient was commenced on a heparin infusion. Due to concerns about risk of embolic sequelae and unknown aetiology of the aortic mass, she underwent emergency aortic surgery. At operation, an 8 cm long rubbery mass with the proximal end fixed to the aortic wall just above the left main stem ostium and extending into the arch was identified. There was a 2 cm thrombus at the base of the left subclavian artery. Both were removed and the underlying aortic wall looked normal and smooth. The ascending aorta was replaced with an interposition graft.

The sampled ascending aortic wall was free of specific histological abnormality. Microscopy of the excised aortic mass revealed Gram-negative bacilli. Culture of the mass was positive for *Citrobacter koseri* sensitive to gentamicin and meropenem. The patient was commenced on both antibiotics intravenously and was switched to oral ciprofloxacin after 2 weeks to complete a total duration of 6 weeks of antibiotic therapy. Mycobacterial culture of the tissue sample was negative with acid-fast bacilli not seen.

Outcome

This is an unusual case of acute upper limb ischaemia due to an infective mass of unremarkable histology in the ascending aorta with associated thrombus extending into the subclavian and brachial arteries. The aortic wall at surgery was normal and there was no evidence of vasculitis or prothrombotic state. The history of weight loss in the weeks preceding her admission and the growth of *Citrobacter koseri* from the excised tissue make an infective process the most likely cause of what we would retrospectively call vegetation or infected thrombus in the ascending aorta and arch. Unusually for infective endocarditis, the aorta was affected in isolation with no vegetation seen on the heart valves.

The patient made a good postoperative recovery and was eventually discharged home on warfarin. On subsequent clinic follow-up, the patient had some residual weakness and numbness in the left upper limb but was otherwise well.

Discussion

The *Citrobacter* species are anaerobic Gram-negative bacilli that belong to the Enterobacteriaceae family. They can cause various infections in adults involving the urinary, gastrointestinal and respiratory tracts.¹ *Citrobacter koseri* endocarditis is rare, with several published case reports particularly in immunocompromised patients, haemodialysis patients and intravenous drug users.^{2–4} There is one case report from Japan describing an infected thoracoabdominal aortic aneurysm caused by this organism, although in our case, the underlying aorta appeared morphologically normal.⁵ Isolated aortic infection due to *Citrobacter koseri* without underlying aortopathy, prosthetic material or heart valve involvement has not previously been documented.

Learning points

- > Consider limb ischaemia (and differentials for this) in a young patient presenting with symptoms of limb weakness, pain or altered sensation.
- > Consider infection/vegetation as a differential for 'thrombus' seen on computed tomography or echocardiography.

- > Blood cultures should be taken despite the absence of a raised temperature in a patient with systemic symptoms and elevated white blood count. ■

References

- 1 Drelichman V, Band JD. Bacteremias due to *Citrobacter diversus* and *Citrobacter freundii*. Incidence, risk factors, and clinical outcome. *Arch Intern Med* 1985;145:1808–10.
- 2 Figueroa Castro CE, Smith PW. *Citrobacter koseri* endocarditis in a patient undergoing hemodialysis: case report and review of the literature. *Infect Dis Clin Pract* 2009;17:198–200.
- 3 Tellez I, Chrysant GS, Omer I, Dismukes WE. *Citrobacter diversus* endocarditis. *Am J Med Sci* 2000;320:408–10.
- 4 Raval J, Nagaraja V, Poojara L, Denniss AR, Eshoo S. *Citrobacter koseri* native valve endocarditis: A case report and review of the literature. *Journal of Indian College of Cardiology* 2014;4:246–8.
- 5 Bito A, Narahara Y, Murata N, Yamamoto N. A case of infected thoracoabdominal aortic aneurysm caused by *Citrobacter koseri*. *Japanese Journal of Cardiovascular Surgery* 2008;37:333–6.

**Address for correspondence: Dr Deacon Lee, Sussex Cardiac Centre, Brighton and Sussex University Hospitals NHS Trust, Eastern Road, Brighton BN2 5BE, UK.
Email: deacon.lee.04@aberdeen.ac.uk**