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CASE REPORT

Chronic-contained rupture of an infected aneurysm of the abdominal aorta due to *Listeria monocytogenes*

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ABSTRACT

We report a case of chronic-contained rupture of an infected aneurysm of the abdominal aorta, from which *Listeria monocytogenes* was cultured. The diagnosis of rupture and retroperitoneal mass was made by computed tomography, whereas FDG-PET diagnosed vessel wall inflammation. The infectious nature only became apparent at surgery.

KEYWORDS

Aortic rupture, aneurysm, diagnostic imaging, infected, listeria infections

INTRODUCTION

Infected aneurysms represent a diagnostic and therapeutic challenge. *Listeria monocytogenes* is very rarely reported as the causative organism of infected aortic aneurysm. This gram-positive bacillus has emerged as an important food-borne pathogen in the last 20 years.
We report a case of a chronic-contained rupture of an infected aneurysm of the abdominal aorta, from which *L. monocytogenes* was cultured.

CASE REPORT

Three weeks before admission to our university hospital, a 75-year-old woman was hospitalised elsewhere because of a progressively deteriorating clinical condition (characterised by anorexia and fatigue) and acute low back pain. Laboratory evaluation revealed a C-reactive protein (CRP) of 77 mg/l (normal <12), a white blood cell count (WBC) of 8.4 x 10^9/l (normal 3.5 to 11.0 x 10^9/l), and a haematocrit value of 29% (normal 37 to 47). On computed tomography (CT) of the abdomen, retroperitoneal fibrosis was suspected and she was therefore treated with methylprednisolone. The clinical state of the patient improved and she was discharged one week later, on 40 mg methylprednisolone daily. For unclear reasons, the methylprednisolone was stopped by her general practitioner.
In the following two weeks, her clinical condition deteriorated and she was referred to our hospital. Her past history revealed coronary artery disease, hypertension, hysterectomy and cholecystectomy.
On physical examination, the patient was afebrile, blood pressure was 164/82 mmHg and pulse rate 72 beats/min. A discrete aortic valve murmur was noted; lung and vascular examination was unremarkable. An extensive blood and urine analysis revealed a CRP of 18.8 mg/l (normal <5), WBC of 9 x 10^9/l (normal 4 to 9 x 10^9/l) and haematocrit 46%. A monoclonal IgG-κ gammopathy was also noted, the significance of which was not clear. Since the patient remained afebrile, no blood cultures were taken.
A positron emission tomography (PET) with radioactive labelled 18-fluoro-deoxyglucose (FDG) showed increased radiotracer uptake around the abdominal aorta (*figure 1*). A control CT of the abdomen demonstrated a saccular aneurysm of the infrarenal aorta with a hypoattenuating mass anterior of the aneurysm, suggestive of a chronic-contained rupture of an abdominal aortic aneurysm (*figure 2*). The area of increased radiotracer uptake corresponded to the area of concern on the CT scan.

The aneurysm was excised and replaced by a rifampicin-bonded Gelsoft graft with reimplantation of the right renal artery.

Figure 1. *Coronal positron emission tomography shows increased radiotracer uptake around the abdominal aorta (arrow)*

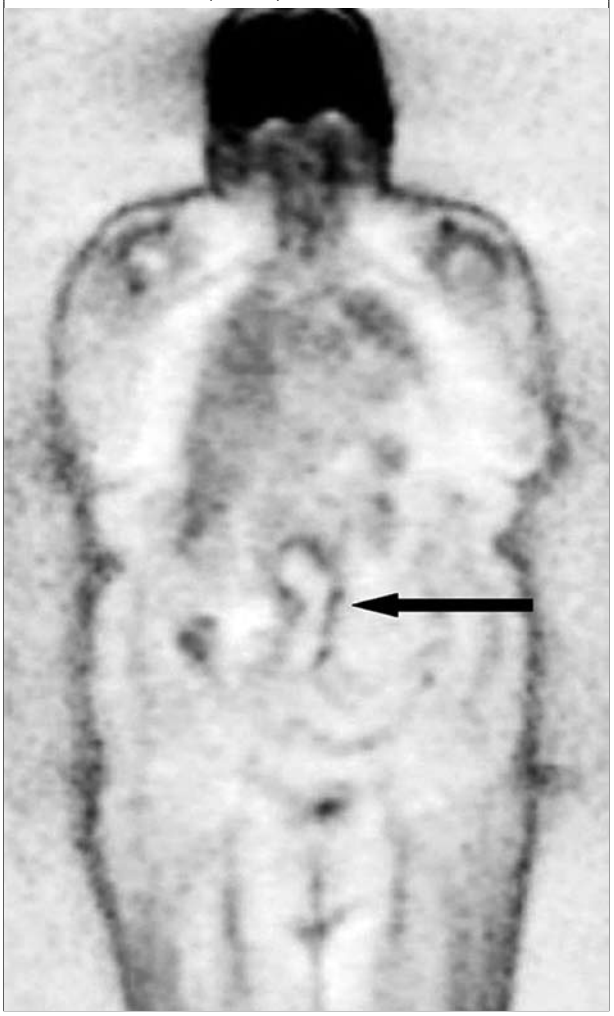
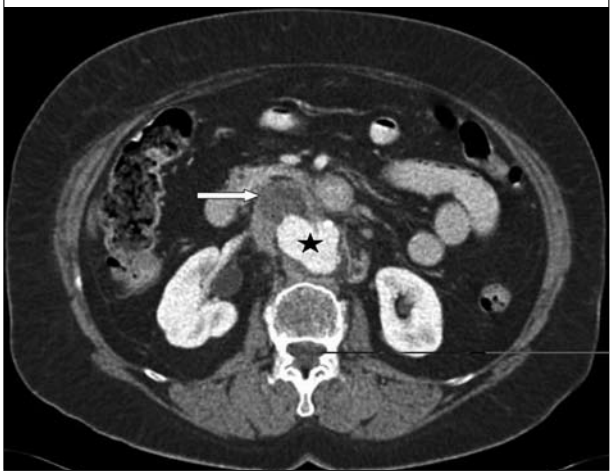


Figure 2. *Repeat transverse contrast-enhanced CT scan - performed 21 days after the first examination - shows a saccular aneurysm (★) with a hypoattenuating mass anterior of the aneurysm (arrow), corresponding to extravasation of blood*



Cultures of the resected material as well as of the haematoma yielded *Listeria monocytogenes*. Treatment was started with ampicillin 1 g every six hours. After four weeks of intravenous therapy, the patient was discharged home and the regimen was changed to oral antibiotic therapy with trimethoprim-sulphamethoxazole 800/160 mg by mouth every 12 hours for another two weeks.

DISCUSSION

Aortic infection develops when a pathogen offends a vulnerable aortic wall. It can arise following bacterial invasion of a previously normal or atherosclerotic aorta and, more commonly, through secondary infection of an existing atherosclerotic aneurysm.[1]

The organisms most frequently isolated are *Staphylococcus aureus*, *Salmonella* species and *Streptococcus* species. A trend toward the involvement of more gram-negative aerobes and anaerobes has been noted (*Clostridium, Pseudomonas, Escherichia coli*, and *Bacteroides*).[2,3]

Although a long list of additional organisms have been reported to cause infected aortic aneurysms, *L. monocytogenes* is a rarity. This food-borne, gram-positive bacillus is widespread in the environment and has been isolated from dust, numerous human (fresh and processed) food products, animal feed, water, sewage, numerous species of animals and asymptomatic humans (5% of the population are estimated to be asymptomatic faecal carriers).[4,5]

It tends to infect the very young and the elderly, pregnant women and immunosuppressed patients (due to malignancy, organ transplant, corticosteroid use or chronic diseases such as diabetes mellitus and cirrhosis).[5] In adults, meningitis or meningoencephalitis and bacteraemia are the principal forms of listeriosis.

Other clinical manifestations have been described, such as pneumonia, conjunctivitis, cholecystitis, lymphadenitis, dermatitis, endocarditis, septic arthritis, peritonitis, osteomyelitis, prosthetic joint infections, prosthetic graft infections and aortitis.[2,5-7]

The diagnosis of an infected aortic aneurysm is usually suspected on imaging studies and confirmed by culturing an organism from the blood. Blood cultures can be negative in up to 50% of the patients, though organisms can be isolated from aneurysmal tissue in up to 75%.[8]

CT scanning with contrast enhancement is the diagnostic tool of choice. Several characteristic features such as saccular shape, rapid expansion and periaortic soft-tissue mass, stranding and/or fluid in an unusual location (thoracic and abdominal aorta at or above the renal arteries) are highly suggestive of an infected aortic aneurysm.[1]

Due to its ability to demonstrate increased *in vivo* glucose consumption in areas of inflammation, an FDG-PET scan can visualise aortitis caused by vasculitides, by autoimmune phenomena, by retroperitoneal fibrosis and by infection.[9] Atherosclerotic inflammation will also cause some FDG accumulation in the vessel wall, but not to the same extent that infection or true vasculitis does.[10] FDG-PET scan, however, does not allow the differentiation between inflammatory and infectious aortitis.

In our patient, a diagnosis of retroperitoneal fibrosis was first made. Therefore, an FDG-PET scan was performed. Increased radiotracer uptake was noted, which corresponded to the area of the ruptured aneurysm present on repeat CT scan. Our patient had more widespread atherosclerosis, as calcifications of the iliac arteries on CT scan showed, but these atherosclerotic lesions did not take up FDG.

A high index of suspicion and correct interpretation of imaging findings, i.e. characteristic features on CT in combination with increased radiotracer uptake on FDG-PET, are critical for early diagnosis and treatment of infected aortic aneurysms.

The preferred treatment of listerial infection is ampicillin. In case of tolerance to ampicillin, an aminoglycoside should be added, since *in vitro* synergy has been observed. In patients with penicillin hypersensitivity, trimethoprim-sulphamethoxazole and vancomycin are the next best choices.[2,4,5] The optimal duration of antibiotic therapy is unknown; however, therapy for at least six weeks is generally recommended.

CONCLUSIONS

Infected aneurysms represent a diagnostic and therapeutic challenge. CT is considered to be the best diagnostic imaging modality in infected aortic lesions. The use of FDG-PET, which gives the opportunity to distinguish between inflammatory and noninflammatory aortic aneurysms, can make an important contribution to the diagnosis.

We believe this case represents the first description of chronic-contained rupture of an infected aneurysm due to *Listeria monocytogenes*.

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