CASE REPORT – OPEN ACCESS

International Journal of Surgery Case Reports 4 (2013) 626–628

Contents lists available at SciVerse ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.elsevier.com/locate/ijscr

# Mycotic aneurysms of the abdominal aorta due to *Listeria monocytogenes*

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ARTICLE INFO

*Article history:*
Received 4 September 2012
Received in revised form 8 January 2013
Accepted 18 February 2013
Available online 17 April 2013

*Keywords:*
Mycotic
Aneurysm
*Listeria*
*Monocytogenes*
Aortic

ABSTRACT

*INTRODUCTION:* Infected abdominal aortic aneurysms (AAAs) can present insidiously with non-specific symptoms or they may present as ruptured AAA in the classical manner.
*PRESENTATION OF CASE:* We report two cases of mycotic AAA with *Listeria monocytogenes*. One patient presented with a ruptured aneurysm, while the other patient had a symptomatic non-ruptured presentation with computer tomography (CT) angiogram demonstrating peri-aortic inflammatory change of a rapidly expanding aneurysm. Both patients were treated with excision of the infected tissue and inlay prosthetic surgical repair as well as long term antibiotics.
*DISCUSSION:* Arterial aneurysms caused by *L. monocytogenes* are rare. Risk factors include immunosuppression, infective endocarditis, intravenous drug use and septicaemia. Listeria infections should be discussed with the Health Protection Agency and local microbiologists due to their ubiquity.
*CONCLUSION:* Abdominal aortic aneurysm due to *L. monocytogenes* is best managed via surgical resection in combination with long term antimicrobial therapy. The role of endovascular exclusion is unclear.


## 1. Introduction

Almost all clinicians will encounter patients with an aortic aneurysm. However, mycotic aneurysms only account for 1–3% of aortic aneurysms.[16] Their non-specific presentation of fever, malaise and leukocytosis, pose a particular challenge to diagnosis and management, which is further compounded by the underlying infectious process.[2]

The gold standard management strategy remains surgical resection and debridement of the infected aorta and surrounding tissues, the use of muscle flaps or omentum to cover the infected field, and either interposition grafting or extra-anatomic bypass followed by long-term antibiotic therapy.[3] However, surgical management in these patients carries a high mortality.[3]

We describe two patients with mycotic infra-renal AAA due to *Listeria monocytogenes*. *L. monocytogenes* is a food borne gram-positive bacillus that usually infects immunocompromised individuals. There are few reported cases of aneurysms infected with *L. monocytogenes* in the literature.[4–11] We report our experience and a review of the literature.

## 2. Case report

### 2.1. Case 1

A 74 year old male with a history of severe rheumatoid arthritis, known AAA (AP diameter 3.7 cm), mild COPD and hypertension was admitted to the medical admission unit with an episode of collapse and sepsis presumed secondary to urinary tract infection. History and examination revealed no signs or symptoms of intra-abdominal pathology and there was no history of abdominal surgery. In the preceding weeks he was noted to have been lethargic and non-specifically unwell. Baseline bloods revealed a raised C – reactive protein (CRP), neutrophilia and a microcytic anaemia. Regular medications included methotrexate. An ultrasound scan revealed the known AAA had rapidly expanded and subsequent CT angiogram confirmed an infra-renal abdominal aortic aneurysm measuring 5.7 cm in AP diameter. The aneurysm sac was thickened with some peri-aortic inflammatory change.

The presence of periaortitis and high inflammatory markers raised a suspicion of a mycotic abdominal aneurysm. The patient successfully underwent open repair of his mycotic aneurysm the following day. A standard inlay repair with a silver impregnated tube graft was performed through a midline laparotomy incision. The duodenum was adhered to the aneurysm sac, but otherwise the surgery was uncomplicated. Blood cultures and tissue from the aneurysm sac confirmed *L. monocytogenes* bacteraemia and infection of the aneurysm sac, respectively. He received rifampicin at induction and for 24 h post operatively. In addition he had a

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2210-2612/$ – see front matter 
http://dx.doi.org/10.1016/j.ijscr.2013.02.024

four week post operative course of IV vancomycin, gentamicin and amoxicillin as recommended by bacteriology results and microbiology advice.

### 2.2. Case 2

A 74 year old male with a history of hypertension was admitted with acute onset of epigastric pain of one hour duration. On examination he was afebrile and had a blood pressure of 95/60 mmHg, a pulse rate of 97 per min and tenderness in the left flank. Focused Assessment with Sonography for Trauma (FAST) scan performed in the emergency department suggested a 5.8 cm AAA and evidence of retroperitoneal haematoma. CT angiogram revealed a 5.6 cm AAA with evidence of rupture and a large left sided retroperitoneal haematoma. His blood tests revealed a haemoglobin level of: 11.3 g/dL, white cell count of $20.3 \times 10^9\ L^{-1}$, and neutrophils of $18.2 \times 10^9\ L^{-1}$.

He was taken to the operating theatre for an emergency surgical repair of his ruptured AAA. A standard inlay technique with rifampicin soaked Dacron tube graft was utilised. At the time of the operation the aneurysm sac was adherent to the duodenum and looked inflammatory hence the aneurysm sac and thrombus were sent for histology and culture. The former revealed atheromatous changes and the latter showed *L. monocytogenes* of the sac. Although he did not show septic signs or symptoms perioperatively, he was treated with a two week course of IV vancomycin, and trimethoprim/sulfamethazole (Co-Trimoxazole, *Septrin*) as recommended by sensitivity results and microbiologists. The patient has remained on low dose oral antibiotic prophylaxis with penicillin V.

Subsequent whole body positron emission tomography (PET) CT scan demonstrated intense FDG uptake around the abdominal aortic wall, corresponding to the graft. It was thought the appearances were most likely to represent resolving haematoma, although infection could not be excluded. Therefore an Indium-111 labelled white cell scan was performed but did not demonstrate a further focus for infection or infection of the graft site.

Both patients were discharged from hospital alive.

## 3. Discussion

Mycotic aortic aneurysms account for only 1–3%[1] of all aortic aneurysms and can occur in previously normal aorta although the presence of an aneurysm does predispose to a mycotic aneurysm.[12] Further risk factors include immunosuppression, infective endocarditis, intravenous drug use and septicaemia.[13] Staphylococcus, Salmonella and Enterobacter species are the most common organisms cultured in mycotic aortic aneurysms.[10]

Arterial aneurysms caused by *L. monocytogenes* are rare. *L. monocytogenes* is food borne Gram-positive bacillus that is widespread in the environment. It has been isolated from dust, numerous (fresh and processed) food products, animal feed, water and sewage. Listeria infections are more common in pregnant women, in the elderly and in immuno-compromised patients, and may cause meningitis in newborns. Due to ubiquity of the organism, outbreaks and sporadic disease continue to occur. Therefore, Listeria and other such uncommon infections should be discussed with the Health Protection Agency (or other appropriate body), as advised by your local microbiologists. The standard antibiotic therapy for listeriosisis is a combination of ampicillin and gentamicin or trimethoprim-sulfamethazole. Vancomycin and erythromycin are generally accepted substitutes.[14]

The association between immunosuppression and *L. monocytogenes* infection is well documented. We report a unique case of a patient who developed listeria infection of the abdominal aorta; with immunosupression secondary to methotrexate use possibly, playing a contributory role in the development of bacteraemia. On the other hand, the second patient did not have an identifiable pathology or risk factor for immunosuppression. Infection of the abdominal aorta with this bacterium is rare. It has previously been reported in patients with malignancy and those on immunosuppressants[17] but remains a rare cause, and the outcome is usually poor. Long term survival data is not available; however experience points to poor short and long term prognosis.

In patients on immunosuppressive medications, there should be a low threshold for sending tissue and blood culture samples for microbiology during AAA repair if any suspicion about possible opportunistic infection exists. This may provide potentially crucial diagnostic information at relatively low cost. In the case of diagnostic uncertainty, notwithstanding the patients immunosuppression status, clinical doubt should be sufficient to keep the patient on appropriate broad spectum antibiotic prophylaxis until culture results become available.

## 4. Conclusion

Abdominal aortic aneurysm due to *L. monocytogenes* is very rare. As with any infectious aortitis, mycotic AAA due to *L. monocytogenes* is best managed via surgical resection and restoration of flow through a graft. Antibiotic coverage is standard for all cases, but there is no consensus on duration of therapy, ranging from short-course (2 weeks) to life-long coverage.[15] The role of endovascular exclusion of such mycotic aneurysm provides a dilemma, as the concept of deploying a prosthetic graft into the site of infection is controversial. Although there are reports of such successful exclusion, the long-term infection-free survival remains unknown.

## Conflict of interest

The authors declare that they have no conflicts of interest concerning this article.

## Funding

None.

## Consent

Patient consent was obtained. There is no identifiable patient data.

## References

1. Chan FY, Crawford ES, Coselli JS, Safi HJ, Williams TW. In situ prosthetic graft replacement for mycotic aneurysm of the aorta. *Annals Thoracic Surgery* 1989;**47**(2):193–203.
2. Clough RE, Black SA, Lyons OT, Zayed HA, Bell RE, Carrell T. Is endovascular repair of mycotic aortic aneurysms a durable treatment option? *European Journal of Vascular and Endovascular Surgery* 2009;**37**:407–12.
3. Muller BT, Wegener OR, Grabitz K, Pillny M, Thomas L, Sandmann W. Mycotic aneurysms of the thoracic and abdominal aorta and iliac arteries: experience with anatomic and extraanatomic repair in 33 cases. *Journal of Vascular Surgery* 2001;**33**:106–13.
4. Navarrete-Reyna A, Rosenstein DL, Sonnenwirth AC. Bacterial aortic aneurysm due to *Listeria monocytogenes*: first report of an aneurysm caused by listeria. *American Journal of Clinical Pathology* 1965;**May (43)**:438–44.
5. Harvey MH, Strachan CJ, Thom BT. *Listeria monocytogenes*: a rare cause of mycotic aortic aneurysm. *British Journal of Surgery* 1984;**71**:166–7.
6. Clouse WD, DeWitt CC, Hagino RT, DeCaprio J, Kashyap VS. Rapidly enlarging iliac aneurysm secondary to *Listeria monocytogenes* infection: a case report. *Vascular and Endovascular Surgery* 2003;**37**(Mar-Apr (2)):145–9.
7. Krol-van Straaten MJ, Terpstra WE, de Maat CE. Infected aneurysm of the abdominal aorta due to *Listeria monocytogenes*. *Netherlands Journal of Medicine* 1991;**38**(June (5–6)):254–6.
8. Barkhordarian S, Harris A, Patterson R. Ruptured thoracic aortic aneurysm from *Listeria monocytogenes* aortitis: a sentinel case. *EJVES Extra* 2005;**9**:78–81.

9. Gauto AR, Lawrence AC, Woodward DR. Arterial infections due to *Listeria monocytogenes*: report of four cases and review of world literature. *Clinical Infectious Diseases* 1992;**14**:23–8.
10. Goddeeris K, Daenens K, Moulin-Romsee G, Blockmans D. Chronic-contained rupture of an infected aneurysm of the abdominal aorta due to *Listeria monocytogenes*. *Netherlands Journal of Medicine* 2006;**64**(March (3)):85–7.
11. Paccalin M, Amoura Z. Infectious aneurysm due to *Listeria monocytogenes*: a new case and review of the literature. *La Revue de Médecine Interne* 1998;**19**(September (9)):661–5.
12. Aziz S, McWilliams R, Rashid A, Gosney JR, Harris PL, Stables RH. Late aortic rupture due to stent margin pseudoaneurysm formation complicating endovascular stent graft repair of a thoracic aortic mycotic aneurysm. *EJVES Extra* 2006;**12**:30–4.
13. Kieffer EMD, Chiche LMD, Gomes DMD. Aortoesophageal fistula: value of in situ aortic allograft replacement. *Annals of Surgery* 2003;**238**(2):283–90.
14. Poros-Gluchowska J, Markiewicz Z. Antimicrobial resistance of *Listeria monocytogenes*. *Acta Microbiologica Polonica* 2003;**52**(2):113–29.
15. Cina CS, Arena GO, FitureAO, ClaseCM, Doobay B. Ruptured mycotic thoracoabdominal aortic aneurysms: a report of three cases and a systematic review. *Journal of Vascular Surgery* 2001;**33**:861–7.
16. Salem MK, Rayt HS, Hussey G, Rafelt S, Nelson CP, Sayers RD, et al. Should Asian men be included in abdominal aortic aneurysm screening programmes? *European Journal of Vascular and Endovascular Surgery* 2009;**38**(December (6)):748–9.
17. Oltean M, Herlenius G, Gäbel M, Friman V, Olausson M. Infectious complications after multivisceral transplantation in adults. *Transplantation Proceedings* 2006;**38**(October (8)):2683–5.