

Imminent rupture of infected aortic aneurysm presenting as lower back pain in an older patient

Satoshi Takashima¹, Tadatsugu Morimoto¹, Hirohito Hirata¹, Masatsugu Tsukamoto¹, Takaomi Kobayashi², and Yoshihara Tomohito¹

¹Saga University Hospital

²Saga University

June 9, 2023

Imminent rupture of infected aortic aneurysm presenting as lower back pain in an older patient: A case report

Satoshi Takashima, Tadatsugu Morimoto, Takaomi Kobayashi, Hirohito Hirata, Tomohito Yoshihara, Masatsugu Tsukamoto, Masaaki Mawatari

¹ Department of Orthopedic Surgery, Faculty of Medicine, Saga University.

Corresponding author: Tadatsugu Morimoto

Mailing address: Department of Orthopedic Surgery, Faculty of Medicine, Saga University, 5-1- 1 Nabeshima, Saga, Japan

Tel: +81-95-234-2343

Fax: +81-95-234-2059

E-mail: sakiyuki0830@gmail.com

Conflict of Interest: The authors declare that they have no competing interests to declare.

【Cover letter】

Editor-in-Chief

Clinical case reports

Dear Editor:

I wish to submit a case report for publication in Clinical Case Reports, titled “Imminent rupture of infected aortic aneurysm presenting as lower back pain in an older patient: A case report.” This paper was co-authored by Tadatsugu Morimoto, Hirohito Hirata, Masatsugu Tsukamoto, Takaomi Kobayashi, Tomohito Yoshihara, and Masaaki Mawatari.

This paper presents the clinical case of an elderly male patient who presented to our hospital with complaints of lower back pain and an infected aortic aneurysm at the time of his initial visit. The patient had poorly controlled type II diabetes mellitus. He presented to our hospital with back pain and numbness in the left lower extremity, which had increased gradually. Further examination revealed an infectious aortic aneurysm, and the patient was referred to the cardiovascular surgery department. We believe that this case makes a significant contribution to the literature because infective aortic aneurysms are rare and are expected to increase in the future due to an increase in the number of compromised hosts.

Furthermore, we believe that there are lessons to be learned from the clinical course of our patient and that this paper will be of interest to the readers of your journal. We hope that the takeaway message will serve as a reminder to physicians regarding consideration of diagnosis of infectious aneurysms when patients present with lower back pain. A delayed diagnosis can have serious consequences and may lead to unsatisfactory clinical outcomes. We hope that the information provided in this report will aid in early detection and treatment of this disease.

This manuscript has not been published or presented elsewhere in part or in entirety, and is not under consideration by another journal. We have read and understood your journal's policies and believe that neither the manuscript nor the study violates any of these policies. The authors declare no conflicts of interest.

Thank you for your consideration. I look forward to hearing from you.

Sincerely,

Satoshi Takashima

Department of Orthopedic Surgery, Faculty of Medicine, Saga University, 5-1-1 Nabeshima, Saga, Japan

Tel: +81-95-234-2343

Fax: +81-95-234-2059

E-mail: stmh1156@gmail.com

【Manuscript】

Keywords: Infected abdominal aortic aneurysm, lower back pain, misdiagnosis

*Introduction:

Infected abdominal aortic aneurysm (IAAA) is a rare but potentially fatal sequela of infectious inflammatory disease of the aortic wall. However, it is rather an under-recognized disease. The incidence of IAAA has increased in the recent years due to the aging population and increasing number of immunocompromised hosts¹. Early diagnosis and management of IAAA can improve the prognosis and survival. However, the diagnosis of IAAA is sometimes challenging in the early stages due to its varied clinical presentation, such as lower back pain².

Herein, we report the case of an older patient in whom a differential diagnosis of spinal degenerative disease was considered due to symptoms such as lower back pain, lower extremity pain, and numbness. However, the patient was ultimately diagnosed with IAAA.

Case history and examination:

A 63-year-old male patient presented to the orthopedic outpatient clinic with complaints of back pain and left leg numbness, which had gradually increased over the past month. The patient had a history of diabetes mellitus (DM), hypertension, and dyslipidemia, but had self-interrupted his medications. No other significant medical history was elicited by the patient.

Physical examination revealed lower back pain and the patient was able to walk without experiencing any neurological deficits. He experienced swelling and local heat in the left lower limb without any erythematous changes or cold sensations in the right leg. The left dorsalis pedis artery was palpable; however, the right dorsal foot artery was poorly palpable.

Investigations were performed to localize the source. His laboratory data showed marked elevation of white blood cells ($26.9 \times 10^3/\text{L}$) and C-reactive protein (17.96 mg/dL; normal range < 0.3 mg/dL), along with increased glycosylated hemoglobin (HbA1c) value (9.4%; normal range $< 6.0\%$), Aspartate Aminotransferase (155 U/L; normal range < 30 U/L), alanine transaminase (ALT) (93 U/L; normal range < 42 U/L), and

gamma-glutamyltransferase (437 U/L; normal range < 64 U/L) levels were also markedly elevated indicating severe infection, DM and liver dysfunction. Fever, back pain, and elevated C-reactive protein levels were suggestive of pyogenic spondylitis. Therefore, lumbar spine radiography and Magnetic Resonance Imaging (MRI) examination were performed. However, lumbar spine radiography and MRI revealed no findings suggestive of pyogenic spondylitis (Figure 1). Based on these results, hepatobiliary system disease was suspected and a medicine specialist was consulted. The patient was admitted due to the suspicion of liver abscess, and underwent detailed examination and treatment.

Differential diagnosis, investigation, and treatment

Contrast-enhanced abdominal computed tomography (CT) revealed a pseudoaneurysm in the descending aorta. The surrounding soft tissues showed a small amount of gas in the L3/4 intervertebral space and above and below them, suggesting a left psoas abscess and L3/4 vertebral spondylodiscitis (Figure 2). On reviewing the radiograph and MRI, we realized that we had missed the imminent rupture of an infected abdominal aortic aneurysm (IAAA) (Figure 1). Blood cultures were positive for Gram-negative rods, and the microorganism was identified as *Escherichia coli*. Based on these findings, the patient was ultimately diagnosed with a left psoas abscess and septic shock secondary to IAAA. Ceftriaxone (CTRX) (2.0 g) was administered every 12 h. Pazufloxacin (PZFX) (1.0 g) was added every 12 h to allow tissue penetration. After the initiation of antibiotic therapy, no worsening tendency was observed. Antimicrobial susceptibility testing revealed that the isolate was susceptible to cefazolin (CEZ) at the minimal inhibitory concentration value. Therefore, 2.0 g of CTRX being administered every 12 h was replaced with 1.0 g of CEZ every 6 h.

*Outcome and follow-up

Four days later, fever and back pain worsened again. Subsequent antibiotic treatment was continued, and the fever stabilized. Laboratory data showed an improvement in white blood cell count ($14.5 \times 10^3/\text{L}$) and C-reactive protein levels (3.56 mg/dL; normal range < 0.3 mg/dL). However, CT revealed a ruptured IAAA despite the patient being fully alert. An emergency surgery was performed (Figure 3). The patient underwent aorto-right external iliac bypass, femoro-femoral bypass, enterectomy, and colostomy. He was managed in the Intensive Care Unit post-surgery, but was in a state of circulatory failure since the end of the surgery. The patient was confirmed dead on the fourth postoperative day.

*Discussion:

IAAA was first described by Osler in 1885 as an aneurysm caused by a bacterial embolus from infective endocarditis³. The concept has since been broadened to include all aneurysms caused by infections along with those caused by the addition of infection to an existing aneurysm⁴. IAAA is rare, accounting for 0.7%-3% of all aortic aneurysms, and is difficult to treat. The hospital mortality rate of patients with infected aortic aneurysms is high, ranging between 5-44%^{5,6}. In the past, bacteremia from infective endocarditis and infective emboli were the main sources of infection. However, with the increasing prevalence of atherosclerosis and medically induced arterial injury (catheters and surgery) associated with aging and an increasing number of easily infected hosts such as those with diabetes, malignancy, and collagen disease, the incidence of IAAA has been reported to increase⁷.

Correct and early medical examination and treatment are essential because IAAA is characterized by a faster rate of enlargement⁸ and a higher frequency of rupture due to its multifocal nature⁹, in comparison to abdominal aortic aneurysm (AAA). However, while AAA is often accompanied by severe symptoms, such as abdominal pain, impaired consciousness, and abnormal blood pressure, most cases of IAAA rupture are confined to the retroperitoneum, and rupture into the abdominal cavity is extremely rare¹⁰. Back pain is often the main symptom in IAAA rather than abdominal pain¹¹. There have been a few cases of IAAA wherein physicians and spine surgeons engaged in lower back pain treatment, and a correct diagnosis was not reached. Therefore, physicians and spine surgeons should be aware of the possibility of IAAA when the patient complains of persistent back pain even after the administration of treatment for symptomatic relief. According to reports by various authors, rupture or impending rupture of an AAA should be suspected when (1) the patient is a middle-aged or older male with a history of an abdominal mass; (2) the pain is severe,

with a definite onset time and a component of lateral abdominal pain; (3) there is no tenderness in the lumbar spine or surrounding soft tissues and no neurological symptoms; (4) the iliopsoas muscle shadow is abnormal on radiography; and (5) a beating mass is detected in the abdomen⁹. Palpation of the abdominal mass is recommended in patients with atypical lower back pain⁹.

The present case involved an older male patient who did not present with lumbar spinal tenderness or neurological symptoms. Remarkably, an abdominal examination was not conducted; therefore, the presence of an abdominal mass was not initially established. Regrettably, the possibility of IAAA, which could have been a potential diagnosis, was not initially considered. In addition, as in the present case, missed imaging findings can also be problematic. IAAA is difficult to diagnose because the main symptom is fever, and the patient presents with a variety of symptoms, including thoracoabdominal pain and back pain, depending on the location of the aneurysm¹². IAAAs are easily overlooked when fever is not the primary symptom. Blood investigations showing signs of infection, such as increased white blood cell counts and elevated C-reactive protein levels, along with positive blood cultures and the presence of soft tissue infiltration around the aorta, as shown on CT or magnetic resonance angiography (MRA), may lead to a diagnosis of IAAA. IAAA does not present with serious symptoms in the early stages, and back pain is the main complaint in 44% cases; therefore, orthopedicians are likely to be involved. However, in cases of lower back pain without the primary complaint of fever, abdominal examinations and blood investigations are rarely performed, and orthopedic surgeons tend to focus only on their area of expertise in diagnostic imaging^{13,14}. Focusing on the spine and spinal cord, without paying attention to the soft tissues that appear in the imaging, can lead to overlooking serious diseases such as IAAA. In the present case, the diagnosis was made on the same day as the patient was suspected of a serious disease and internal medicine and radiology department was consulted, although it had been missed at the time of the initial visit. It should be noted that physicians treating lower back pain tend to look at the ABC (Alignment, Bone, Cartilage) but miss the soft tissues¹⁵. It is necessary to review images from the edges to ensure that entities such as aortic disease, neoplastic lesions of the spine, and hip disease are not missed during this process.

*Consent:

Written informed consent for the publication of this case report (including photographs, case progress, and data) was obtained from the patient's relatives.

【Author Contributions】

ST and TM designed and outlined the main conceptual ideas. TY and TK collected the data. MT, MT, and HH. aided in the interpretation of the results and worked on the manuscript. MM supervised this study. ST wrote the manuscript with the support of MT, M.T, and HH. All the authors discussed the results and commented on the manuscript.

【Funding Information】

No funds, grants, or other support was received.

【COI statement】

The authors declare that they have no conflicts of interest.

【Data availability statement】

Data sharing is not applicable to this article as no datasets were generated or analyzed in the current study.

【ORCID】

Satoshi Takashima: 0009-0009-5013-5812.

【References】

1. Huang J., Cano, et al. Infected aneurysm of the native aorta due to *coccidioides posadasii*. Infectious Disease Society of America 2021; 8(6)

2. Ng J.H., Heng K.W.J. Infected native aortic aneurysm with spondylodiscitis in an elderly septic man with back pain. *BMJ Case Rep* 2021; 14(2)
3. Lucas R.B., Lucia R., Aida R., Manuel M. Mycotic Aortic Aneurysms. *Aortic Aneurysm and Aortic Dissection* 2018
4. Cheng-Hsin Lin., Ron-Bin Hsu. Primary Infected Aortic Aneurysm. *Acta Cardiol Sin* 2014; 30(6): 514-521
5. Corvera J.S., Blitzer D., Copeland H., Murphy D., Hess P.J., Jr., Pillai S.T., Fehrenbacher, J.W. Repair of thoracic and thoracoabdominal mycotic aneurysms and infected aortic grafts using allograft. *Ann Thorac Surg.* 2018;106:1129–1135.
6. Sharma A., Pawar P., Raju R., Ayappan M.K., Mathur K. Neo aortoiliac system repair of *Burkholderia cepacia* infected mycotic aneurysm with impending rupture. *Indian J Vasc Endovasc Surg.* 2018;5:129.
7. Okada K, Yamanaka K, Sakamoto T, et al. In situ total aortic arch replacement for infected distal aortic arch aneurysms with penetrating atherosclerotic ulcer. *J Thorac Cardiovasc Surg* 2014; 148: 2096-100.
8. Shao CC, McFarland GE, Beck AW. Emergent repair of infected aortic aneurysm with contained rupture using a femoral vein neoaortoiliac system. *J Vasc Surg Cases Innov Tech* 2021; 7(3): 502-505
9. Padmanabhan C, Poddar A. Infections of the aorta: *Indian J Thorac Cardiovasc Surg* 2022; 38: 101-114.
10. Tang T, Boyle J.R., et al. Inflammatory Abdominal Aortic Aneurysms 2005; 29(4): 353-362
11. Patelis N, Nana P, Spanos K, et al. The association of spondylitis and aortic aneurysm: *Ann Vasc Surg* 2021; 76: 555-564
12. Garrity BM, Sugarman E, Pulley S. Abdominal aortic aneurysm rupture presenting with focal weakness and altered mental status: *Int J Emerg Med* 2022; 15(1): 28
13. Waindim F, Crim J. MRI of difficult discs: *Clin Radiol* 2023; 78(3): 201-208
14. Onder O, Yarasir Y, Azizova A, Durhan G, Onur MR, Ariyurek OM. Errors discrepancies and underlying bias in radiology with case examples: a pictorial review. *Insights imaging* 2021; 12(1): 51
15. Goes PCK, Pathria MN. Radiographic/MR imaging correlation of the shoulder. *Magn Reson Imaging Clin N Am* 2019; 27(4): 575-585

【Figure/Table】

Figure 1

Radiographic and Magnetic resonance imaging (MRI) of the lumbar spine before treatment.

Lumbar spine radiograph and (B) MRI showing no findings suggestive of discitis or vertebral body destructive lesions at the time of the initial examination. We observed the presence of an imminent rupture of the infected abdominal aortic aneurysm (white arrow) on reexamination.





Figure 2

Abdominal computed tomography (CT) imaging with contrast

Contrast-enhanced abdominal CT shows a pseudoaneurysm in the descending aorta (white arrow).



Figure 3

Abdominal computed tomography (CT) imaging with contrast

The pseudoaneurysm of the abdominal aorta (white arrow) appears markedly enlarged and in a state of imminent rupture. The abscess around the lesion and within the left iliopsoas and psoas major muscles appears to be enlarged.

