Brucella-Associated Mycotic Abdominal Aortic Aneurysm: A Fatal Relapse and the First Reported Case from Oman

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Abstract

Mycotic abdominal aortic aneurysm (MAAA) caused by the *Brucella* species is an exceptionally rare but often fatal complication of brucellosis, particularly in the absence of endocarditis or other focal infections. We report the case of a 90-year-old Omani woman who initially presented with low-grade fever and was incidentally found to have an infrarenal abdominal aortic aneurysm measuring 3.2 cm. Blood cultures grew *Brucella species* and serology was positive for *Brucella melitensis* and *Brucella abortus*, with high serologic titers. Notably, she had a history of unpasteurised camel milk consumption. She initially responded to antimicrobial therapy but was lost to follow-up. Eight months later, she re-presented with abdominal pain, functional decline and lack of adherence to medications. CT angiography revealed aneurysm expansion to 6 cm with signs of impending rupture and wall thickening. Blood cultures again isolated *Brucella spp.*, confirming relapsed bacteremia. Given her advanced age, frailty, cachexia, poor baseline functional status, and complex aneurysm anatomy, she was considered a poor candidate for surgical or endovascular repair. Antimicrobial and supportive therapy were started, however she died the following day. This case underscores the diagnostic and therapeutic challenges of Brucella-associated MAAA while being the first documented case from Oman, highlighting the need for early recognition, structured follow-up, and increased awareness in endemic regions.

Keywords: Brucellosis; Infected; Mycotic; Abdominal Aortic; Aneurysm; Mycotic; Brucella Melitensis; Brucella Abortus

Introduction

Abdominal aortic aneurysms (AAAs) are typically linked to degenerative risk factors such as age, smoking, and hypertension. A small fraction (0.7%–3%) are infection-related and classified as infected or mycotic aneurysms.[1] The most common pathogens are *Salmonella* and *Staphylococcus aureus*; *Brucella* species are extremely rare.[1] Brucellosis, a zoonotic disease caused primarily by *Brucella melitensis* and *Brucella abortus*, is endemic in parts of the Middle East, including Oman.[2] Human infection usually occurs via unpasteurized dairy consumption, direct animal contact, or inhalation of aerosolized bacteria. While brucellosis mainly affects the musculoskeletal and genitourinary systems, cardiovascular complications are uncommon, with endocarditis being the most frequently reported cardiovascular complication.[3] Mycotic AAAs (MAAAs) due to *Brucella species* are exceptionally rare. Diagnosis and treatment are challenging due to vague symptoms, low clinical suspicion, and lack of standardized protocols.[4] The suspected mechanism involves hematogenous spread, bacteremia, and direct invasion of the vessel wall.[4] These aneurysms tend to occur in the abdominal aorta, often presenting as saccular aneurysms or pseudoaneurysms.[4,5] Management typically involves prolonged antibiotic therapy, alongside surgical or endovascular repair to prevent rupture.[4,5] We report the first known case from Oman of a *Brucella*-associated infected MAAA, emphasizing its diagnostic complexity and management strategy.

Case Report

A 90-year-old woman presented in early 2024 with a one-month history of low-grade fever and chills, without localizing symptoms. Symptoms persisted despite antibiotics prescribed at urgent care centers. Her medical history included breast cancer treated a decade earlier with neoadjuvant chemotherapy, radical mastectomy, and radiotherapy, with remission since. She had no other known comorbidities. Notably, she reported consuming unpasteurized camel milk. Blood cultures from three consecutive samples grew *Brucella* species. Serology showed elevated titers: *Brucella melitensis* at 1:10,240 and *Brucella abortus* at 1:1,280. Transthoracic echocardiography showed no vegetations. There was no clinical evidence of endocarditis, neurobrucellosis, or spinal involvement. Laboratory results are summarized in Table 1. CT imaging revealed a 3.14 cm infrarenal abdominal aortic aneurysm (AAA) with mural thrombus and mild fusiform dilation of the right common iliac artery [Figure 1]. PET CT showed no signs of active endovascular infection [Figure 1]. She was started on gentamicin, doxycycline, and rifampicin. Due to elevated liver enzymes, rifampicin was briefly replaced with ciprofloxacin but reinstated within seven days as liver enzymes improved. Gentamicin was later replaced with intravenous ceftriaxone due to concerns about worsening her severe pre-existing hearing loss. She completed two weeks of a three-drug regimen in the hospital, including one IV agent, then was discharged on oral doxycycline and rifampicin with a plan for at least six weeks of therapy. Outpatient follow-up was arranged to monitor clinical response and treatment duration. However, she was lost to follow-up and later found to be non-adherent to antimicrobial therapy.

Table 1: Laboratory Investigations at Presentation, Interim, Discharge and Second Admission.

Variables	Initial Admission	At Discharge	Second Admission
Haemoglobin (11.0-14.5; 10^12/L)	8.8	9.4	7.6
Platelet count (150-450; 10 ^9/L)	87	395	134
White Cell Count (2.4-9.5; 10 ^9/L)	3.9	5.6	10.6
C- Reactive Protein (0-5 mg/L)	177	76	114
Sodium (135-145 mmol/L)	133	135	132
Creatinine (45-84 μmol/L)	59	60	41
Alanine Aminotransferase (0-33 U/L)	59	52	10
Albumin (35-52g/L)	20	21	13
Alkaline Phosphatase (35-104 U/L)	205	232	112
Aspartate Aminotransferase (0-32 U/L)	152	90	16
Bilirubin, Total (0-17 umol/L)	19	9	23
Protein, Total (66-87 g/L)	62	63	65
Urine Microscopy and Culture	Negative	-	-
Blood Culture	Brucella Species	No growth after 5 days	Brucella Species
Cytomegalovirus (CMV) Serology	Negative	-	-
Epstein Barr Virus (EPV)	Negative	-	-
HIV 1&2 Ag/Ab	Negative	-	-
Parvovirus B19 PCR (Qualitative)	Negative	-	-
Acute Hepatitis screening	Negative	-	-
Chronic Hepatitis screening	Negative	-	-
Brucella Antibody Titre	*Brucella Melitensis* at 1:10,240 *Brucella Abortus* at 1:1,280	-	-
Coxiella Burnettii Serology (Q fever)	Negative	-	-
Dengue Serology	Negative	-	-
Hepatitis E virus	Negative	-	-
Mycoplasma pneumonia PCR	Negative	-	-
Respiratory Virus Screen**	Negative	-	-
SARS-CoV-2 PCR	Negative	-	-
Urinary Antigen – Legionella	Negative	-	-
Urinary Antigen – Pneumococcus	Negative	-	-

**Respiratory Virus Screen (Parechoviruses, Human Bocavirus, Influenza A PCR, Influenza B PCR, Corona virus, Parainfluenza 1,2,3,4,PCR, Rhinovirus PCR, RSV PCR, Human Metapneumovirus PCR, Adenovirus RVS, Enterovirus RVS, H1N1 confirmatory PCR).
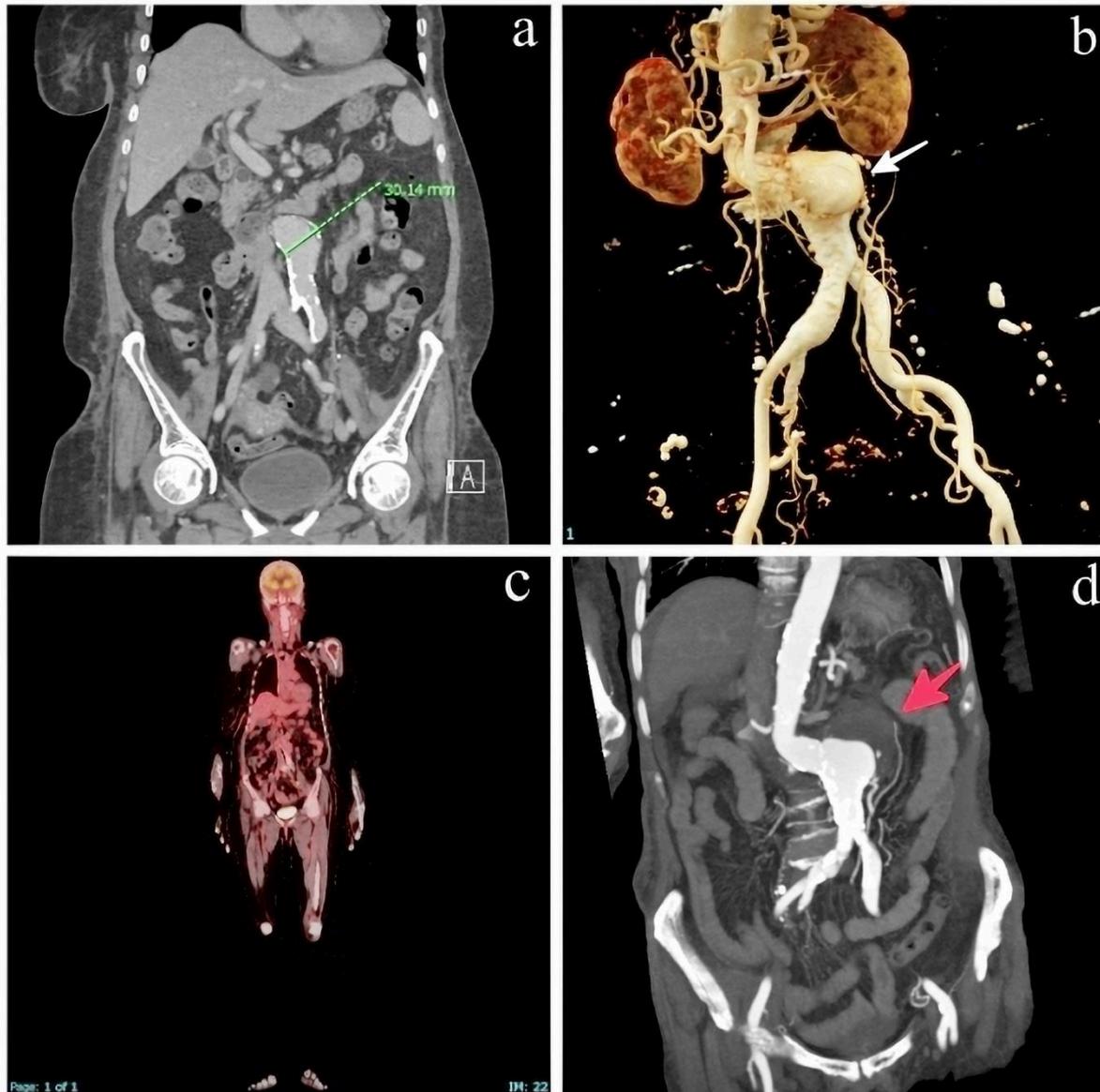
Footnote - Figure 1: (a) Initial CTA showing an infrarenal abdominal aortic aneurysm (maximum diameter, 3.14 cm) with calcified walls. (b) CTA recon of figure 1(a) showing the info-renal aneurysm (white arrow) with bilateral ectatic common iliac arteries.(c) Positron emission tomographic (PET) CT showing no evidence of active endovascular infection. (d) At the second presentation, CT demonstrates interval enlargement to 6.0 × 6.0 cm, with rupture and associated retroperitoneal hematoma (red arrow).

Figure 1: Collage of CT Angiography and PET-CT Findings in a Mycotic Abdominal Aortic Aneurysm with Subsequent Rupture.

Eight months after the initial admission, she returned with fever, abdominal pain, vomiting, anorexia, and systemic decline. She appeared cachectic, was hypotensive, and had a decline in functional status. Repeat CT angiography showed AAA expansion to 6 cm, with wall breach and surrounding inflammation, consistent with impending rupture [Figure 1]. Blood cultures again isolated *Brucella* species, confirming relapsed bacteremia. Given her advanced age, malnutrition, hypoalbuminemia, complex aneurysm anatomy, and goals of care, she was not a candidate for surgical or endovascular repair. She was started on IV ceftriaxone, oral doxycycline, and rifampicin. The patient's condition deteriorated overnight, and she died the following day due to aneurysm rupture and sepsis. This case report adheres to the CARE (CAse REport) guidelines for reporting case reports.

Discussion

Brucella-associated infected AAA is a rare but fatal complication of brucellosis. Vascular involvement likely results from bacteremic seeding of the vasa vasorum or direct extension from infected tissues.[4–6] Chronic inflammation weakens the arterial wall, leading to pseudoaneurysm and eventual rupture. Symptoms are often nonspecific, commonly including abdominal pain and low-grade fever, which can delay diagnosis.[4,6] Most vascular complications of brucellosis arise from endocarditis-related embolic events. Primary arterial involvement without cardiac infection, as in this case, is especially rare and often underrecognized. Definitive diagnosis requires microbiologic confirmation. Culture growth remains the gold standard for brucellosis diagnosis. Blood cultures are the most commonly used specimen but may take up to days to yield *Brucella* growth, although semi-automated systems can shorten detection time. The World Health Organisation (WHO) recommends prolonged incubation and the use of tissue cultures when available.[7] Serologic tests such as standard agglutination test (SAT), enzyme-linked immunosorbent assay (ELISA), and Coombs test are also valuable, with sensitivities exceeding 90% in chronic and focal infections.[8] CT angiography is the preferred modality for assessing aneurysm size, wall integrity, and perivascular inflammation. PET-CT is a valuable tool in culture-negative or relapsed cases, offering diagnostic insight beyond conventional imaging. Studies have shown that its accuracy in detecting infected aortic aneurysms is high—and notably superior to contrast-enhanced CT. While PET-CT has excellent sensitivity, its specificity is limited by false negatives, as likely occurred in our case.[1,4,9]

There are no universal treatment guidelines for *Brucella*-IAAA. WHO recommends dual therapy with doxycycline and rifampicin for a minimum of six weeks; aminoglycosides like gentamicin or streptomycin are often added in severe or focal infections.[7,10] Harrison's Infectious Diseases and China CDC identifies doxycycline with streptomycin as the optimal regimen.[11,12] In this case, the patient initially received a combination of doxycycline, rifampicin, and gentamicin then the latter replaced with IV ceftriaxone due to the patient's pre-existing severe hearing impairment and patient preference. However, the lack of surgical source control and failure to follow up likely contributed to relapse. Surgical repair is often necessary due to a rupture risk of up to 53% within one week of diagnosis.[4–6] Open repair is preferred in patients with favorable anatomy and adequate physiological reserve. Endovascular aneurysm repair (EVAR) may be an option for high-risk patients, though it carries a higher risk of late complications including persistent infection and endoleaks.[6] Guidelines from Society for Vascular Surgery (SVS), European Society for Vascular Surgery (ESVS), and National Institute for Health and Clinical Excellence (NICE) generally favour open surgery unless contraindicated.[13,14] In this case, the patient's poor nutritional status, frailty, and complex aneurysm anatomy excluded both options.

Relapse is a major challenge in *Brucella*-related aneurysms. While overall relapse rates in brucellosis are ~10%, they can exceed 35% in aneurysmal cases.[6,15] Risk factors include advanced age, monotherapy, short treatment duration, immunosuppression, and absence of surgical control. Relapse is defined as recurrence within 12 months; after that, reinfection is more likely.[6,15,16] In our patient, relapse at eight months was consistent with unresolved infection. Given the high risk of relapse, close follow-up with serial imaging (CT or PET-CT) and serologic monitoring for up to two years is recommended.[4,6] Unfortunately, our patient's advanced frailty limited therapeutic options, and despite appropriate medical therapy, the infection proved fatal. This case highlights the vital role of patient education and adherence in managing Brucella-associated vascular infections. Despite appropriate initial therapy, loss to follow-up and non-adherence led to relapse and fatal rupture. In endemic settings like Oman, clear communication on treatment duration, risks of discontinuation, and the need for follow-up is essential. Prevention efforts, including avoiding unpasteurized dairy and raising awareness about brucellosis, are equally critical to reducing disease burden.

Conclusion

This case highlights a rare but deadly complication of brucellosis: a Brucella-associated infected abdominal aortic aneurysm. While we cannot definitively confirm a mycotic aneurysm without tissue diagnosis, the clinical course raises important diagnostic considerations. Despite appropriate initial therapy, relapse occurred due to lack of follow-up and absence of source control. In frail patients unfit for surgical intervention, prognosis remains poor. Early recognition, structured monitoring, and multidisciplinary management are essential to improve outcomes in this high-risk population. Increased awareness and case reporting are needed to guide future treatment strategies.

Disclosure

Written informed consent could not be obtained from the patient due to her clinical condition and subsequent demise. However, no personal identifiers are included in this report, and only relevant clinical, laboratory, and imaging findings are presented in accordance with ethical publication standards.

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