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Brucella-Induced Infrarenal Aortic Mycotic Pseudoaneurysm With Extensive Mycotic Vasculitis

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Abstract

We report the case of a 53-year-old man with a history of consuming raw lamb liver and hunting wild birds who presented with a two-month history of undulating fever, abdominal pain, diarrhea, and joint pain. Computed tomography angiography (CTA) identified a 14-16 mm infrarenal aortic pseudoaneurysm with periaortic inflammatory changes. Blood cultures grew *Brucella* species. Positron emission tomography/computed tomography (PET/CT) demonstrated intense fluorodeoxyglucose (FDG) uptake at the site of the pseudoaneurysm, with additional findings consistent with mycotic vasculitis involving both common iliac arteries. Further investigations excluded neurobrucellosis, spondylodiscitis, and endocarditis. The patient received triple antimicrobial therapy comprising doxycycline, rifampin, and levofloxacin and underwent open aortic repair using a cryopreserved allograft with an omental wrap. Conventional staining of the excised aortic tissue was negative; however, ribosomal DNA (rDNA) polymerase chain reaction (PCR) with next-generation sequencing confirmed the presence of *Brucella* DNA in the tissue. The postoperative course was complicated by a self-limiting perigraft fluid collection, renal infarction, and retrograde ejaculation. At three-month follow-up, the graft remained patent, although a new internal iliac artery aneurysm was identified and required surveillance. This case highlights the value of PET/CT in defining the extent of *Brucella*-associated vascular infection, the role of molecular diagnostics in confirming tissue infection when conventional methods are negative, and the importance of preoperative counselling regarding the risk of sexual dysfunction following infrarenal aortic reconstruction.

Categories: Internal Medicine, Cardiac/Thoracic/Vascular Surgery, Infectious Disease
Keywords: aortic pseudoaneurysm, brucellosis, cryopreserved allograft, infectious aortitis, mycotic aneurysm

Introduction

Brucellosis is a systemic zoonotic infection caused by Gram-negative, facultative intracellular coccobacilli of the genus *Brucella* [1,2]. It remains one of the most common bacterial zoonoses worldwide, with more than 500,000 new human cases reported annually. Transmission occurs primarily through the consumption of unpasteurized dairy products or undercooked organ meats, as well as through direct contact with infected animals [1,2]. In the United States (US), a recent Centers for Disease Control and Prevention (CDC) surveillance report analyzing 1,796 confirmed and probable cases from 2010 to 2024 found that, among individuals without international travel, the most frequently reported exposures involved animal contact, particularly skinning, slaughtering, and hunting wild animals. In contrast, among individuals with international travel, consumption of unpasteurized dairy products or undercooked meat was the predominant exposure [3].

Vascular infection typically develops when circulating *Brucella* organisms seed an atherosclerotic, traumatized, or otherwise structurally vulnerable arterial wall during bacteremia, resulting in vessel wall destruction and aneurysmal dilatation at the site of infection. This distinguishes a mycotic (infected) aneurysm from a conventional degenerative aneurysm, which develops gradually due to non-infectious weakening of the arterial wall. Mycotic aneurysms result from direct microbial invasion of the vessel wall, often exhibit a saccular and rapidly progressive morphology, and carry a substantially higher risk of rupture, septic embolization, and contiguous spread of infection to adjacent structures.

Brucellosis has been described as "the great imitator" because of its protean clinical manifestations, which frequently contribute to diagnostic delays [4]. Cardiovascular complications occur in fewer than 3% of cases but are the leading cause of brucellosis-related mortality. These complications most commonly manifest as endocarditis, while infected aortic aneurysms represent rarer but life-threatening manifestations [2,4]. A systematic review of 130 cases of *Brucella*-related aortic and iliac involvement identified the abdominal aorta as the most commonly affected site and reported an overall mortality rate of 12.3% [5]. A separate review identified 71 cases over a 70-year period, with an overall mortality rate of 22% [2]. Open surgical repair remains the cornerstone of treatment, although endovascular approaches have also been reported in selected cases [2,6].

Although open surgical repair with autogenous or cryopreserved reconstruction is an established approach for infected aortic aneurysms, the specific contributions of whole-body PET/CT and tissue-level molecular diagnostics to the management of *Brucella*-related vascular infections remain less well described. We present the case of a previously healthy 53-year-old man who developed a *Brucella*-induced infrarenal aortic mycotic pseudoaneurysm with extensive mycotic vasculitis, likely acquired through the consumption of raw lamb liver. In this case, PET/CT identified clinically occult vasculitis extending beyond the primary lesion, directly influencing surgical planning. Furthermore, tissue-level 16S rDNA PCR with reflex next-generation sequencing established the microbiological diagnosis despite negative conventional stains and cultures of the excised aorta. The patient was successfully managed with open surgical repair using a cryopreserved aortic allograft.

Case Presentation

A 53-year-old man of Iranian descent with no significant past medical history presented to his primary care physician in late February 2026 with several weeks of progressive fatigue, diffuse osteoarticular pain, night sweats, and intermittent fevers, initially treated empirically for presumed sinusitis. He subsequently developed severe abdominal and bilateral hip pain and, during international travel over the following three weeks, experienced fevers up to 38.9°C with persistent abdominal pain and watery diarrhea, treated empirically for a presumed enteric infection with only partial improvement. He returned to the United States with an unintentional weight loss of 7.3 kg. His exposure history was notable for consumption of raw lamb liver in the months preceding symptom onset, regular hunting and butchering of wild birds, and childhood residence in a brucellosis-endemic region of Iran; he denied consumption of unpasteurized milk.

For clarity, the overall timeline is summarized as follows: symptom onset occurred in late February 2026, approximately seven weeks before presentation, with fatigue, osteoarticular pain, night sweats, and intermittent fever; abdominal pain and diarrhea developed roughly three weeks later during international travel. The patient presented to the emergency department (ED) on hospital day 0, when imaging first identified the aortic outpouching. Infectious disease consultation, whole-body PET/CT, and antimicrobial initiation occurred over the following days of admission. Open aortic repair was performed on hospital day 7, with discharge on postoperative day 5. Follow-up CT angiography was obtained at three weeks and three months after surgery.

An outpatient infectious workup was unrevealing, but persistently elevated inflammatory markers (erythrocyte sedimentation rate (ESR) 41 mm/hr and C-reactive protein (CRP) 5.2 mg/dL) prompted cross-sectional imaging. Contrast-enhanced computed tomography (CT) of the abdomen and pelvis in the ED revealed a 16-mm focal outpouching of the anterior infrarenal abdominal aorta (Figure *1*).



FIGURE 1: Initial contrast-enhanced computed tomography (CECT) demonstrating the infrarenal aortic outpouching

Axial CECT of the abdomen and pelvis at the level of the infrarenal abdominal aorta. Moderate atherosclerosis is present, with a focal outpouching of the anterior aortic wall measuring 16 mm.

Dedicated CTA then confirmed a 14-mm pseudoaneurysm with surrounding inflammatory fat stranding

extending into the right common iliac artery (Figure 2). Blood cultures obtained in the ED grew Gram-negative rods, subsequently confirmed as *Brucella* species by PCR at the local department of public health, a genus-level assay that does not resolve species-level identification (e.g., *Brucella melitensis* versus *Brucella abortus*), with a *Brucella* antibody titer of 1:80; serologies for *Bartonella*, *Coxiella*, *Coccidioides*, and *Francisella* were negative.

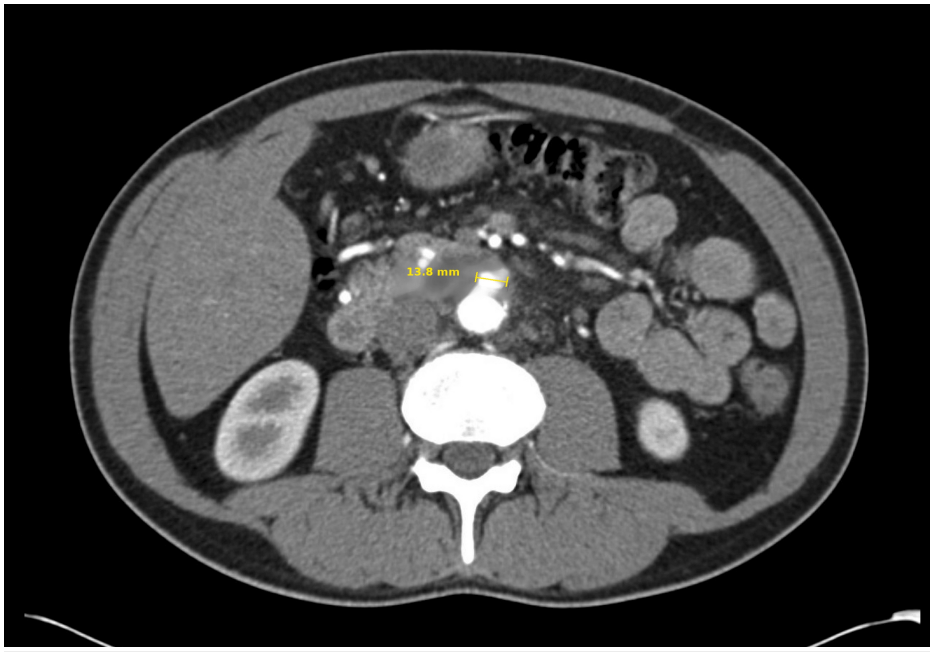


FIGURE 2: Computed tomography angiography (CTA) showing periaortic inflammatory change

Axial CTA of the abdomen and pelvis (with and without contrast) at the same infrarenal level. The focal anterior aortic outpouching measures 14 mm, with surrounding inflammatory fat stranding extending into the right common iliac artery.

On admission, a comprehensive CTA from the thoracic aorta through the pelvis confirmed no interval change in the outpouching, with new circumferential wall thickening of the infrarenal aorta extending into both external iliac arteries, consistent with inflammatory/infectious aortitis (Figure 3).



FIGURE 3: Computed tomography angiography (CTA) of the thoracic and abdominal aorta showing circumferential wall thickening

Axial CTA of the thoracic and abdominal aorta and pelvis (with and without contrast). The outpouching is unchanged at 14 mm, with new circumferential wall thickening (up to 3 mm) of the infrarenal aorta extending into both external iliac arteries. The celiac axis origin is stenotic with poststenotic dilation to 13 mm; the superior mesenteric, inferior mesenteric, and bilateral (duplicated) renal arteries are patent.

Early in the admission, he was started on combination antibiotic therapy and surgical planning. Infectious disease was consulted and transitioned the patient to targeted triple therapy.

A comprehensive evaluation for metastatic infection, including magnetic resonance imaging of the brain, lumbar spine, and pelvis; lumbar puncture; transthoracic and transesophageal echocardiography; and ophthalmologic examination, was negative for neurobrucellosis, spondylodiscitis, sacroiliitis, and endocarditis, though dilated fundus examination revealed bilateral cotton wool spots attributed to bacteremia and anemia rather than direct ocular involvement [7]. Whole-body PET/CT, performed to assess the extent of vascular infection, demonstrated intensely FDG-avid soft tissue surrounding the pseudoaneurysm, with a maximum standardized uptake value (SUVmax) of 7.6, and additional, previously unsuspected sites of mycotic vasculitis along the posterior infrarenal aorta and bilateral common iliac arteries (SUVmax up to 10.7), as well as multistation reactive lymphadenopathy (Figure *4*).

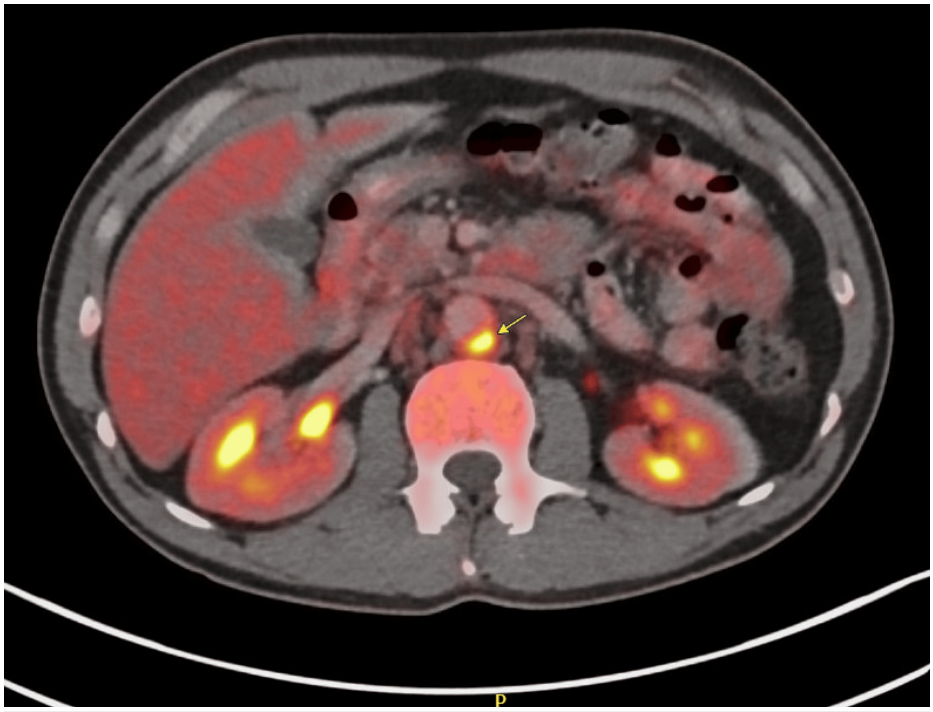


FIGURE 4: Positron emission tomography/computed tomography (PET/CT) demonstrating intense fluorodeoxyglucose (FDG) avidity along the aorta and iliac arteries

Fused axial PET/CT of the abdomen. The arrow marks intensely FDG-avid soft tissue surrounding the infrarenal aortic outpouching (16 mm; SUVmax 7.6). Additional FDG-avid inflammatory change is present along the posterior infrarenal aorta below the renal arteries (SUVmax 6.0) and along both common iliac arteries (SUVmax 10.7 right, 9.8 left).

Serial inflammatory markers demonstrated a progressive decline with treatment, summarized in Table *1*.

Parameter	Pre-admission	ED presentation	Hospital admission	1-month postoperative	Normal range
ESR (mm/hr)	41	62	48	33	<12
CRP (mg/dL)	5.2	3.1	3.1	<0.3	<0.8

TABLE 1: Serial inflammatory markers

Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were 41 mm/hr and 5.2 mg/dL prior to admission, 62 mm/hr and 3.1 mg/dL at emergency department presentation, 48 mm/hr and 3.1 mg/dL at hospital admission, and 33 mm/hr and less than 0.3 mg/dL at one month postoperatively, against reference ranges of less than 12 mm/hr and less than 0.8 mg/dL, respectively.

Given the positive *Brucella* serologies and vascular involvement, the infectious disease team initiated targeted triple antibiotic therapy with doxycycline (100 mg orally twice daily), levofloxacin (500 mg orally daily, increased to 750 mg daily given the severity of vascular involvement), and rifampin (600 mg orally daily, increased to 900 mg daily). The rationale for triple therapy was based on evidence that adding a fluoroquinolone to standard doxycycline-rifampin therapy significantly reduces treatment failure and relapse rates [8].

Blood cultures obtained after three days of targeted therapy showed clearance in one of two sets, and cultures on postoperative days three and four were both negative. On admission day 7, the patient underwent open infrarenal mycotic abdominal aortic aneurysm repair with cryopreserved aortic allograft reconstruction and circumferential omental wrap; cross-clamp time was 60 minutes with an estimated blood loss of 1.2 liters. Histopathology of the excised aorta demonstrated severe medial degeneration with granulation tissue and acute and chronic inflammation (Figure *5*); conventional microbiologic stains (acid-fast bacilli, Grocott methenamine silver, Warthin-Starry, and Gram) were all negative. Tissue sent to a

reference laboratory for 16S rDNA PCR with reflex next-generation sequencing subsequently confirmed *Brucella* species, providing definitive molecular diagnosis in the setting of culture- and stain-negative histopathology; as with the blood culture PCR, this assay establishes genus-level identification and does not provide species-level resolution, which would require culture-based biotyping or whole-genome sequencing not performed in this case.

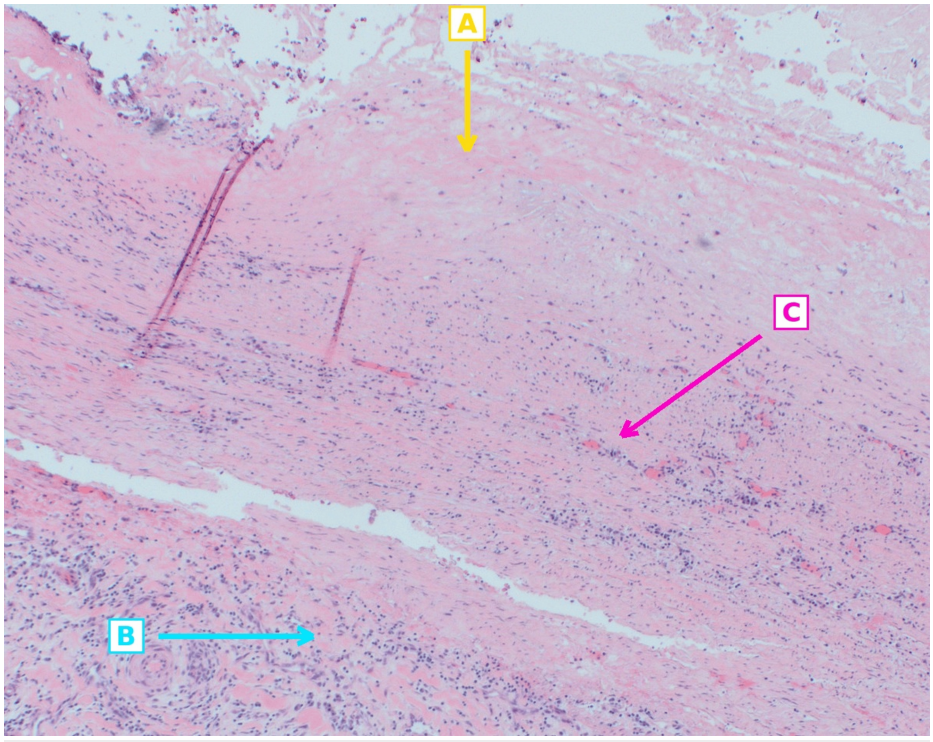


FIGURE 5: Histopathology of the excised aorta

Hematoxylin and eosin-stained section of the excised aortic wall. Yellow arrow (A) indicates an area of severe medial degeneration with loss of normal elastic architecture. Cyan arrow (B) indicates granulation tissue. Magenta arrow (C) indicates a mixed acute and chronic inflammatory infiltrate.

The postoperative course was notable for three complications. A perigraft retroperitoneal fluid collection identified on CTA three weeks postoperatively resolved spontaneously by three-month follow-up, consistent with a postoperative seroma rather than graft infection, supported by negative blood cultures and normalized CRP. A new left renal infarct, likely embolic, was identified on the same study with preserved renal function throughout follow-up. Most significantly, the patient developed retrograde ejaculation, a recognized complication of bilateral common iliac dissection during infrarenal aortic reconstruction; urology evaluation confirmed intact hypothalamic-pituitary-gonadal axis function, and the patient was started on pseudoephedrine with counseling regarding possible need for assisted reproduction if pharmacologic therapy failed. At three months, follow-up CTA demonstrated a widely patent aortoiliac graft of normal caliber without dissection or intramural hematoma, with stable celiac stenosis and an occluded, likely postsurgical, inferior mesenteric artery (Figure *6*), though a new 10-mm focal aneurysmal dilation of the left internal iliac artery was identified, warranting continued surveillance. The patient remained on continuous triple antibiotic therapy at the time of this report, with de-escalation planned pending infectious disease follow-up.

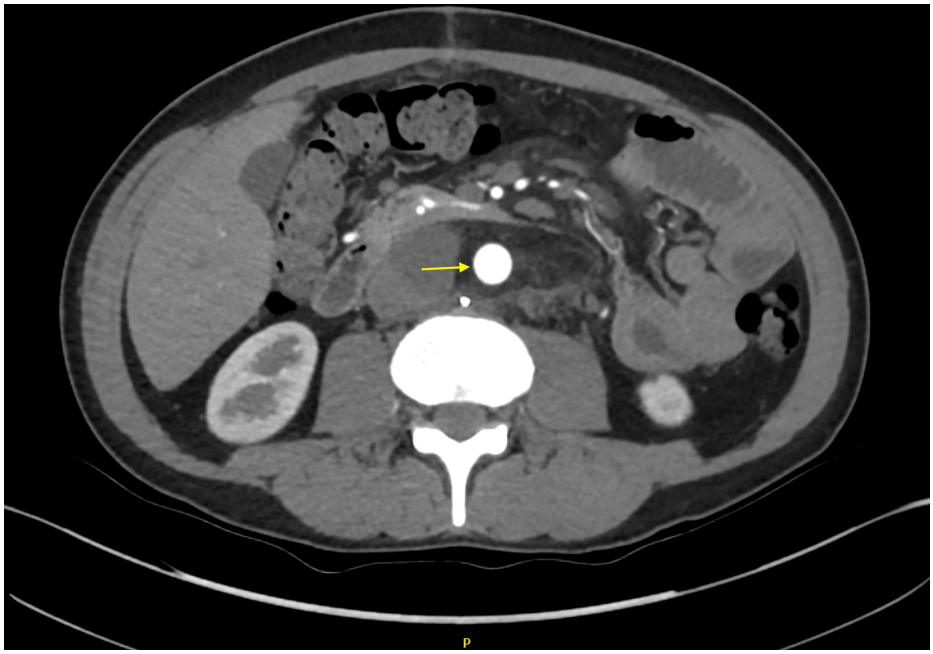


FIGURE 6: Postoperative computed tomography angiography (CTA) following infrarenal aortic aneurysm repair

Axial CTA of the abdomen and pelvis (with and without contrast) after infrarenal abdominal aortic aneurysm repair. The yellow arrow indicates the widely patent aortoiliac graft lumen, of normal caliber without dissection or intramural hematoma. The celiac stenosis with poststenotic dilation is stable; the inferior mesenteric artery is occluded, likely postsurgical, and the remaining visceral and renal arteries are patent.

Discussion

This case illustrates several important lessons in the diagnosis and management of *Brucella*-associated mycotic aortic aneurysms. The patient experienced a diagnostic delay of approximately seven weeks, with initial nonspecific symptoms attributed to sinusitis and subsequent gastrointestinal symptoms during travel leading to empiric treatment for presumed enteric infection, a diagnostic odyssey characteristic of brucellosis, "the great imitator" [4]. The undulating fever pattern, osteoarticular complaints, and constitutional symptoms occurred despite an exposure history that, in retrospect, pointed toward brucellosis even though the patient resided in a non-endemic setting [3,4]. The infection was most likely acquired through consumption of raw lamb liver, a well-documented transmission route, consistent with CDC surveillance data identifying consumption of undercooked meat and direct animal contact as the predominant US exposures [1,3]. A low threshold for serologic testing and blood cultures is warranted when such exposures coexist with an otherwise unexplained subacute febrile illness, even in non-endemic settings.

Cardiovascular involvement occurs in fewer than 3% of brucellosis cases but accounts for the majority of brucellosis-related deaths, and the abdominal aorta is the most commonly affected site, consistent with our case [2,5]. The serial CT and CTA in this patient illustrate the evolution of infectious aortitis from a focal outpouching to circumferential periaortic inflammatory change, and the PET/CT findings were particularly notable, demonstrating not only the primary pseudoaneurysm but also extensive mycotic vasculitis along the posterior infrarenal aorta and bilateral common iliac arteries that would not have been appreciated on CTA alone. This pattern of diffuse vascular involvement beyond the index aneurysm has been described in infectious aortitis; in this patient, it directly informed surgical planning and postoperative surveillance imaging [9,10]. Whole-body PET/CT should therefore be considered early in patients with suspected or confirmed *Brucella* aortitis, both to define the full extent of vascular involvement and to monitor treatment response during follow-up.

The optimal antibiotic regimen for *Brucella* mycotic aneurysms is not established by randomized trials. Standard therapy for uncomplicated brucellosis consists of doxycycline plus either streptomycin or rifampin for six weeks, but this patient's vascular involvement warranted prolonged triple therapy instead [1,4]. A systematic review and meta-analysis demonstrated that adding a fluoroquinolone to doxycycline-rifampin therapy significantly reduces treatment failure and relapse rates, which supported the regimen selected here, with dose escalation reflecting the severity of vascular involvement [8]. Extended or suppressive antibiotic therapy is often considered when prosthetic vascular material is present [11]. The total planned duration of therapy had not yet been determined at the time of this report, consistent with evidence that

treatment courses for *Brucella* vascular and prosthetic graft infections are frequently extended well beyond the six weeks used for uncomplicated disease, in some reports, for a year or longer, with the endpoint individualized based on clinical, serologic, and imaging response rather than a fixed duration.

Given the gram-negative organism identified in this patient, open surgical repair with in situ reconstruction was selected over endovascular repair, consistent with reports that synthetic grafts carry a higher reinfection risk than autogenous tissue or cryopreserved allografts in this setting, and that endovascular repair carries a risk of persistent infection around retained prostheses in a contaminated field [2,6,11]. A cryopreserved aortic allograft with omental wrap was therefore selected, an approach supported by reported series of cryopreserved allografts for aorto-iliac infection demonstrating acceptable patency and survival outcomes [12-14]. A notable feature of this case was the use of tissue-level 16S rDNA PCR with reflex next-generation sequencing to confirm *Brucella* species despite negative conventional histopathologic stains, an approach of increasing value in culture-negative vascular infections [2,4]. Tissue-level molecular diagnostics should be pursued whenever conventional stains and cultures are negative in suspected vascular infection.

Retrograde ejaculation, this patient's most distressing complication, results from disruption of the superior hypogastric plexus during bilateral common iliac dissection, which was necessary given the extent of vasculitis identified on PET/CT [15,16]. The new left internal iliac artery aneurysm identified at three-month follow-up may represent progression of mycotic vasculitis, given the intense FDG uptake previously noted at this site, or atherosclerotic degeneration in the setting of pre-existing disease, and warrants continued imaging surveillance. The perigraft fluid collection and renal infarct described above are likewise reported as observed postoperative findings with a plausible but unproven relationship to the underlying infection or its surgical management; causality cannot be established with certainty from a single case. Patients undergoing similar bilateral iliac dissection should be counseled preoperatively regarding the risk of retrograde ejaculation, with early referral for fertility-preserving options if it occurs. Long-term multidisciplinary follow-up incorporating serial inflammatory markers, surveillance imaging, and infectious disease reassessment remains essential given the risk of relapse and graft-related complications.

This report is limited by the inability to establish causality from a single case, the lack of species-level identification of the *Brucella* isolate, and a follow-up period of three months that is insufficient to establish durable infection control or long-term graft patency, particularly for a disease that may relapse months to years after treatment; longer-term surveillance imaging and infectious disease follow-up will be required to confirm sustained cure and graft durability.

Conclusions

This case illustrates that *Brucella* infection can cause an infrarenal aortic mycotic pseudoaneurysm with extensive vasculitis and should be considered in patients presenting with undulating fevers, osteoarticular pain, and relevant dietary or occupational exposures, even in non-endemic settings. Blood culture, serology, and tissue-level 16S rDNA PCR with next-generation sequencing together established the diagnosis after conventional stains were negative, and whole-body PET/CT identified additional vascular involvement not appreciated on CT angiography alone, suggesting potential value for this imaging modality in delineating disease extent. Combination antibiotic therapy with open surgical repair using a cryopreserved allograft was followed by a favorable early outcome, complicated by retrograde ejaculation, underscoring the importance of preoperative counseling regarding this risk. As findings from a single case, these observations should be interpreted as hypothesis-generating rather than establishing the superiority of a particular diagnostic or surgical strategy, and the three-month follow-up period is too short to confirm durable infection control or long-term graft success.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Nirosh E. Mataraarachchi, David Farchadi, Aliya Khan, Paige Dobalian

Acquisition, analysis, or interpretation of data: Nirosh E. Mataraarachchi, David Farchadi

Drafting of the manuscript: Nirosh E. Mataraarachchi

Critical review of the manuscript for important intellectual content: Nirosh E. Mataraarachchi, David Farchadi, Aliya Khan, Paige Dobalian

Supervision: David Farchadi

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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