

A case of Brucellosis with Large Periaortic Mass And Secondary Vasculitis In A Patient Presenting Intermittent Abdominal Pain

Huilan Liu

Chinese Academy of Medical Sciences & Peking Union Medical College

Yutong Zhang

Aerospace Central Hospital: Central Hospital of China Aerospace Corporation

Xiaomei Leng (✉ lpunch@126.com)

Peking Union Medical College Hospital Eastern Branch: Peking Union Medical College Hospital

Yunjiao Yang

Peking Union Medical College Hospital Eastern Branch: Peking Union Medical College Hospital

Xiaofeng Zeng

Peking Union Medical College Hospital Eastern Branch: Peking Union Medical College Hospital

Case Report

Keywords: Brucellosis, aortic vasculitis, large periaortic mass.

Posted Date: August 23rd, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-819102/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background Brucellosis is still highly prevalent and causes high morbidity. It can involve any organ system and has been implicated in protean complications. Cardiovascular involvement is the main cause of mortality. This case described a female patient infected by *Brucella* with large periaortic mass and secondary vasculitis whose manifestation was abdominal pain. The aim was to raise the awareness of earlier recognition of *Brucella* infections without fever and remitting risk by taking appropriate treatments for those with cardiovascular involvement.

Case presentation A case was reported regarding a female present intermittent abdominal pain. Two months later, she was admitted to the Department of Rheumatology and Immunology in our hospital due to high inflammatory markers, the large periaortic mass and vasculitis manifestations in aortic computed tomography angiography. By detailed examination, Brucellosis was highly suggestive based on positive blood cultures. Finally, no discomfort has ever occurred, and the mass was prominently reduced after antibiotic therapy of half a year.

Conclusions The clinical manifestations of brucellosis are protean. For those without fever and cardiovascular involvement as the main manifestation, especially vasculitis, we must not just set the standard rigidly, instead, it is recommended to carry out the relevant differential diagnosis to avoid misdiagnosis or missed diagnosis.

Background

Brucellosis is a zoonotic disease caused by *Brucella* infection and yet prevalent world widely. There are various manifestations of Brucellosis, and it can seriously endanger human health among some cases [1]. Based on its epidemiology, clinical symptoms, imaging examination, serological examination, and most notably expanding the understanding of the rare manifestations of the disease, it would be expected to make the correct diagnosis as soon as possible and reduce the risk of death, especially when implicated in the cardiovascular involvement. Therefore, here we reported the case presenting intermittent abdominal pain without fever, concurrent with large periaortic mass and secondary vasculitis, which was designed to improve the diagnosis and treatment of brucellosis.

Case Presentation

A 57-year-old woman, with intermittent abdominal pain, was admitted to our ward. She was suffering from pain mainly in the left lower abdomen and around the umbilicus with onset 2-month prior admission, accompanied by diaphoresis and nausea. At the same time, she felt a pulsation on the left side of the umbilicus. After that, her symptoms occurred intermittently and even waked up during sleep. During this period, she never monitored her body temperature. And it was vague about whether she was febrile.

Her symptoms did not relieve after 2 months, so she came to our hospital. In the past 2-month, her weight had lost about 5kg. She acknowledged of smoking and drinking for a long time. Her mother had suffered from tuberculosis, but she denied other special family history. On physical examination, her temperature was normal. Bilateral blood pressure was symmetrical and normal. Heart murmur wasn't detected. Suspicious tenderness was observed at the lower left side of the umbilicus but without rebound pain. At that location, a pulsating mass with a diameter of about 4 cm can be palpated. The mass was firm and fixed. Blood vessel murmurs can be heard in the abdomen. Other vital signs and various examinations were normal.

Her laboratory investigation revealed the elevation of hypersensitive C-reactive protein (hsCRP) level, 50 mg/L and erythrocyte sedimentation rate (ESR), 79 mm/h. Routine chemistry and liver enzyme test results were normal, as was an interferon gamma release assay (T-spot. tuberculosis) for Mycobacterium tuberculosis. Immunological studies including anti-nuclear antibodies, rheumatoid factor, anti-neutrophil cytoplasmic antibodies, immunoglobulin, and complement were all negative, with the exception of positive anti-perinuclear factor, anti-wave protein and anti-cyclic citrulline peptide antibodies. Urinalysis and stool specimen were normal.

The echocardiogram showed no obvious abnormalities. An aortic computed tomography (CT) angiography was obtained which demonstrated periaortic masses presenting the thick-walled saclike structure from the abdominal aorta at the level of the L4 vertebral body to the anteriority of the left common iliac artery (maximum cross-section was about 4.0cm×2.3cm). Furthermore, CTA identified multiple non-penetrating aortic ulcers and the local small protrusion of the abdominal aorta protruded into the lesion (diameter about 4mm). In addition, the initial segment of the right internal iliac artery was severely stenosis, and the rest had mild luminal stenosis.

At that point, blood culture results were reported after 85 hours of incubation and proved to be positive for *Brucella melitensis*. On further questioning, she admitted that She had raised a few sheep in her family for nearly half a year and she had sweating but she denied night sweats. Based on her symptoms (abdominal pain), imaging findings (mass around the aorta, aortic ulcer, arterial stenosis), epidemiological history (raising sheep), and positive blood culture, Brucellosis was highly suggestive. Due to the suspected secondary vasculitis, the patient started to be treated with rifampicin 600 mg qd, minocycline 100 mg bid, and amikacin 400mg qd by intramuscular injection.

On the third day of the start of therapy, the patient presented with a high fever, with a maximum temperature of 39.2°C. After exclusion of infectious factors, rifampicin was highly suspected of culprit responsible for drug fever. Then ceftriaxone and levofloxacin were employed replacing rifampicin due to the drug intolerance. After antibiotic therapy, her abdominal pain had remitted and hsCRP levels were normalized and ESR level dropped to 39mm/h before discharge. The combination therapy of doxycycline, ceftriaxone and levofloxacin was continued. A follow-up of aortic CTA approximately 6 month later demonstrated the mass was prominently reduced (maximum cross-section was about 1.5cm×0.6cm) and the patient remained in good health.

Discussion And Conclusions

Brucellosis, a zoonotic disease caused by the Gram-negative bacterium *Brucella* infection, has a high incidence and morbidity rates in both humans and animals, which has imposed a heavy burden on society [1]. There are many kinds of *Brucella*, the most pervasive type is *Brucella melitensis*. The main source of infection of *Brucella* is animal food, and it can also be spread through contact with sick animals, its secretions or excrements. Once infected, clinical manifestations of brucellosis are protean. The common clinical manifestations include fever, sweating, abdominal pain, etc. But none of them was specific. Patients with brucellosis frequently experience local infections that can invade any tissues, organs or systems, ranging from the most common skeletal system to the rare cardiovascular system, the latter of which refers to endocarditis, myocarditis, pericarditis, and arteritis. Although rare, cardiovascular complications are the main cause of death regarding brucellosis.

Among variable cardiovascular involvement, vasculitis, especially concurrent with aortic and splanchnic artery involvements, has been reportedly limited as a clinical manifestation of Brucellosis. Herrick et al. reported 34 cases of *Brucella* infection leading to vascular involvement in which the most frequent site of involvement was the aorta, with 23 cases (68%) followed by the upper extremity blood vessels and the lower extremity blood vessels [1]. In the last few decades, the literatures reported suggested that brucellosis vascular involvement mainly arose in the aorta. A summary by Cascio demonstrated that a total of 46 cases complicated with aortic involvement had been investigated, including 18 cases of ascending aorta involvement, 30 cases descending aorta or abdominal aorta, of pseudoaneurysm in 6 cases and an ulcerative process in 2 cases [2]. Among many of these cases, vascular involvement led to increased mortality. Of this patient, aorta CTA exhibited multiple arteritis in aorta and its branches, accompanied by small aortic ulcers. Additionally, with the large inflammatory mass around the aorta the patient was also encompassed with considerable risk of adverse events.

The diagnosis of brucellosis with vascular involvement remains challenging. For those patients who had abnormal imaging findings on vascular involvement as the main manifestation and relatively simple clinical symptoms without fever, we were first required to determine whether it was vascular disease or vasculitis. This patient was an elderly woman with a long-term history of smoking and drinking, with imaging results showing the large arteries had atherosclerosis with plaque formation, on a basis of atherosclerosis vascular disease was supposed to be taken into consideration, while it can generally never result in elevated inflammatory markers such as hsCRP. Therefore, single vascular disease was hard to explain the whole story. According to the 2012 classification criteria for vasculitis, it was divided into 7 categories [3]. Immune-related vasculitis and vasculitis caused by other infections such as tuberculosis were also excluded after carefully examination. By chance, this patient had a positive result in blood culture after a series of screenings. The vasculitis attributed to brucellosis belonged to seventh category, that was, secondary vasculitis associated with infection etiology. This case also highlighted the importance of complete collection of clinical data, thus having the opportunity to discover the truth about the disease from the clues. Interestingly, while the high titers of rheumatoid arthritis related to autoantibodies existed, the patient had no symptoms of joints. Combined its above

positive antibodies with the patient's long-term history of smoking, it was considered that this was associated with smoking, the association and complicated pathogenesis of which had been discussed before [4, [5].

The main principles to identify antibiotics regimens for Brucellae are as follows: first, with the capability of entering into macrophages and keep active in the acidic intracellular environment; second, available to be applied for a longer period of time; last but not least, at least two antimicrobial drugs are preferred [6]. Derived from expert recommendation, comparative randomized and nonrandomized clinical trials, meta-analyses, observational studies, the current approaches are developed. In practical clinical work, the specific antibacterial drug treatment protocol, however, requires integrate multifactorial elements, including organ involvement, clinical severity, scope of application, drug symptoms, and so on. Regarding the course of treatment, there is yet another issue with a great controversy. Compared with other focal infection, aortic involvement is suggested to maintain targeted antibiotic therapy for longer length. Nevertheless, relapse frequently occurs even in adequate treated patients.

In addition to drug treatment, many literatures have reported surgical treatment. The appropriate timing of surgery is supposed to be carefully weighed. For cardiovascular involvement, indications for surgery include impending rupture of aneurysm, hemodynamic instability, and severe limb ischemia, which are similar to those used to treat fungal aneurysms and other intravascular infections [1]. Most patients undergo surgery immediately when infection is discovered.

Of this patient, she had multiple vasculitis changes in its aorta and was at high risk of rupture of the mass around the aorta at any time. As with previous cases, vascular rupture caused by aortic vasculitis was not uncommon and aortic vasculitis tended to cause increased morbidity even when receiving medication therapy [7, [8, [9]. Based on focal infection of crucial involvement, the patient underwent triple antimicrobial therapy and was slightly adjusted due to drug intolerance. Given that ceftriaxone was viewed as a promising candidate for combination therapy in specific situations of Brucella infection, therefore, alternative therapy considered it as prior choice. On the other hand, we were always ready for emergency surgery even after the initial start of antibacterial drugs. Fortunately, everything went smoothly during antibiotic therapy. We became greatly relieved that the mass around her aorta had dramatically shrunk after months of anti-brucellar treatment, which also meant that the risk of rupture was significantly reduced compared with that of the beginning of admission to the ward. However, aortic CTA uncovered that aortic ulcers and arterial lumen stenosis failed to reach improved. It is necessary to complete the aortic MRA examination to assess whether there are vascular inflammation signals in the next follow-up, which will facilitate us to comprehensively evaluate how to deal with anti-inflammatory drugs of corticosteroids and immunosuppressive agents to treat secondary vasculitis. Hence, more long-term follow-up was indispensable for this patient.

A detailed knowledge of patients' medical history always merits to be fully appreciated, followed by early diagnosis, timely utilization of appropriate drugs and surgical treatment, thus hopefully decreasing the morbidity rate, improving the prognosis, and reducing the social economic burden.

Declarations

Acknowledgments

Not applicable.

Authors' contributions

Huilan Liu wrote the manuscript and carried out the analysis; Yutong Zhang investigated the case; Xiaomei Leng and Yunjiao Yang supervised this study; Xiaofeng Zeng involved in the designed work. All authors read and approved the final manuscript.

Authors' information

Not applicable.

Funding

This study was supported by the Chinese National Key Technology R&D Program, Ministry of Science and Technology [2017YFC0907601, 2017YFC0907602, 2017YFC0907603]; Beijing Municipal Science & Technology Commission [No.Z201100005520022,23, 25-27] CAMS Innovation Fund for Medical Sciences (CIFMS) [2019-I2M-2-008] and the National Basic Research Program of China (973 Program) (No. 2014CB541801).

Availability of data and materials

All original (de-identified) data and materials are available upon request from the corresponding author.

Ethics approval and consent to participate

The ethics committee approved the study. Written informed consent has been obtained from the patient in accordance with the Declaration of Helsinki.

Consent for publication

The case described here provided written consent for the publication of this case report.

Competing interests

The authors declare that they have no competing interests.

References

1. Herrick JA, Lederman RJ, Sullivan B, Powers JH, Palmore TN. Brucella arteritis: clinical manifestations, treatment, and prognosis. *Lancet Infect Dis*. 2014;14(6):520–6. doi:10.1016/s1473-3099(13)70270-6.
2. Cascio A, De Caridi G, Lentini S, Benedetto F, Stilo F, Passari G, et al. Involvement of the aorta in brucellosis: the forgotten, life-threatening complication. A systematic review. *Vector Borne Zoonotic Dis*. 2012;12(10):827–40. doi:10.1089/vbz.2012.0965.
3. Jennette JC, Falk RJ, Bacon PA, Basu N, Cid MC, Ferrario F, et al. 2012 revised International Chapel Hill Consensus Conference Nomenclature of Vasculitides. *Arthritis Rheum*. 2013;65(1):1–11. doi:10.1002/art.37715.
4. Wouters F, Maurits MP, van Boheemen L, Verstappen M, Mankia K, Matthijssen XME, et al. Determining in which pre-arthritis stage HLA-shared epitope alleles and smoking exert their effect on the development of rheumatoid arthritis. *Ann Rheum Dis*. 2021. doi:10.1136/annrheumdis-2021-220546.
5. Ishikawa Y, Terao C. The Impact of Cigarette Smoking on Risk of Rheumatoid Arthritis: A Narrative Review. *Cells*. 2020;9(2). doi:10.3390/cells9020475.
6. Bosilkovski M, Keramat F, Arapović J. The current therapeutical strategies in human brucellosis. *Infection*. 2021. doi:10.1007/s15010-021-01586-w.
7. Chen SL, Kuo IJ, Fujitani RM, Kabutey NK. Endovascular Management of Concomitant Thoracic and Abdominal Aortic Ruptures Resulting from Brucellosis Aortitis. *Ann Vasc Surg*. 2017;38:190.e191-190.e194. doi:10.1016/j.avsg.2016.08.007.
8. Tosatto V, Boattini M, Nascimento P, Barata Moura R. Lymphadenitis and aortitis due to *Brucella melitensis* infection. *Infection*. 2020;48(2):313–4. doi:10.1007/s15010-019-01385-4.
9. Wu SJ, Huddin JC, Wanger A, Estrera AL, Buja LM. A case of *Brucella* aortitis associated with development of thoracic aortic aneurysm and aortobronchial fistula. *Cardiovasc Pathol*. 2019;39:5–7. doi:10.1016/j.carpath.2018.10.011.

Figures

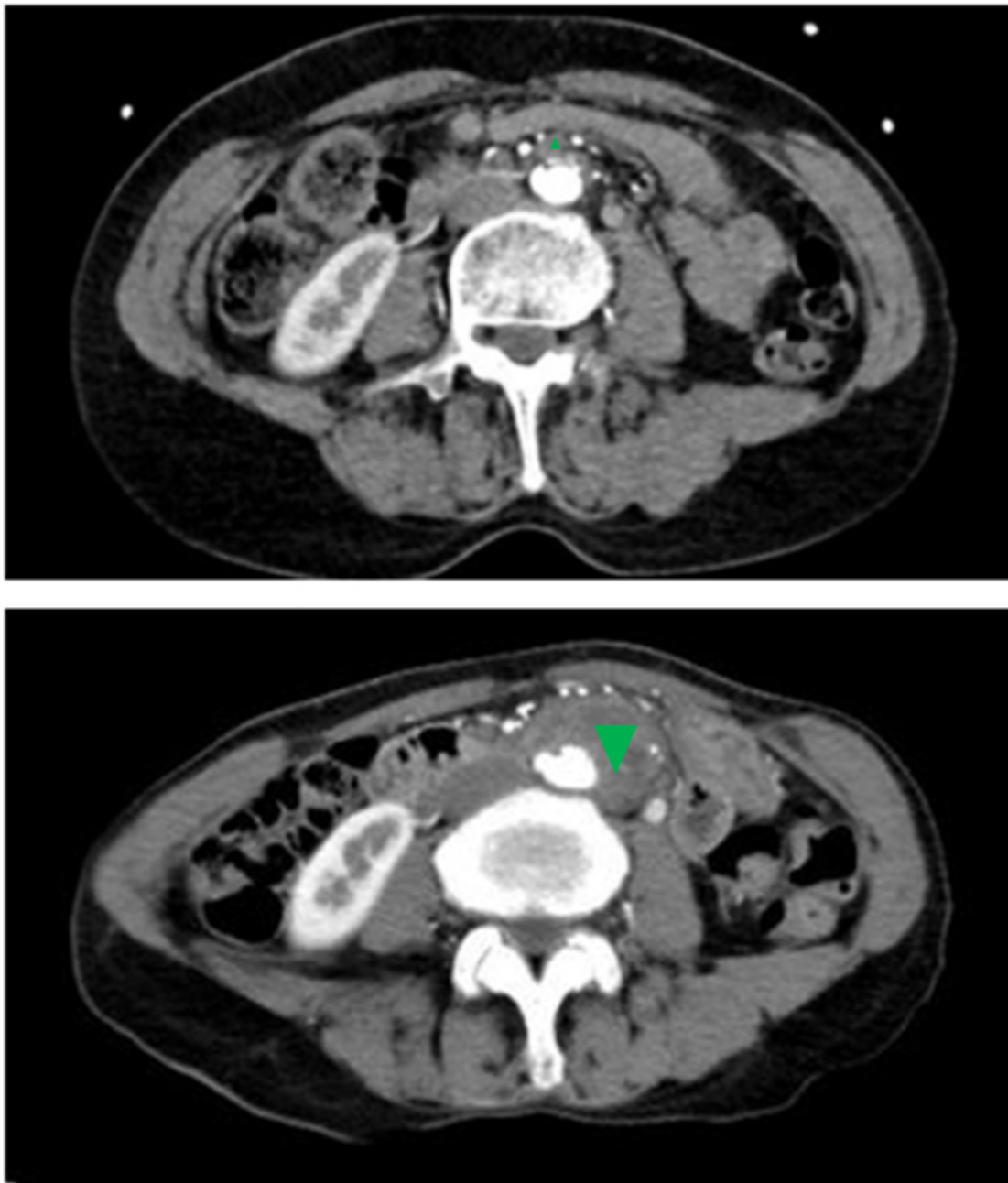


Figure 1

Aortic computed tomography (CT) angiography, before and after treatment respectively. The big triangle in the picture and the arrow pointing downwards referred to the mass around the aorta before treatment. The small triangle and the arrow pointing upwards pointed to the mass after treatment for half a year.