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CLINICAL CASE

Splenic abscess secondary to brucellosis: a case report

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Abstract

Brucellosis is a zoonotic infection transmitted to humans by infected animals, through the ingestion of unpasteurized dairy products or by contact with tissues or fluids from infected animals or humans. The symptoms present as an insidious picture, characterized by fever, general malaise, night sweats, and arthralgias. Splenic abscess is an extremely rare complication. The diagnosis of brucellosis is made by immunological means. However, the presence and location of abscesses are detected by ultrasonography, tomography or magnetic resonance imaging. Our manuscript presents the case of a splenic brucelloma in an adult male.

Keywords: *Brucella. Zoonosis. Splenic abscess.*

Introduction

Brucellosis is a zoonotic infection transmitted to humans by infected animals (cattle, sheep, and goats), through the ingestion of unpasteurized dairy products or by contact with tissues or liquids of infected animals or humans. Brucellosis is the most common zoonosis worldwide, with 100-200 cases of human brucellosis reported annually in the United States. In Latin America, Mexico is one of the countries with the highest incidence of brucellosis and is considered a country where the disease is endemic. During the years 2012 to 2017, the disease represented the most important zoonosis in terms of human morbidity with 15,496 cases recorded[1-5].

Unlike other infectious organisms, Brucella does not have virulence factors. However, it uses other mechanisms to infect its host, such as the presence of lipopolysaccharides, outer membrane protein, and type IV secretion systems and BvrR/BvrS (system devoted to the homeostasis of the outer membrane and, therefore in the interface for cell invasion)[6,7]. Four species of Brucella have been described as having the ability to infect humans: *Brucella melitensis*, *Brucella abortus*, *Brucella suis,* and *Brucella canis*. However, most infections identified in humans are caused by *B. melitensis*[8,9].

The symptoms of brucellosis present as an insidious picture, characterized by fever, malaise, night sweats, and arthralgias. Fever may be accompanied by chills, and due to its duration, it may be recurrent, mild, or prolonged. Additional symptoms may include weight loss, arthralgias, low back pain, headache, dizziness, anorexia, dyspepsia, abdominal pain, cough, and psychiatric symptoms such as depression. A characteristic that makes its diagnosis difficult is the frequent finding of hepatosplenomegaly and lymphadenopathy, which suggest myeloproliferative syndromes[10,11].

Diagnosis is made by nucleic acid amplification tests, nucleic acid hybridization tests, or through cultures,

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which are still considered the gold standard for *Brucella* identification. However, serological tests are the most widely used in endemic areas, due to their low cost and accessibility[12,13]. Although brucellosis can affect any organ, the development of splenic abscesses is extremely rare with an estimated frequency of occurrence of 0.05-0.7%. This complication is clinically relevant because if not treated properly it can be life-threatening[14,15]. The objective of this article is to report a case of splenic abscess secondary to human brucellosis.

Clinical case

A 40-year-old male patient, who presented to the emergency department in May 2023 for approximately 21 days, generalized weakness, hyporexia, prolonged fever of more than 15 days of evolution, periodic, of unquantified nocturnal predominance, which subsides with antipyretics transiently and generalized headache. The picture is accompanied by unintentional weight loss of 10 kg in approximately 3 months. As a personal history, smoking since the age of 20, suspended 6 months ago, chronic alcoholism since the age of 30, suspended 6 months ago, and consumption of dairy foods produced in the community allegedly without pasteurization.

On physical examination, he was neurologically intact. Chest with decreased respiratory murmur, voice transmission, and dullness to percussion in the left hemithorax, integrating pleural effusion syndrome. Right hemithorax without pathological alterations. Precordium with rhythmic heart sounds without aggregates. Globose abdomen, palpable hepatosplenomegaly 5 cm below the rib margin, hepatalgia to the palmopercussion, upper and lower limbs without pathological data lower limb with strength and muscle tone without alteration.

Due to the symptoms and the history of consumption of unpasteurized dairy products, laboratory and cabinet studies (blood count, procalcitonin, blood cultures, Rose Bengal staining, standard agglutination tests (SAT), agglutination test in the presence of 2-mercaptoethanol, and a contrasted thoraco-abdominal computed tomography [CT]) are performed to rule out and/or confirm the diagnosis of brucellosis. However, no other studies were conducted to look for brucellosis involvement in other organs and systems. Seventy-two hours later, laboratory results are obtained, which show positivity for Rose Bengal staining, as well as for SAT and agglutination test in the presence of 2-mercaptoethanol, (2-ME) with titers of 1:150 for SAT and 1:80 for 2-ME. Contrasted thoraco-abdominal CT scan shows a hypodense, well-defined, well-defined lesion, without reinforcement with contrast medium located in the lower pole of the spleen (Fig. 1); analytically, it is reported: procalcitonin 1.07 ng/mL, C-reactive protein 154.0 mg/dL, hemoglobin (Hb) 11.50 g/dL with mean corpuscular volume of 86.6 fL, mean corpuscular Hb of 29.7 g/dL, and thrombocytopenia of 95000/mL.

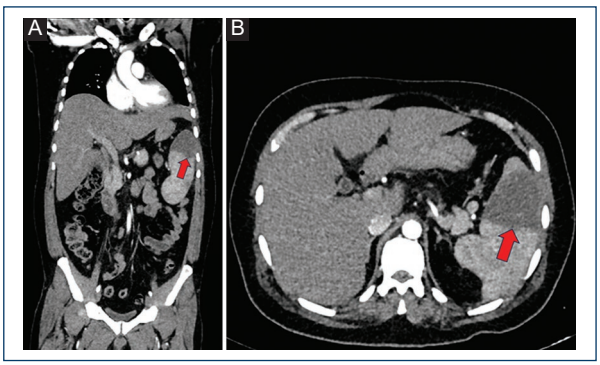

Figure 1. Thoraco-abdominal computed tomography, with the presence of a hyperdense lesion, well-defined and defined in the upper pole of the spleen (red arrows). **A:** axial and **B:** sagittal cutting.

With confirmation of the diagnosis of brucellosis, treatment with doxycycline 100 mg PO every 12 h for 6 weeks + gentamicin at 5 mg/kg/day for 7 days is initiated.

The patient's evolution was favorable, with remission of fever and dyspnea; biochemically, a significant decrease in procalcitonin 0.09 ng/mL versus 1.07 ng/mL, Hb of 12.8 g/dL versus 11.50 g/dL, and 184000 platelets/mm^3 versus 95000/mL was observed with respect to her admission. An appointment was made to the external internal medicine clinic in 1 month for follow-up.

Conclusions

In the case of our patient, several factors favored brucellosis infection, among them, it is worth noting that Mexico is one of the countries with the highest incidence of brucellosis in Latin America as a result of its fragile health system and the poor conditions of the population[3,4]. In addition, our patient had a history of ingestion of unpasteurized dairy products, which represents one of the most important risk factors for the transmission of the disease[16,17], favored by two important factors, on the one hand the deficiency of sanitary

controls of farm animals, especially in rural areas, and on the other the total absence of sanitary controls for food processing by the local population[3,4].

An important aspect that we must highlight about our patient was the fact that the clinical picture with which he was admitted to the emergency department characterized by anemia, weight loss, fever, and splenomegaly suggested the onset of tuberculosis or a myeloproliferative disease, both exclusionary diagnoses in the case of brucellosis. However, without a history of the patient's consumption of supposedly unpasteurized dairy products, they could delay the diagnosis and specific treatment of brucellosis and, thus, increase the risk of severe complications[1]. On the other hand, although systemic brucellosis is rare, there are reports of Brucella infection of the spleen, although this entity is extremely rare[14,15], this could be explained by the ability of Brucella to infect, survive, and replicate within macrophages located in reticuloendothelial organs, which is done through multiple mechanisms including its ability to alter phagocytosis. Prevent apoptosis or modulate the host's innate immune response by directly regulating the elements of the signaling pathway, mediated by the toll-like receptor-4 receptor adapter and MyD88-adapter-like[13,18-20].

In the case of the first-choice treatment for brucellomas, this has not yet been determined; however, several antibiotic treatment guidelines have been suggested, which depend on several factors such as accessibility, costs, adverse reactions, or the coexistence of other infectious diseases such as tuberculosis in the case of double or triple regimens with rifampicin, such as doxycycline-rifampicin-quinolone, doxycycline-rifampicin-aminoglycoside, or rifampicin-aminoglycoside; however, these could be contraindicated in countries with high rates of rifampicin resistance.

Although the scheme recommended by the World Health Organization establishes the triple regimen with doxycycline-rifampicin-streptomycin as the first scheme of choice[21]; in the case of our patient, the lack of adherence, socioeconomic conditions, availability, and accessibility of drugs in our hospital determined the administration of a double scheme consisting of doxycycline at a dose of 100 mg orally for 6 weeks + gentamicin at a dose of 5 mg/kg IV every 24 h/week. However, 7 days after starting the pharmacological treatment, streptomycin was replaced by gentamicin due to the high cost of streptomycin. Finally, it should be noted that in case of severe complications associated with splenic brucelloma, non-surgical drainage should be performed as described by Del Arco et al. due to the lower complication rate and high success rates[22].

Finally, an important limitation of our clinical case was the fact that we could not perform subsequent studies on our patient to evaluate the response to medical treatment, this is common in second-level hospitals where the population living in rural areas is itinerant and, in most cases, does not attend follow-up consultations after the start of any medical treatment.

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Conflicts of interest

The authors declare no conflicts of interest.

Ethical considerations

Protection of human subjects and animals. The author declares that no experiments on humans or animals were performed for this research.

Confidentiality, informed consent, and ethical approval. The author has followed their institution's confidentiality protocols, obtained informed consent from patient, and secured approval from the Ethics Committee. SAGER guidelines have been followed as applicable to the nature of the study.

Declaration on the use of artificial intelligence. The author declares that no generative artificial intelligence was used in the writing or creation of the content of this manuscript.

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