Medical Science and Discovery
ISSN: 2148-6832

Non-Necrotizing Granulomas in Bone Marrow Biopsy of a Patient with Bicytopenia: Brucellosis Case

Rafiye Ciftciler[1]*, Gulfidan Ozturk[2]

1 Konya City Hospital, Department of Hematology, Konya,TR
2 Aksaray Training and Research Hospital, Department of Pathology, Aksaray, TR

*** Corresponding Author:** Rafiye Çiftçiler **E-mail:** rafiyesarigul@gmail.com

ABSTRACT

Objective: Brucellosis has the ability to mimic a variety of multisystem illnesses, exhibiting a wide range of clinical polymorphism that frequently leads to misdiagnosis and treatment delays, thus raising the risk of complications. In cases of brucellosis, hematologic abnormalities might manifest as anemia, leukopenia, thrombocytopenia, lymphomonocytosis, hemolytic anemia, disseminated intravascular coagulation, and pancytopenia.

Material and Methods: In this study, we presented the bone marrow biopsy findings of a brucellosis case.

Case: For ten days, a 19-year-old male patient with fever, exhaustion, weight loss, loss of appetite, and stomach pain was taken to the emergency room. A bone marrow aspiration and biopsy were conducted because of the patient's indications and symptoms. Brucella melitensis was isolated in the blood and bone marrow cultures on the 7th day.

Conclusion: Brucellosis, one of the most common zoonoses in the world and our country, can occur with a wide variety of complications.

Keywords: Brucellosis, fever, non-necrotizing granuloma, cytopenia, bone marrow, hepatosplenomegaly

INTRODUCTION

Brucellosis is an important disease that is endemic in all regions of our country and affects both the animal industry and human health. It is a zoonotic disease caused by Brucella spp., a gram-negative bacteria. Brucellosis; can affect many systems, as well as the reticuloendothelial system and bone marrow. Any organ or tissue in the body may be infected with Brucella. Hematological findings such as anemia, leukopenia, thrombocytopenia, lymphocytosis, hemolytic anemia, diffuse intravascular coagulation, and pancytopenia can be encountered in patients with brucellosis infection (1). One of the possible causes of cytopenias in brucellosis is granuloma formation in the bone marrow (2). A granuloma is a group of mononuclear phagocytes that is compact and well-organized. Granuloma cells serve as both a protector and a destroyer for the host (1). In this study, we presented the bone marrow biopsy findings of a brucellosis case.

CASE

A 19-year-old male patient, who was previously healthy and dealing with animal husbandry, was admitted to the emergency room with fever, fatigue, weight loss, loss of appetite, and abdominal pain for ten days. Physical examination revealed abdominal tenderness and hepatosplenomegaly. Bone marrow aspiration and biopsy were performed because the patient’s signs and symptoms were insisted in the inpatient service; his thrombocyte count dropped to 35x103/µL, hemoglobin to 9g/dL, and white blood cell to 1970/µL. Rose Bengal test was positive, Brucella tube agglutination test was positive at 1/640 titer. Brucella melitensis isolation was detected on the 7th day in the blood and bone marrow culture examination. Doxycycline 2x100 mg/day and rifampicin 600 mg/day were administered as treatment. In the microscopic examination of bone marrow sections, age-appropriate normocellular tissue was detected. Non-necrotizing granuloma formation characterized by the accumulation of epithelioid histiocytes in a focal area was observed in Figure 1.

Case Report Article

Received 30-03-2022

Accepted 17-04-2022

Available Online: 17-04-2022

Published 30-04-2022

http://dx.doi.org/10.36472/msd.v9i4.710

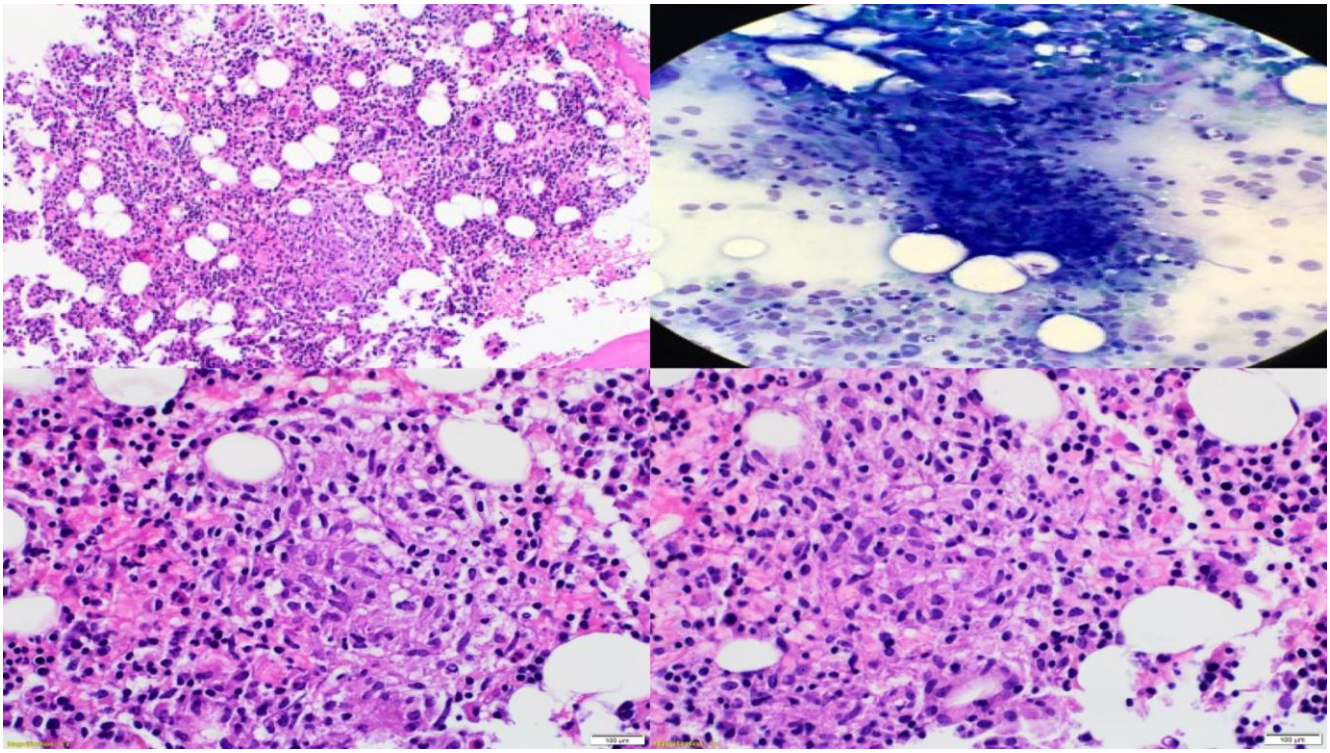

Figure 1. A) An age-appropriate normocellular bone marrow tissue (Hematoxylin-eosin staining: x100). B) Non-necrotizing granulomas in Brucellosis in bone marrow aspiration (May-Grunewald-Giemsa Stain;200x) C/D) Non-necrotizing granuloma characterized by accumulation of epitheloid histiocytes in a focal area (Hematoxylin & Eosin staining; 400x)

On the 10th day of the treatment, the patient's laboratory findings and symptoms improved, and the treatment was planned to be completed to 6 weeks. When the treatment was completed, the patient's symptoms regressed. At the end of 6 weeks, leukocyte hemoglobin and thrombocyte values were found to be within the normal range.

DISCUSSION

Brucella species are encapsulated Gram-negative coccobacilli that cause abortion and infertility in wild and domestic animals. Brucella melitensis is the most common pathogen found in sheep and goats, and it is also the most commonly implicated pathogen in human illness. In addition to direct contact with sick animals, transmission occurs through the consumption of unpasteurized dairy products. Human-to-human transmission has been documented through breast milk (3). Brucella spp. isolation from a sterile location, such as blood or bone marrow, confirms the diagnosis. Although the rate of blood isolation fluctuates, it is now believed to be around 50% (4).

The vague clinical symptoms make diagnosis difficult. Fever, night sweats, malaise, joint pain, and weight loss are the most prevalent symptoms, with hepatosplenomegaly and lymphadenopathy detected on examination (5). Increased inflammatory markers, liver enzymes, and hematological abnormalities such as pancytopenia are also possible accompanying findings. The pathophysiology of pancytopenia in brucellosis is unclear; however, it appears to be complex. Hypersplenism, hemophagocytosis, bone marrow hypoplasia, and bone marrow granulomatous lesions, as well as immunological damage, appear to be key factors in the development of these abnormalities (6, 7).

Brucella species can induce pancytopenia by directly inhibiting proliferating marrow cells, causing parasitized macrophages to release inhibitory mediators and stimulating lymphocytes to release inhibitory mediators (8).

The incidence of pancytopenia in brucellosis patients ranges from 3% to 21% (9). Studies related to bone marrow involvement of Brucella infection have been performed. Al-Eissa et al. reported that 110 children's hematologic alterations during the active course of brucellosis infection and found pancytopenia in 14% of them (10).

Akbayram et al. reported that Brucella infection was accompanied by pancytopenia in 25 (13.3%) of 187 children (8). Non-necrotizing granuloma formation in bone marrow biopsy is generally a rare finding. From an aspect of the department of infectious diseases, the differential diagnosis for Coxiella burnetii, Ebstein Barr Virus infection, Leishmaniasis, Histoplasmosis, Bartonellosis, and Mycobacterial diseases should be made. Non-necrotizing granulomas have also been reported in Brucellosis (11, 12).

In the case we presented, it was observed that pancytopenia developed together with the symptoms. In the patient's bone marrow biopsy, non-necrotizing granuloma formation, characterized by the accumulation of epithelioid histiocytes in the focal area, was observed. Studies have reported that all patients recovered completely, and peripheral blood counts returned to normal 2 to 6 weeks after antibiotic treatment of brucellosis (8, 13).

CONCLUSION

Brucellosis, one of the most common zoonoses in the world and our country, can occur with a wide variety of complications. Because the clinical signs of brucellosis are so variable and ambiguous, it might be mistaken for other illnesses. As a result, clinical diagnosis of this illness is difficult. Our study emphasizes the importance of a bone marrow biopsy, bone marrow culture, and a thorough clinical history in determining the diagnosis.

Author Contributions: RÇ, GÖ: Study design, Literature review, Data collection and/or processing, Analysis and/or interpretation, **RÇ:** Writing, Revision

Acknowledgments: None

Conflict of interest: The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. This research did not receive and a specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical approval: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by Local Ethical Committee. All procedures performed in studies with human participants met the ethical standards of the Institutional Research Commission and the 1964 Declaration of Helsinki and its subsequent amendments or comparable ethical standards.

REFERENCES

1. Demir C, Karahocagil MK, Esen R, Atmaca M, Gönüllü H, Hayrettin A. Bone marrow biopsy findings in brucellosis patients with hematologic abnormalities. Chinese medical journal. 2012;125(11):1871-6.
2. Crosby E, Llosa L, Quesada MM, Carrillo P C, Gotuzzo E. Hematologic changes in brucellosis. Journal of Infectious Diseases. 1984;150(3):419-24.
3. Lowe CF, Showler AJ, Perera S, McIntyre S, Qureshi R, Patel SN, et al. Hospital-associated transmission of Brucella melitensis outside the laboratory. Emerging Infectious Diseases. 2015;21(1):150.
4. Al Dahouk S, Nöckler K. Implications of laboratory diagnosis on brucellosis therapy. Expert review of anti-infective therapy. 2011;9(7):833-45.
5. Dean AS, Crump L, Greter H, Hattendorf J, Schelling E, Zinsstag J. Clinical manifestations of human brucellosis: a systematic review and meta-analysis. PLoS neglected tropical diseases. 2012;6(12):e1929.
6. Citak EC, Citak FE, Tanyeri B, Arman D. Hematologic manifestations of brucellosis in children: 5 years experience of an anatolian center. Journal of Pediatric Hematology/Oncology. 2010;32(2):137-40.
7. Yildirmak Y, Palanduz A, Telhan L, Arapoglu M, Kayaalp N. Bone marrow hypoplasia during Brucella infection. Journal of pediatric hematology/oncology. 2003;25(1):63-4.
8. Akbayram S, Dogan M, Akgun C, Peker E, Parlak M, Caksen H, et al. An analysis of children with brucellosis associated with pancytopenia. Pediatric Hematology and Oncology. 2011;28(3):203-8.
9. Erduran E, Makuloglu M, Mutlu M. A rare hematological manifestation of brucellosis: reactive hemophagocytic syndrome. Journal of Microbiology, Immunology and Infection. 2010;43(2):159-62.
10. Al-Eissa YA, Assuhaimi SA, Al-Fawaz IM, Higgy KE, Al-Nasser MN, Al-Mobaireek KF. Pancytopenia in children with brucellosis: clinical manifestations and bone marrow findings. Acta haematologica. 1993;89(3):132-6.
11. Kvasnicka H, Thiele J. Differentiation of granulomatous lesions in the bone marrow. Der Pathologe. 2002;23(6):465-71.
12. Kitt E, Brannock KR, VonHolz LA, Planet PJ, Graf E, Pillai V, editors. A case report of pediatric brucellosis in an Algerian immigrant. Open forum infectious diseases; 2017: Oxford University Press.
13. Young EJ, Tarry A, Genta RM, Ayden N, Gotuzzo E. Thrombocytopenic purpura associated with brucellosis: report of 2 cases and literature review. Clinical infectious diseases. 2000;31(4):904-9.