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CASE REPORT

Brucellosis-related pancytopenia: a diagnostic and therapeutic challenge case report from an endemic region

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ABSTRACT

Brucellosis, endemic in the Middle East and similar regions, can present with pancytopenia, complicating diagnosis and treatment. We report a 62-year-old female with fever, fatigue, and weight loss. Persistent pancytopenia required prolonged triple antibiotic therapy. Clinicians must consider brucellosis–related pancytopenia and tailor therapy with careful monitoring.

Keywords: Brucellosis; Pancytopenia; Triple therapy; Endemic regions; Hematologic complications

INTRODUCTION

Brucellosis is a widespread zoonotic infectious disease caused by *Brucella* (1). Endemic regions include the Middle East, Central Asia, North Africa, China, South America, and other developing countries (2). In Iran, the pooled incidence of brucellosis was estimated 0.001% annually, with Relative frequencies ranging from 7.0 to 276.41 per 100,000 populations across different provinces (3).

Clinically, brucellosis presents with nonspecific and variable manifestations. In endemic regions, physicians are often familiar with the disease and may consider it early in the differential diagnosis; however, atypical presentations and unusual hematologic manifestations can still create diagnostic challenges and occasionally delay diagnosis (4). Multiple organ systems can be affected (5), with the reticuloendothelial system primarily involved, frequently causing hepatosplenomegaly and lymphadenopathy. Hematologic abnormalities such as leukopenia and anemia are relatively common, while thrombocytopenia or pancytopenia is rare (6), with an incidence of 2% to 14% among adult patients (7).

Although acute brucellosis presenting with mesenteric lymphadenitis and pancytopenia is unusual, it should be considered in the differential diagnosis, especially in endemic regions (8). The underlying mechanisms likely involve splenomegaly, impaired phagocytic function, immune suppression, and bone marrow involvement (9, 10).

Brucellosis requires prolonged combination antibi-

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otic therapy; dual therapy may carry higher relapse risk compared to triple therapy (11-13).

Given the rarity and complexity of pancytopenia, this report presents a successfully treated case and highlights the urgent need for standardized or locally adapted clinical guidelines to improve diagnosis and management of brucellosis-associated hematologic complications.

CASE PRESENTATION

A 62-year-old woman with no prior medical history presented to the emergency department of Shariati Hospital with a 10-day history of fever, chills, fatigue, malaise, myalgia, arthralgia, sore throat, dry cough, headache, poor oral intake, and an unintentional 5-kg weight loss. On admission, she was febrile (38.8°C) with tachycardia but stable respiratory status. Musculoskeletal and neurologic examinations were normal. On admission, the patient had leukopenia (WBC 2,480/µL) with an absolute neutrophil count of 1,017/µL (41% neutrophils), mild normocytic anemia (hemoglobin 11.5 g/dL, hematocrit 34.9%, MCV 81.7 fL), and severe thrombocytopenia (platelet count 42,000/µL), fulfilling the criteria for pancytopenia.

A hematology-oncology consultation was requested due to generalized weakness and cytopenias. Peripheral blood smear showed giant platelets, hypochromic red cells, and atypical lymphocytes without blasts. Flow cytometry revealed normal distributions of granulocytes, T cells, and B cells with no evidence of hematologic malignancy. Whole-body contrast-enhanced CT imaging demonstrated no lymphadenopathy but mild splenomegaly (140 mm).

Given persistent fever and respiratory symptoms, infectious diseases consultation was obtained. Chest CT was unremarkable, and PCR testing for COVID-19 and influenza was negative. Brucellosis was considered in the differential diagnosis based on the patient's clinical findings and history of regular consumption of unpasteurized dairy products from a nearby livestock farm, and was subsequently confirmed by a positive Wright agglutination titer >1:640.

Treatment was initiated with intramuscular gentamicin (5 mg/kg daily), oral rifampin (900 mg once daily), and doxycycline (100 mg twice daily). Due to persistent severe headache, brain MRI and MR venography were conducted, both unremarkable. Lumbar puncture was performed to evaluate for neurobrucellosis; cerebrospinal fluid (CSF) analysis including smear, bacterial culture, *Brucella* culture, PCR, and Wright test was all negative. Echocardiography was normal.

Over the first treatment week, fever, chills, headache, myalgia, and respiratory symptoms resolved, and pancytopenia improved (Table 1), though fatigue and poor intake persisted. After 14 days, gentamicin was discontinued and the patient was discharged on rifampin and doxycycline.

Two weeks later, she returned with recurrent fatigue, nausea, and generalized skin desquamation. Rifampin was discontinued due to suspected drug reaction, and gentamicin plus doxycycline was restarted, leading to rapid improvement. New leukopenia and thrombocytopenia (Table 2) prompted a modified triple therapy regimen of rifampin, doxycycline, and trimethoprim-sulfamethoxazole (1 DS tablet twice daily). She improved and was discharged.

She completed a three-month course of therapy without further adverse effects, regained 15 kg, and demonstrated serologic improvement (Wright 1:80, 2ME negative). Follow-up from 2023 to 2025 revealed no relapse.

DISCUSSION

Brucellosis is a systemic infection with highly variable and nonspecific clinical manifestations, making diagnosis challenging, particularly in endemic regions. Epidemiological exposure, especially contact with infected animals or consumption of unpasteurized dairy products, remains a key determinant of clinical suspicion and early diagnosis (14, 15). Therefore, timely recognition relies primarily on integrating exposure history with compatible clinical and laboratory findings rather than isolated test results.

Hematologic involvement, including pancytopenia, is an uncommon but important manifestation of brucellosis. Proposed mechanisms include hypersplenism due to splenomegaly, immune-mediated cytopenias, and transient bone marrow suppression (9, 10). In this case, the presence of splenomegaly without lymphadenopathy and the complete recovery of blood counts following antimicrobial therapy support reversible infection-related marrow suppression rather than an alternative hematologic disorder.

Although serologic methods remain the cornerstone of diagnosis due to accessibility and cost-effec-

Table 1. Trends in hematologic indices and *Brucella* serology throughout hospitalization

Parameter	Hospital Day					Reference range
	Admission (23.8.29)	Day 3	Day 5	Day 7	Day10	Discharge (23.9.12)	
WBC	2480	3450	3300	2880	3190	4700	4500-12500/cumm
-N%	41	38					
-L%	51	52					
-M%	8	9					
RBC	4.27	4.54	4.8	4.47	4.8	4.71	*10^6/µL
Hb	11.5	12	12.7	11.9	12.6	12.4	12-16gr/dl
Hct	34.9	37.3	39.2	38.2	40.6	38.9	%
MCV	81.7	81.66	81.16	85.46	84	82.59	Fl
Plt	42000	95000	102000	123000	161000	152000	150000-400000/cumm
Wright	1:320						Up to 1/160 titer
2ME	1:160						-

Table 2. Labratory finding during the second hospitalization and modified therapy

Parameter	Hospital Day					Reference range
	Admission (23.9.28)	Day 3	Day 5	Day7	Discharge (23.10.7)	
WBC	4700	4100	2840	2610	4160	4500-12500/cumm
-N%	41	48				
-L%	51	42				
-M%	8	9				
RBC	4.71	4.56	4.19	4.50	4.54	*10^6/µL
Hb	12.4	12	11.5	12.3	12.2	12-16gr/dl
Hct	38.9	38	36.7	37.9	38.5	%
MCV	82.59	83.2	87.16	84.46	84.2	Fl
Plt	152000	144000	131000	124000	123000	150000-400000/cumm
Wright	1:320					Up to 1/160 titer
2ME	1:160					-

tiveness, results must always be interpreted within the clinical and epidemiological context to avoid misdiagnosis or delay in treatment (16).

Standard treatment is based on combination antimicrobial therapy; however, in complicated cases, prolonged or triple-drug regimens are sometimes used, with limited evidence suggesting potential reduction in relapse risk in selected populations (12). In this patient, hematologic recovery occurred during prolonged therapy, but a direct causal effect of the triple regimen cannot be established. The improvement most likely reflects resolution of infection-associated marrow suppression rather than a specific treatment effect.

Treatment duration should be individualized according to disease severity, clinical response, and regional experience, particularly in endemic settings where relapse risk may vary.

CONCLUSION

Brucellosis should be considered in the differential diagnosis of unexplained pancytopenia, particularly in endemic regions and in patients with relevant epidemiologic exposure. This case demonstrates that brucellosis-associated pancytopenia is potentially reversible with appropriate antimicrobial therapy and careful follow-up. Although hematologic re-

covery was observed during prolonged triple-drug treatment, no conclusion can be drawn regarding the superiority of this regimen based on a single case. Further studies are needed to better define the optimal management of hematologic complications in brucellosis.

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REFERENCES

1. O'Callaghan D. Human brucellosis: recent advances and future challenges. *Infect Dis Poverty* 2020; 9: 101.
2. Mirnejad R, Jazi FM, Mostafaei S, Sedighi M. Epidemiology of brucellosis in Iran: A comprehensive systematic review and meta-analysis study. *Microb Pathog* 2017; 109: 239-247.
3. Franco MP, Mulder M, Gilman RH, Smits HL. Human brucellosis. *Lancet Infect Dis* 2007; 7: 775-786.
4. Sorsa M, Mamo G, Waktole H, Abunna F, Zewude A, Ameni G. Seroprevalence and Associated Risk Factors of Ovine Brucellosis in South Omo Zone, Southern Ethiopia. *Infect Drug Resist* 2022; 15: 387-398.
5. Sari I, Altuntas F, Hacioglu S, Kocyigit I, Sevinc A, Sacar S, et al. A multicenter retrospective study defining the clinical and hematological manifestations of brucellosis and pancytopenia in a large series: Hematological malignancies, the unusual cause of pancytopenia in patients with brucellosis. *Am J Hematol* 2008; 83: 334-339.
6. Brucellosis: Background, Pathophysiology, Etiology. Medscape. 2023 [cited 2026 Jun 19]. Available from: https://emedicine.medscape.com/article/213430-overview
7. Uluğ M, Yaman Y, Yapici F, Can-Uluğ N. Clinical and laboratory features, complications and treatment outcome of brucellosis in childhood and review of the literature. *Turk J Pediatr* 2011; 53: 413-424.
8. Dağ MS, Türkbeyler İ, Gökhan A, Aydınlı M, Savaş MC, Kadayıfçı A. Mesenteric lymphadenitis, pancytopenia, and acute brucellosis. *Eur J Ther* 2011; 17: 153-154.
9. Ben Lahlou Y, Benaissa E, Maleb A, Chadli M, Elouennass M. Pancytopenia revealing acute brucellosis. *ID Cases* 2020; 23: e01037.
10. Erkurt MA, Sari I, Gül HC, Coskun O, Eyigün CP, Beyan C. The first documented case of brucellosis manifested with pancytopenia and capillary leak syndrome. *Intern Med* 2008; 47: 863-865.
11. Maduranga S, Valencia BM, Li X, Moallemi S, Rodrigo C. A systematic review and meta-analysis of comparative clinical studies on antibiotic treatment of brucellosis. *Sci Rep* 2024; 14: 19037.
12. Huang S, Wang H, Li F, Du L, Fan W, Zhao M, et al. Better efficacy of triple antibiotics therapy for human brucellosis: A systematic review and meta-analysis. *PLoS Negl Trop Dis* 2023; 17(9): e0011590.
13. Ariza J, Bosilkovski M, Cascio A, Colmenero JD, Corbel MJ, Falagas ME, et al. Perspectives for the treatment of brucellosis in the 21st century: the Ioannina recommendations. *PLoS Med* 2007; 4(12): e317.
14. Centers for Disease Control and Prevention (CDC). Estimates human Brucella infections could be four times higher than previously thought. Food Safety. 2023 [cited 2025 Nov 10]. Available from: https://www.food-safety.com/articles/8817-cdc-estimates-human-brucella-infections-could-be-four-times-higher-than-previously-thought
15. Laine CG, Johnson VE, Scott HM, Arenas-Gamboa AM. Global Estimate of Human Brucellosis Incidence. *Emerg Infect Dis* 2023; 29: 1789-1797.
16. Yagupsky P, Morata P, Colmenero JD. Laboratory diagnosis of human brucellosis. *Clin Microbiol Rev* 2019; 33(1): e00073-19.