

Coronavirus Pandemic

Brucellosis in a patient diagnosed with Coronavirus Disease 2019 (COVID-19)

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Abstract

Brucellosis is a common zoonotic infection. Brucellosis typically presents with fever, weakness, night sweats, and arthralgias. Symptoms associated with Coronavirus Disease 2019 (COVID-19) and infection with *Brucella* spp. are similar to one another, which may lead to delayed diagnosis of the latter condition. There are no previous reports of brucellosis in a patient previously diagnosed with COVID-19. We present here the case of a 20-year-old male who we diagnosed with brucellosis after joint pains and fever that persisted after resolution of COVID-19.

Key words: COVID-19; *Brucella* spp.; joint pain; fever.

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Introduction

Brucellosis is a global zoonotic infection with multisystem involvement that is notably endemic in Mediterranean and Central Asian countries [1]. Brucellosis is currently the most common zoonosis worldwide; approximately 500,000 new cases are reported each year [2]. Typical symptoms of this disease include fever, anorexia, weight loss, malaise, and joint pain; osteoarticular involvement is observed frequently in association with this infection.

In the final months of 2019, a novel virus emerged in Wuhan, China, which ultimately resulted in an international pandemic. In February 2020, the World Health Organization (WHO) named the virus as Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2) and the associated disease as Coronavirus Disease-2019 (COVID-19) [3]. Fever, muscle and joint pain are among the typical symptoms associated with COVID-19. Given the number of patients infected with SARS-CoV-2 and the need to provide rapid triage and treatment, clinicians can easily miss the diagnosis of brucellosis given the similar nature of the presenting symptoms.

To the best of our knowledge, there are no previous reports describing co-infections with *Brucella* spp. and SARS-CoV-2. As such, we present the case of a 20-year-old male patient who was diagnosed with brucellosis after high fever and joint pain persisted after resolution of COVID-19.

Case Report

A 20-year-old male presented to our outpatient clinic with chief complaints of weakness, fatigue, fever, and joint pain. A PCR-test of an oropharyngeal swab sample was positive for SARS-CoV-2. Unenhanced chest computed tomography (CT) revealed bilateral pulmonary infiltrates that were consistent with the diagnosis of COVID-19 (Figure 1).

The patient was diagnosed with COVID-19; his treatment regimen included hydroxychloroquine (200 mg twice daily) and enoxaparin (0.4 mL once daily) for 5 days and instructed to maintain isolation at home. He returned four days later with persistent fever and joint pain. PCR-test of a second oropharyngeal swab sample was negative for SARS-CoV-2. Physical examination revealed an axillary temperature of 38 °C (100.4 °F), heart rate at 90 beats/min and blood pressure at 100/70 mmHg with no other specific findings on multi-system review. Laboratory evaluations included serum C-reactive protein (CRP) at 2.6 mg/dL, an erythrocyte sedimentation rate (ESR) at 32 mm/h, white blood cell count (WBC) at 12,500/ µL, serum aspartate aminotransferase (AST) at 22 U/L, and serum alanine aminotransferase (ALT) at 40 U/L (Table 1). The results from all other blood tests were normal.

A more detailed clinical evaluation was performed. A diagnosis of brucellosis was considered once it became clear that the patient resided in a rural area and frequently consumed unpasteurized milk and dairy

products. Rose-Bengal test for serologic diagnosis of brucellosis was positive; *Brucella* agglutination (Coombs antiserum) was also positive at a titer of 1/160. Oral treatment included doxycycline (200 mg/day) and rifampicin (600 mg/day) for six weeks. The patient returned for follow-up after 10 days of antibiotic treatment and reported diminished fever and joint pain.

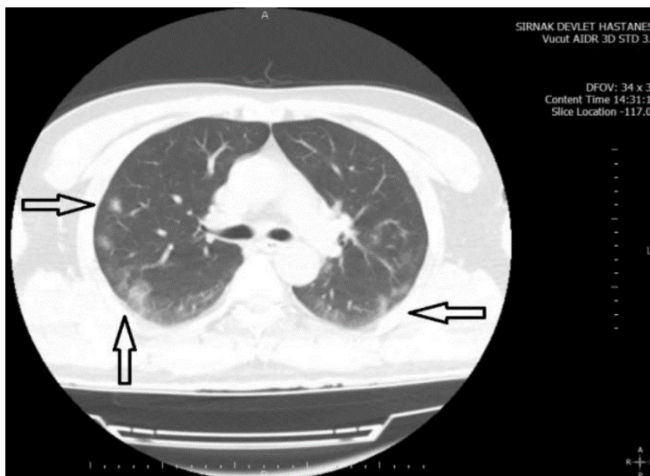
Discussion

Brucellosis, previously known as recurrent Mediterranean fever, undulant fever, and Malta fever, is a systemic disease caused by bacteria of the genus *Brucella*. Brucellosis is the most common zoonotic disease worldwide and can be transmitted to humans from sheep, goats, cattle, pigs and other animals [4]. The infection is frequently transmitted by consumption of unpasteurized dairy products and/or undercooked meat from infected animals. Indeed, our patient lived in a rural area, and reported consumption of unpasteurized milk and other dairy products.

Fever is the most common symptom of brucellosis; this is often accompanied by chills, myalgia, arthralgia, nausea, vomiting, weight loss, and lymph node enlargement. Likewise, spleen and liver enlargement can be detected in some patients. Osteoarticular involvement is the most common complication, and is detected in approximately half of all cases of brucellosis [5]. Osteoarticular involvement can include sacroiliitis, spondylitis and arthritis of the peripheral joints. Our patient complained of fever and joint pain; the pain subsided temporarily in response to non-steroidal anti-inflammatory drugs (NSAIDs). However, when he first presented to a hospital involved in managing pandemic COVID-19, the positive oropharyngeal swab result suggested SARS-CoV-2 infection as the most likely source of his symptoms.

The diagnosis of brucellosis requires full assessment of past medical history, clinical evaluation, and routine laboratory and radiological tests, along with bacterial culture and serology testing. Serological

Figure 1. Unenhanced chest CT revealed bilateral pulmonary infiltrates that were consistent with the diagnosis of COVID-19 (at arrows).



examinations are very useful diagnostic methods as they are easy to perform and yield rapid results. The Rose Bengal test is often used for screening for brucellosis, although positive results must be confirmed by a serum agglutination test. In the presence of clinical findings, serum agglutination titers of 1/160 and above are indicative of brucellosis. The diagnosis of brucellosis became clear, given symptoms that included persistent fever and joint pain that were accompanied by a positive Rose Bengal and serum agglutination tests (titer 1/160).

The WHO suggests that treatment for brucellosis that includes doxycycline at 200 mg/day and rifampicin at 600–900 mg/day; for oral/parenteral therapy, combinations including rifampicin and streptomycin at 15 mg/kg/day for the first 2–3 weeks can be included as part of a 6-week regimen [1]. Once the diagnosis of brucellosis was established, our patient underwent treatment with oral doxycycline (200 mg/day) and rifampicin (600 mg/day); his symptoms had clearly diminished as early as 10 days after treatment was initiated.

Table 1. Laboratory examinations.

Blood test	Results	Reference range
CRP (mg/dL)	2.6	0–0.5
ESR (mm/h)	32	0–20
WBC (/µL)	12,500	3,590–9,640
Neutrophil (/µL)	9,500	1,640–5,950
Lymphocyte (/µL)	2,800	1,120–3,330
Hemoglobin (g/dL)	12.4	13.2–17.2
Platelet (/µL)	163,000	148,000–339,000
AST (U/L)	22	5–34
ALT (U/L)	40	0–55

SARS-CoV-2 emerged in China and spread rapidly to many countries. Infections with this virus pathogen have resulted in the death of more than 700,000 people as this writing; the number of cases of COVID-19 is rapidly approaching 20 million worldwide. COVID-19 is a highly contagious disease; its main clinical symptoms are fever, dry cough, and shortness of breath accompanied by muscle and joint pain. Clinicians working in hospitals focused on treating patients with COVID-19 can easily miss a diagnosis of brucellosis, given the similar clinical symptoms. To the best of our knowledge, this is the first presentation of a patient who was infected with both *Brucella* and SARS-CoV-2; this possibility should not be overlooked. It is critical to recognize that late diagnosis of this bacterial infection with have a negative impact on quality of life.

Conclusions

Clinicians working in hospitals around the world are focused on pandemic COVID-19. However, it is critical to consider other diagnoses, particularly brucellosis, in patients who present with persistent fever and joint pain. Clinicians should keep in mind the fact that delayed treatment for brucellosis may be associated with great suffering and may even result in permanent joint deformation.

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