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A confusing case: COVID-19 or acute brucellosis?

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ABSTRACT:

Introduction: *Both brucellosis and COVID-19 infected patients may present with very different clinical presentations. In this case report, we aimed to present an acute brucellosis patient, with positive Polymerase chain reaction (PCR) test result for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus, which caused diagnostic confusion.*

Case presentation: We present a case of a 52-year-old male patient who had fever, dry cough myalgia and a sore throat. He had no contact with a SARS-CoV-2 confirmed patient at the time of admission but had history of contact with sheep and goats. The overall number of white blood cells and platelets was within normal limits. He had elevated liver enzymes and lymphomonocytosis. SARS-CoV-2 was detected by RT-PCR on nasopharyngeal and oropharyngeal swab. His computerized thoracic tomography examination was normal. Blood culture was negative, but *Brucella* serological test results were positive.

Conclusions: This example demonstrates how co-infection can develop and why it is critical to screen out endemic infections, such as brucellosis, in COVID-19 patients.

Keywords: COVID-19, Brucellosis, SARS-CoV-2, Endemic regions, Differential diagnosis.

INTRODUCTION

COVID-19 can present with a wide range of symptoms and laboratory findings[1]. Human brucellosis is a disease caused by intracellular *Brucella* bacteria. This disease is a common zoonosis that affects half a million people each year globally especially in Mediterranean countries. Humans get brucellosis by direct or indirect contact with an infected animal. The most prevalent routes of transmission are consumption of unpasteurized milk/dairy products as food or contact with animals contaminated with *Brucella*. However, although rare, there are also transmission routes such as inhalation, blood transfusion, laboratory contamination. Fever, dry cough, malaise, and arthralgia are the most common symptoms, making it difficult to identify from other respiratory illnesses[2]. According to the findings of a recent meta-analysis[3], skin findings (rash) and respiratory/cardiac/genito urinary involvements were shown to be more prevalent in pediatric brucellosis patients. Furthermore, hepatitis was the most prevalent brucellosis consequence in all groups, followed by osteoarticular involvement, respiratory tract, cardiovascular, central nerve, hemophagocytic syndrome, and orchitis/epididymitis, in that order[3].

For almost two years, COVID-19 has been affecting globe and has been included in the differential diagnosis of many diseases. It has occasionally made physicians' lives difficult due to the variety of clinical signs and symptoms it causes. Likewise, brucellosis is a disease known as the great mimicker. Brucellosis also causes many different involvements and complaints. In this manuscript, we present a patient who was admitted to the hospital with symptoms of fever, myalgia, and a sore throat and was eventually diagnosed with acute brucellosis.

CASE PRESENTATION

A 52-year-old male patient was admitted to outpatient clinic of our SARS-CoV-2 dedicated hospital located in Canakkale province (Turkey), with complaints of a four-day history of fever, dry cough, weakness,

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myalgia, and a sore throat. He had no history of shortness of breath. He had no history of close contact with SARS-CoV-2 confirmed case. Also, he announced that he had had two doses of the inactivated COVID-19 vaccine, the last dose of which was two months ago. The patient had been diagnosed with diabetes for two years.

His general condition was moderate, he was conscious, oriented, and cooperative. His body temperature was 38.2°C. Other vital signs were normal. His lung auscultation was normal and there was no heart murmur. Laboratory results showed a normal white blood cell (WBC) count but lymphomonocytosis. WBC: 4.5 x 10^9/L [neutrophils (43%) and increased lymphocytes (51%) and monocytes (11%)], platelets count (169,000 per mm^3), his liver enzymes were found to be elevated (Aspartate aminotransferase: 93 U/L, alanine aminotransferase: 78 U/L), and he had an elevated C-reactive protein level (8.5 mg/dL). Other biochemical and hemogram parameters were normal.

His computerized thoracic tomography (CT) scan revealed no evidence of COVID-19 pneumonia. Also, there was no evidence of hepatomegaly or splenomegaly in the lower sections of the thoracic CT.

After the initial examination, he was suspected of having COVID-19 and he was hospitalized. A reverse transcription real-time fluorescent polymerase chain reaction (RT-PCR) for SARS-CoV-2 was obtained from the patient with a preliminary diagnosis of COVID-19. SARS-CoV-2 was detected by RT-PCR on nasopharyngeal and oropharyngeal swabs. He was treated with favipiravir 1600 mg bid as a loading dose, followed by 600 mg bid for a total of five days as empirical treatment in accordance with the Ministry of Health of the Republic of Turkey's COVID-19 Treatment Guidelines.

As his fever continued over 38.0°C on the third day of his hospitalization, and two samples of blood culture and urine cultures were sent to the microbiology laboratory. There were no respiratory symptoms and no signs in favor of significant bacterial infection on physical examination. The patient complained of hip joint and lumbar pain on the fourth day of hospitalization. A more comprehensive clinical examination was performed. When it was understood that the patient lived in a rural area, serological tests were performed for brucellosis. The Rose-Bengal test was positive, and *Brucella* Coombs agglutination test was likewise positive at a titer of 1/320. He was diagnosed as acute brucellosis based on clinical, serological test results findings and the patient's history. Sacroiliac radiography was requested for hip pain, and lumbar magnetic imaging was requested for low back pain. There was no finding in favor of sacroiliitis or spondylodiscitis. Therefore, streptomycin treatment was not given. Doxycycline (200 mg/day) and rifampicin (600 mg/day) were administered orally for six weeks. After 3 days of antibiotic therapy, patient's fever and joint discomfort had subsided.

He was discharged after eight days in the hospital with recommendations of quarantine at home for six days.

DISCUSSION

Brucellosis is still an important public health problem in Turkey, and it is usually transmitted by contact with unpasteurized animal products and/or contaminated animals[4]. The presented patient did indeed reside in a rural region and admitted having history of bare-handed contact with sheep's body fluid (urine and fetal fluids) one month ago.

In the available literature, there are cases with co-infection of COVID-19 and *Brucella*, which are frequently reported from Turkey[5-7], and one from Saudi Arabia[8].

The most common brucellosis symptom is fever, which is frequently accompanied by chills, myalgia, arthralgia, vomiting, nausea, weight loss, and lymph node enlargement. In certain cases, enlargement of the spleen and liver can also be noticed. The most prevalent consequence is osteoarticular involvement, which is found in around half of all brucellosis patients[4].

Given the identical clinical signs, clinicians working in hospitals focused on treating COVID-19 patients might easily miss a diagnosis of brucellosis[8]. As the patient was admitted to us, our hospital was SARS-CoV-2 dedicated hospital and we may be overlooked brucellosis on the admission day.

The presented case also had fever, dry cough myalgia and a sore throat. There were no radiological or examination findings in favor of pneumonia. He had elevated liver enzymes and lymphomonocytosis. The presented case had elevated liver enzymes and lymphomonocytosis and the case was perfectly fitting a classic COVID-19 presentation. However, brucellosis cases can present with similar findings as it affects the reticuloendothelial system (liver, spleen, and bone marrow) and causes systemic infection[2,3].

The diagnosis of brucellosis necessitates a thorough review of the patient's medical history, a clinical examination, and regular laboratory and radiographic investigations, as well as bacterial culture and serology testing. Identification of *Brucella* species from blood, bone marrow, or other tissues is required for a valid case of brucellosis, but this is seldom attainable in all cases. Positive serology is used to diagnose most cases. Serological tests are particularly valuable diagnostic procedures since they are simple to perform and provide quick findings. The Rose Bengal test is frequently used for brucellosis screening, but positive results must be verified by a serum agglutination test. Serum agglutination titers of 1/160 and higher are diagnostic of brucellosis in the context of clinical symptoms. The presence of symptoms such as a prolonged fever and joint discomfort, as well as a positive Rose Bengal and Coombs agglutination tests led to the diagnosis of brucellosis[4]. Even though similar cases in the literature[5-9] had positive blood cultures, no growth was seen in the blood cultures of the patient we described. Slow growth characteristics of the *Brucella* genus, lower susceptibility to chronic infection and localized infections make culture identification of *Brucella* organisms difficult[10].

This disease has a global geographical distribution and is most common in the Mediterranean and Central

Asian countries. According to several research[11-14], the prevalence of brucellosis in Turkey ranges from 1% to 26.70%, with varying rates in different geographic areas. Brucellosis should be considered the differential diagnosis of many diseases in endemic areas, including COVID-19, as it has non-specific clinical and laboratory findings[5-7].

The World Health Organization (WHO) recommends a 6-week regimen that comprises oral doxycycline 200 mg/day plus rifampicin 600-900 mg/day for brucellosis treatment[4]. The patient we presented was treated with oral doxycycline (200 mg/day) and rifampicin (600 mg/day) in line with WHO recommendations. His fever had receded, and his symptoms were visibly lessened as early as 3 days after therapy began.

CONCLUSIONS

During the COVID-19 pandemic, healthcare workers should evaluate the diagnosis of Brucellosis in individuals presenting febrile symptoms in endemic areas.

Conflict of interest:
The authors declare that they have no conflicts of interest.

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