CASE REPORT

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A Case of Coincidentally Diagnosed Brucellosis in a Patient with COVID-19

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ABSTRACT Coronavirus disease-2019 (COVID-19) is a serious health problem that started in China in December 2019 and spread worldwide as a pandemic. Due to the fact that COVID-19 is a pandemic, it can be associated with many diseases. In particular, high rates of co-infection with other respiratory pathogens, including influenza virus, Legionella pneumophila, Mycoplasma pneumoniae, have been described. Brucellosis is a bacterial zoonosis caused by Brucella spp. that can be transmitted through direct contact with infected animals or ingestion of unpasteurized milk or milk products. Brucellosis is endemic in our country, and is still increasing in people who are engaged in animal husbandry and consuming raw milk or milk products. Clinical findings are of brucellosis similar to COVID-19 infection and diagnosis is difficult. In this presentation, a case diagnosed with brucellosis while being followed up in the intensive care unit due to COVID-19.

Keywords: Brucellosis; COVID-19; fever

Coronavirus disease-2019 (COVID-19), which began with its first worldwide case in December 2019, is an infectious disease caused by a coronavirus. Since then, the disease has spread around the world, resulting in a pandemic. Although most people present with mild to moderate symptoms, 5% of patients present with critical symptoms.[1] Brucellosis is a zoonotic disease transmitted to humans by drinking raw milk and coming into contact with animals. It has nonspecific clinical signs, such as intermittent fever, sweating, weakness, and joint and muscle pain.[2] The clinical data are generally similar to COVID-19. Co-infection of many diseases has been reported in connection with the COVID-19 pandemic. Although expected, a rare pathogen such as *Brucella* is extremely rare to be found incidentally in a patient treated with a COVID-19 diagnosis. This case report presents a patient with *Brucella* detected in blood cultures during observation in the intensive care unit (ICU) because of COVID-19.

CASE REPORT

A 62-year-old patient was admitted with suspected COVID-19 pneumonia after he went to the clinic with complaints of fever, shivering and chills. He was admitted to the ICU due to respiratory failure, tachypnoea and hypoxemia on arterial blood gas (Table 1). It was known from his history that he had been diagnosed with malignant mesothelioma for 1 year and received chemotherapy 1 week ago. The patient whose physical examination and laboratory values are in Table 1, in high resolution computerized tomography (HRCT), there were diffuse manifestations of ground glass density in the lower lobes of both lungs with a tendency to confluence in prominent peripheral subpleural areas. A polymerase chain reaction (PCR) test was taken from a patient whose HRCT was compatible with COVID-19 pneumonia and it was positive. Empirically, meropenem was started. Blood, sputum and urine cultures were taken.

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TABLE 1: Patient findings and laboratory values.

Body temperature; 39°C
Heart rate; 120 beats/min
Respiratory rate; 15/min
Arterial blood pressure; 100/65 mmHg
WBC (/µl): 900 (3,590-9,640)
Neutrophil (/µl): 0.5 (1,640–5,950)
Lymphocyte (/µl): 0.2
Hb (g/dL): 12 (13.2-17.2)
Platelet (/µl): 76,000 (148,000-339,000)
CRP (mg/L): 177 (0-5)
Procalcitonin (ng/mL): 5 (0-0.5)
Fibrinogen (mg/dL): 284 (200-393)
D-Dimer (ng/mL): 330 ng/mL (69-243)
Ferritin (ng/mL): >2,000 (21.8-274.6)
SOFA score; 3
APACHI II score; 24
pH: 7.64
$PaCO_2$ (mmHg): 31 (35-48)
PaO_2 (mmHg): 57 (83-108)
SaO_2 (%): 89 (92-98.5)
HCO_3-(mmol/mL): 23 (22-26)
Lactate: 2.64

WBC: White blood cell; Hb: Hemoglobin; CRP: C-reactive protein.

The patient was started on treatment with methylprednisolone at a dose of 1 mg/kg. Due to hypoxemia, the patient was started on high-flow nasal oxygen therapy. In addition to meropenem treatment, teicoplanin treatment was added to the patient whose hypoxemia continued. There was no increase in the patient's intensive care admission cultures. Re-culture was taken on the 5th day of hospitalization of the patient whose fever continued. Microbiologists informed us that *Brucella* growth was present in the blood culture.

When deepening the anamnesis, it was found that the patient was engaged in animal husbandry, intensive contact with animals, and consumption of raw milk. *Brucella* antibodies were sampled for the study. Results for antibodies: *Brucella* immunoglobulin (Ig) M (+), *Brucella* IgG (-). A combination of doxycycline 100 mg and rifampicin 600 mg was started. On the 3rd day of the treatment, the fever subsided. A patient with increasing respiratory failure and deepening hypoxemia was intubated on the 20th day of hospitalization. Given the presence of sepsis in a patient with a SOFA score of 7, treatment was initiated following the 2016 Sepsis Guidelines. In HRCT, bilateral lung cavitary lesions were detected and with the suspicion of fungal infection, empirical liposomal Amphotericin B was started at a dose of 3 mg/kg. Antibiotic-related allergies were considered in a patient who developed an extensive rash after the first dose of Amphotericin B and treatment was changed to voriconazole (2x6 mg/kg after loading 2x4 mg/kg maintenance therapy). Despite the ongoing treatment, the patient's need for inotropies increased and he died on the 25th day of hospitalization against the background of septic shock. Informed consent was obtained from the patient's family.

DISCUSSION

Clinical manifestations of COVID-19 range from asymptomatic patients with mild symptoms to severe symptoms requiring hospitalization and intensive care.[1,3]

Our patient was at risk for COVID-19, as he had a malignancy and had recently received chemotherapy. The patient was diagnosed with Brucellosis during his follow-up period in the ICU due to COVID-19 treatment. Due to the fact that COVID-19 is now a pandemic, it can be seen in association with many diseases. The coexistence of COVID-19 and Brucellosis is very rare.

In particular, high rates of coinfection with other respiratory pathogens, including influenza, legionnaires' disease and mycoplasma pneumonia, have been described.

A study of 8,274 patients showed that 5.8% of patients with COVID-19 had co-infections with other respiratory pathogens. Another study showed that COVID-19 coinfection with other respiratory pathogens was 21%. The prevalence of bacterial co-infection was found to be higher in ICU patients, reaching 14%.[4-6] The coexistence of brucellosis in a patient with COVID-19 has only been reported in one case in the literature. The diagnosis of brucellosis is based on good anamnesis and suspicion.[7,8]

Although its clinic may be asymptomatic, many serious clinical conditions such as corrugated fever,

myalgia, infective endocarditis, hepatosplenomegaly, meningitis and an abscess may occur.[9] In our case, COVID-19 infection did not have these clinical findings.

Initial findings are nonspecific ones such as intermittent fever, sweating, weakness and joint and muscle pain and these signs are similar to those characteristics of COVID-19.

Although the diagnosis of Brucellosis is usually thought of when these findings are encountered by clinicians, it may not be considered first in the COVID-19 pandemic, which shows similar clinical findings. Since the first diagnosis that came to our mind in our case was COVID-19, PCR test was performed. COVID-19 comorbidity is an expected situation during many diseases or treatment processes. However, it is very rare to see such an uncommon disease as brucellosis, which is difficult to diagnose without a clinical diagnosis, in a patient treated with COVID-19. Although detection of bacteria in blood culture is the gold standard, it is not always possible. There was no growth in the initial cultures of our patient. Reproduction in blood culture is expected, especially in patients with acute infection or relapse. If there is no growth in the blood culture, it may need to be repeated. Especially in our case, reproduction was registered in the blood culture of a patient without clinical suspicion of Brucellosis.[10-12] Respiratory system involvement is an unexpected finding in *Brucella* cases and is usually seen in COVID-19 cases.[13] However, it has been shown in the literature that *Brucella* can be transmitted through the respiratory tract and can cause respiratory system symptoms, although it is rare.[14] Our patient has respiratory system findings due to existing mesothelioma. Therefore, respiratory system findings may not have just been due to COVID-19.

In conclusion, given the increase in the rapid transmission of the Pandemic to the community, the suspicion of severe acute respiratory syndrome-coronavirus-2 infection and the test threshold should be low even if those with fever and respiratory symptoms test positive for other respiratory pathogens. This is crucial to interrupt the virus' transmission cycle. However, other endemic diseases should not be ignored in patients with COVID-19. COVID-19 can conceal or mimic other febrile diseases in endemic areas. Every patient with fever, chills and joint pain should be screened for brucellosis and the presence of additional respiratory symptoms should not deter us from screening. Because brucellosis can be transmitted by inhalation from barn dust and rarely cause pneumonia. A high index of suspicion, early tests and a multidisciplinary approach are very important to treating COVID-19 pneumonia and co-infections in patients with comorbidities like our patients.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Onurcan Balık;* ***Design:*** *Pınar Karabacak;* ***Control/Supervision:*** *Pakize Kırdemir, Mustafa Kemal Yıldırım;* ***Data Literature Review:*** *Yasemin Görgülü;* ***Writing the Article:*** *Pınar Karabacak, Onurcan Balık;* ***Critical Review:*** *Pakize Kırdemir.*

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