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# Simultaneous occurrence of knee septic arthritis and coronavirus disease 2019 (COVID-19): A case report

Mandana Khodashahi<sup>a</sup>, Rozita Khodashahi<sup>b</sup>, Zeinab Saremi<sup>c,\*</sup><sup>a</sup> Rheumatic Diseases Research Center, Mashhad University of Medical Sciences, Mashhad, Iran<sup>b</sup> Department of Infectious Diseases and Tropical Medicine, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran<sup>c</sup> Department of Internal Medicine, School of Medicine, Birjand University of Medical Sciences, Birjand, Iran

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## ABSTRACT

**Background:** Coronavirus disease 2019 (COVID-19) pandemic is increasingly recognized as a serious, worldwide public health concern. Most of the patients with COVID-19 are asymptomatic or show mild symptoms. It is important to identify the unusual manifestations and their long-term complication.

**Case presentation:** A case of COVID-19 in 45 years old man with septic arthritis due to *Staphylococcus aureus* is presented. COVID-19 was diagnosed using real-time polymerase chain reaction without obvious clinical manifestation. The patient had no history of trauma or inflammatory arthritis and had progressive left knee pain and limitation of movement. Knee X-ray was normal. Aspiration of the knee joint fluid showed a cloudy and purulent appearance. The patient was admitted to hospital and immediately treated with vancomycin 1gr/12 hr. A polymerized chain reaction (PCR) test for COVID-19 was performed, which was positive 24 h after hospitalization. *Staphylococcus aureus* was reported in synovial fluid culture which was sensitive to vancomycin and ciprofloxacin, thus vancomycin was continued. On the 4th day of hospitalization the patient had cough, therefore underwent CT scan lungs and ground-glass opacities (GGO) characteristic of COVID-19 were noticed. Favipiravir and interferon were started. Patient's knee aspiration was performed for 5 consecutive days. On the 6th day of hospitalization, joint fluid markedly decreased and the patient's oxygen saturation was 96%. One week after hospitalization, the patient was discharged and a month later knee examination was completely normal.

**Conclusions:** Septic arthritis should be considered in the manifestations or co-morbidity of COVID-19 patients with joint pain, swelling or redness.

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## 1. Introduction

Up to now, coronavirus disease 2019 (COVID-19) outbreak has become a global public health emergency and the disease has spread to many countries worldwide. Patients with COVID-19 showed a diverse range of symptoms, such as fever, cough, fatigue, loss of smell, joint pain, and diarrhea. Moreover, the clinical severity of COVID-19 varies from acute respiratory distress syndrome (ARDS) and multiple organ dysfunctions to asymptomatic [1]. There have been reports of reactive arthritis and the onset of inflammatory arthritis (rheumatoid arthritis; psoriatic arthritis and gouty arthritis) after COVID-19 [2]. But there are few reports of septic arthritis during or after COVID-19 [3]. There is an

agreement to the important emerging frontline role of rheumatologists in managing COVID-19 during the pandemic [4].

## 2. Case presentation

A 45-year-old Iranian male farmer was referred to the rheumatology clinic in Birjand city November 2020 because of severe pain and swelling of the left knee which had started 1 week ago with progressive pain and limitation of movement. He had occasional fever for 4 days and symptoms gradually worsened over the past week. This case report was approved by the ethics committee of Birjand University of Medical Sciences (IR.BUMS.REC.1400.127). Written informed consent was obtained from the patient for publication of this case report and for the accompanying exclusive images.

On clinical examination, there was redness, hotness, tenderness and limitation of movement of the left knee. Vital signs were as follow: 38 °C axillary temperature, 20 breaths/minute, heart rate

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\* Corresponding author.

E-mail address: [zsaremi@bums.ac.ir](mailto:zsaremi@bums.ac.ir) (Z. Saremi).<https://doi.org/10.1016/j.ejr.2022.06.001>

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(HR) was 90 beats/minute and blood pressure (BP) 120/60 mmHg and oxygen saturation rate was 97% in room air. There was no dyspnea, cough, diarrhea, urinary tract infection or history of any previous disease. The patient was unable to work for the preceding week due to severe knee pain. He did not take any medication and had no relatives with COVID-19 disease. Aspiration of the knee joint fluid was performed (Fig. 1), which had a cloudy and purulent appearance. The white blood cells (WBCs) count in the joint fluid was 64,000/high power field (HPF) with 94% polymorphonuclear leukocytes (PMNs). No crystals were seen in polarized microscope. The patient was admitted to hospital and immediately treated with vancomycin 1gr/12 hr.

Knee X-ray was normal. Because the patient was hospitalized during the COVID-19 pandemic, and despite the fact that he had



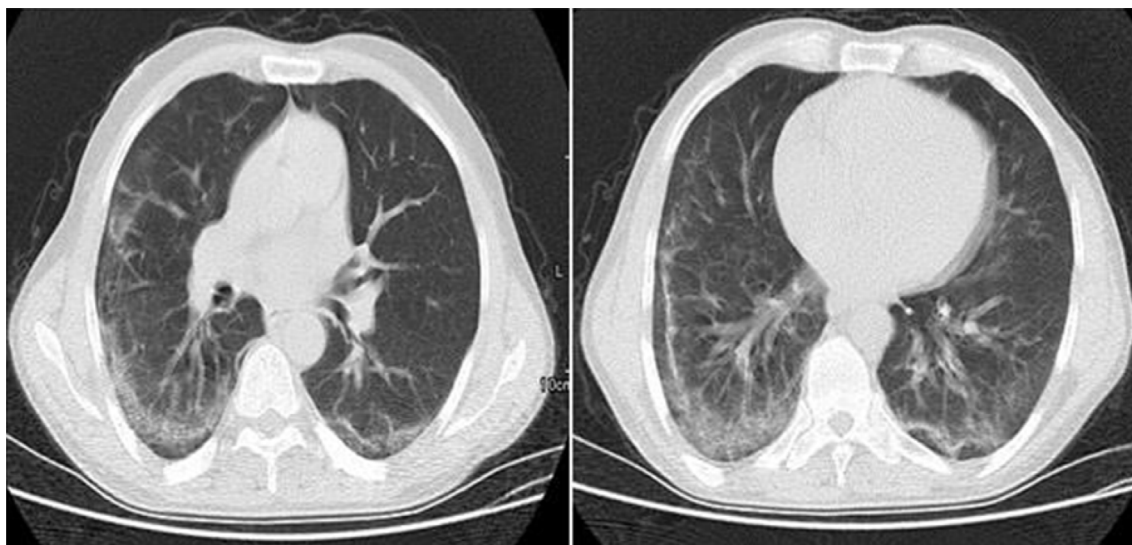
**Fig. 1.** Left knee synovial aspiration in a 45-year-old Iranian male farmer with septic arthritis and coronavirus disease 2019 (COVID-19): Synovial fluid was turbid with low viscosity.

no complaints of pulmonary, respiratory, cough, etc. symptoms, a polymerized chain reaction (PCR) test for COVID-19 was performed, which was positive 24 h after hospitalization. At that time, laboratory results were as follow: WBC count was 6700/ul with 78% PMNs and 22% lymphocytes, erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) was 64 mm/hr and 23 mg/l, respectively, urea-creatinine and liver function tests were normal, *Staphylococcus aureus* was reported in synovial fluid culture which was sensitive to vancomycin and ciprofloxacin, thus vancomycin was continued.

24 h after hospitalization, joint effusion decreased slightly and joint fluid was drained daily. Naproxen (500 mg/12 hr), famotidine (40 mg/12 hr), and zinc sulfate capsules were added to the patient's medication regimen. On the 4th day of hospitalization the patient had cough, therefore underwent CT scan of lungs and ground-glass opacities (GGO) characteristic of COVID-19 were noticed (Fig. 2). Favipiravir and interferon were started for the patient. Patient's knee aspiration was performed for 5 consecutive days and WBC count of synovial fluid on day 5 was 12,000 with 86% PMNs and was semiturbid. On the 6th day of hospitalization, joint fluid markedly decreased and the patient's oxygen saturation was 96%. One week after hospitalization, the patient was discharged with medications including ciprofloxacin (500 mg/12 hr) and naproxen (500 mg/12 hr), these drugs continued for a week after discharge and a month later the patient's knee examination was completely normal.

### 3. Discussion

This is a report of COVID-19 in a patient with septic arthritis. Septic arthritis (also called infectious arthritis) is an uncommon but serious medical emergency with microbial and immunological etiologies [5] and the main causative organism involved is *Staphylococcus aureus*, which can be isolated from 37 to 56% of cases [6]. It is well-documented that suppression of the immune system whether by immunosuppressant drugs or in autoimmune diseases is the key risk factor for the development of septic arthritis [7]. It has been reported that immunocompromised patients are more susceptible to the generation of septic arthritis [7]. For example, human immunodeficiency virus (HIV)-infected patients exhibit an increased prevalence of musculoskeletal infections [8]. However, in the current case report, the patient had no history of any



**Fig. 2.** Computed tomography (CT) scans lungs of a 45-year-old Iranian male farmer with septic arthritis and coronavirus disease 2019 (COVID-19) showing ground-glass opacities characteristic of COVID-19.

diseases and had not received immunosuppressive therapy yet. Therefore, the incidence of an uncommon infection in this patient might be associated with COVID-19. Up to now, considerable literature has grown up around the impact of COVID-19 on host immune responses and functions [9,10]. Recently, Remy *et al.* investigated the effect of COVID-19 on host immune responses and interaction with different immune cells and found that COVID-19 suppresses host innate and adaptive immune responses [11]. Indeed, the term “immunologic collapse” refers to the suppression of host immune responses by severe acute respiratory syndrome–coronavirus2 (SARS-CoV2) infection [12,13].

As a consequence of this condition, patients with COVID-19 are more susceptible to opportunistic infectious microorganisms such as *Staphylococcus aureus*. Interestingly, Zhou *et al* indicated that 50% of patients with COVID-19 develop secondary hospital-acquired infections [14]. 5 cases of septic arthritis in hip were described after improvement of COVID19 with salmonella and coagulase negative staphylococci [3] and others reported a case of hip septic arthritis 3 month after COVID19 [15]. Furthermore, a case of shoulder septic arthritis was reported 1 week after Pfizer-BioNTech vaccine [16], but in present case, the patients did not receive any vaccine. Also there are case reports of inflammatory arthritis (rheumatoid arthritis, systemic lupus erythematosus, reactive arthritis, crystal-proven arthropathy flare, new-onset psoriatic arthritis and flare of preexisting inflammatory arthritis) after COVID19 [2,17,18]. This report describes the simultaneous existence of knee septic arthritis with *Staphylococcus aureus* and COVID 19. Due to the onset of pulmonary symptoms on the fourth day of hospitalization and as the incubation period COVID19 is about 2 weeks, he may have had COVID 19 at first and showed signs of septic arthritis before the onset of obvious pulmonary symptoms.

Concerning this precise evidence, it seems that in the present case, COVID-19 infection provides a favorable condition for the opportunistic infectious microorganisms to develop septic arthritis. The current case presents the association of COVID-19 with septic arthritis. Therefore, close monitoring of COVID-19 patients especially those with arthritis is recommended and these patients should be examined for sepsis. In COVID patients with joint swelling, the possibility of septic arthritis should be considered and further evaluation should be done in suspicious cases.

#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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