

## Acute Inflammatory Arthritis Associated with Severe Systemic Inflammatory Response as A Late Manifestation Of COVID-19 Infection: A Case Report

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### Introduction

Inflammatory arthritis is characterized by joint pain and swelling, it is typically associated with synovial fluid cell count greater than 2000 cells/mm<sup>3</sup> in the affected joint [1]. A wide range of rheumatological diseases can cause inflammatory arthritis such as rheumatoid arthritis, spondylarthritis, and crystal-induced arthritis. However, inflammatory arthritis can also be a manifestation of systemic conditions including viral and bacterial infections.

COVID-19 is a rapidly growing viral infection that mainly affects the respiratory system. The most common presenting symptoms are fever, fatigue, dry cough, myalgia, and dyspnea [2]. A Bi-phasic course of COVID-19 infection has been reported [3].

We are reporting a patient who developed acute inflammatory arthritis associated with severe systemic inflammatory response two weeks after initial COVID-19 infection.

### Case report

A 62-year-old male with a past medical history of diabetes and hypertension was admitted for COVID-19 infection. He presented with sore throat, cough, and fever for one week. His initial examination was significant for fever of 38.5° C, normal BP and HR, his oxygen saturation was 95% on room air; on lung exam, he had basal crackles in the right lower zone. The patient was admitted with pneumonia and the COVID-19 PCR test was sent. His initial labs were: Hb 11.9 gm/dl (normal 13-17 gm/dl), WBC count of 16,400 /  $\mu$ L (normal 4000-11000 /  $\mu$ L) neutrophils of 78.8%, platelets 338,000 /  $\mu$ L, elevated C-reactive protein (CRP) of 290

mg/L (normal <5 mg/L), normal kidney and liver function tests.

He was initially started on ceftriaxone and azithromycin for pneumonia. Later on, his COVID-19 PCR came back positive, so he was started on hydroxychloroquine, oseltamivir, and azithromycin as per the local protocol, and his ceftriaxone was stopped. The patient's condition was stable over the next few days with no more spikes of fever and he maintained good oxygen saturation on room air.

Five days after his admission, he started spiking fever again and he developed acute right knee pain and swelling. His temperature was 38.5° C and on exam his right knee was hot, tender, and swollen. He denied any history of joint pain or similar episodes previously. His repeat labs showed leukocytosis 20,600 /  $\mu$ L, CRP 427 mg/L, and ferritin 1000 ug/L (normal 30-553 ug/L). This time he had no respiratory symptoms or change in his oxygen saturation and his lung exam was unremarkable. He underwent arthrocentesis to rule out septic arthritis and was started on Ceftriaxone empirically. His synovial fluid cell count was 3,900 /  $\mu$ L (82% neutrophils), RBC 11,000 /  $\mu$ L, and negative gram stain. He was started on paracetamol and celecoxib for his arthritis. Full septic workup was ordered, and all his blood, urine, and synovial fluid cultures came back negative and he had a normal chest x-ray. One day later, he complained of elbow and shoulder pain. His COVID-19 PCR swab test was repeated and came back positive.

Over the next 48 -72 hours his joint pain improved and his knee swelling started to subside, there was no more fever and a repeated blood test revealed normal WBC count of 10,000 /  $\mu$ L and his CRP down to 57 mg/L (figure 1) so his

antibiotic was stopped. His RF, CCP, and HLA-B27 came back negative. He continued to improve and seven days

after his knee swelling, he was discharged home in stable condition.

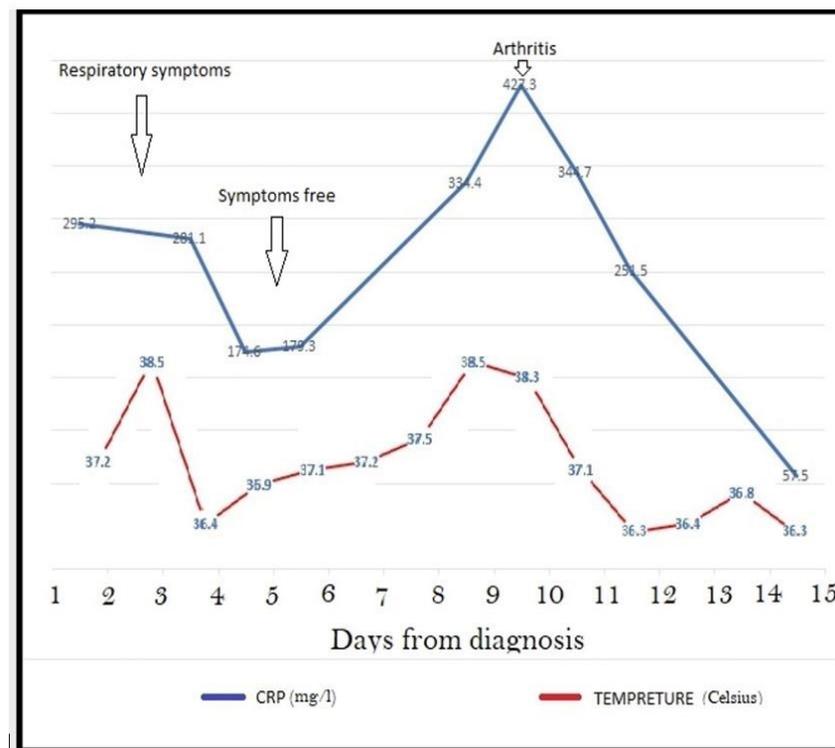


Figure 1 : patient temperature celsius degree (red ) and CRP values mg /l (blue) during the clinical course of covid 19 infection of the patient .

## Discussion

We presented a patient who developed acute inflammatory arthritis two weeks after his initial presentation of COVID-19 infection. Few days after he showed almost full recovery from COVID-19 infection, he had sudden acute systemic inflammatory response manifested by fever, knee swelling, leukocytosis, high CRP, and ferritin level without any relapse of his pulmonary symptoms. His acute arthritis presentation was very similar to septic arthritis, however synovial fluid cell count, gram stain, and disease course were consistent with inflammatory arthritis.

Several manifestations of COVID-19 infection have been reported. Fever, fatigue, and dry cough have been the most common presentations [4]. In addition to respiratory symptoms, gastrointestinal symptoms have been also reported as presenting complaints in some cases [5]. Rare reports of dermatological manifestations have also been published [6].

Like in our case, two phases of illness during the course of COVID-19 infection have been reported [4]. It is believed that the early phase is mediated by type I Interferons leading to restricting virus replication through the interferon-stimulated genes. It is followed by an exuberant host systemic inflammatory response phase [7]. This phase of COVID-19 infection is manifested by persistent fevers, elevated inflammatory markers, and elevated proinflammatory cytokines [8].

## Conclusion

Our case suggests that acute inflammatory arthritis with relapse of the severe systemic inflammatory response can be seen during the course of COVID-19 infection even when respiratory symptoms disappear.

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