



# Reactive arthritis after COVID-19: a case report

*Artrite reativa pós-COVID-19: relato de caso*

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## ABSTRACT

Complications associated with COVID-19 include renal failure, myocarditis, thrombotic events, and retinitis. However, other manifestations, such as reactive arthritis, also seem to be associated with infection and require further investigation. We report the case of a 32-year-old woman in Rio de Janeiro, RJ who developed reactive arthritis 5 days after the onset of flu-like symptoms. Laboratory tests, GeneXpert for COVID-19, and synovial fluid puncture were performed. Positive GeneXpert results for COVID-19, increased inflammatory markers, non-reactive serological markers of autoimmunity, and negative culture in synovial fluid were observed. These results ruled out both septic arthritis and rheumatoid arthritis, leading to a diagnosis of post-infectious arthritis resulting from SARS-CoV-2.

**Keywords:** Reactive arthritis, COVID-19, autoimmunity.

## RESUMO

As complicações associadas à COVID-19 incluem insuficiência renal, miocardite, eventos trombóticos e retinite. No entanto, outras manifestações, como a artrite reativa, também parecem estar atreladas a este vírus e precisam ser melhor investigadas. O caso relatado se refere a uma paciente de 32 anos, do sexo feminino, na cidade do Rio de Janeiro (RJ), que desenvolveu um quadro de artrite reativa após 5 dias da manifestação de sintomas gripais. Foram realizados exames laboratoriais, genexpert para COVID-19 e punção do líquido sinovial. Observou-se genexpert positivo para COVID-19, aumento nos marcadores inflamatórios, marcadores sorológicos de autoimunidade não reagentes e cultura negativa no líquido sinovial. Esses resultados descartam artrite séptica, bem como artrite reumatoide, passando a ser considerado o quadro de artrite pós-infecciosa decorrente do SARS-CoV-2.

**Descritores:** Artrite reativa, COVID-19, autoimunidade.

## Introduction

The novel coronavirus (SARS-CoV-2), which causes COVID-19, was first detected on December 31, 2019, in Wuhan City, Hubei Province of China. On January 30, 2020, the World Health Organization declared the outbreak a public health emergency of international concern. Since then, several studies have been conducted to elucidate the influence of the novel virus on the immune system.<sup>1</sup>

The immune system defends the body against infectious agents, and such function is mediated by mechanisms of innate and adaptive immunity, which are fundamental in the response to disease-causing microorganisms. In COVID-19, a benign and self-limiting evolution of the disease depends on an efficient and balanced immune response. However, in certain cases, an exacerbated immune response

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to SARS-CoV-2 can generate more severe forms of the disease.<sup>2-4</sup>

Complications known to be associated with COVID-19 include renal failure, myocarditis, thrombotic events, and retinitis.<sup>5</sup> However, because this disease is new, post-COVID-19 sequelae are not yet well understood. We report the case of a patient who developed reactive arthritis after COVID-19 infection.

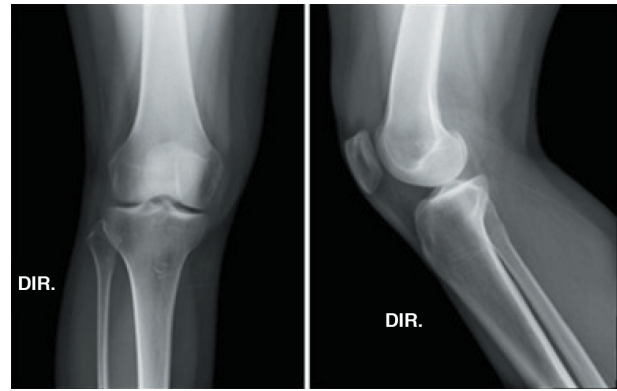
### Case report

A 32-year-old woman presented with pharyngitis and cough on June 8, 2022. After 5 days, she developed fever (37.8 °C), a blood pressure of 140/90 mmHg, and signs of inflammation in the right knee and right shoulder. She was admitted to the emergency room on June 11, 2022.

Laboratory tests were performed, and a radiograph of the right knee and magnetic resonance imaging (MRI) of the right knee and shoulder were obtained. The radiograph showed obliteration of the suprapatellar fat pad, suggesting a synovial reaction (Figure 1). Knee MRI showed marked joint effusion, and joint puncture was performed (Figure 2). Fluid



**Figure 1**  
Radiograph of the right knee showing obliteration of the suprapatellar fat pad



**Figure 2**

Magnetic resonance imaging of the right knee showing marked joint effusion

analysis showed 2,240 leukocytes per mm<sup>3</sup>, with 1,366 polymorphonuclear cells per mm<sup>3</sup>. Cultures and bacterioscopy were negative. Shoulder MRI showed effusion of the acromioclavicular and glenohumeral joints.

The patient was tested for COVID-19 using GeneXpert, which was positive, and underwent a transthoracic echocardiogram, which showed absence of vegetation. The patient tested negative for rheumatoid factor (RF), anti-streptolysin O (ASLO), antinuclear antibody, anti-cyclic citrullinated peptide antibody (anti-CCP), venereal disease research laboratory test, HIV serology, anti-hepatitis C virus, anti-hepatitis A virus, and hepatitis B surface antigen. Regarding inflammatory markers, there were increased levels of C-reactive protein (8.2 mg/dL) and a high erythrocyte sedimentation rate (41 mm). Laboratory tests showed leukocytosis (10,390/ $\mu$ L) with neutrophilia (7,865/ $\mu$ L), but normal levels of lymphocytes (1,870/ $\mu$ L) and basophils (0/ $\mu$ L). Red blood cell numbers were also normal.

The patient significantly improved after 5 days of treatment with nonsteroidal anti-inflammatory drugs (NSAIDs), rest, and cold compresses. This clinical presentation was compatible with post-viral reactive arthritis.

### Discussion

Septic arthritis is an infection of the synovial fluid caused by pyogenic bacteria.<sup>6</sup> The microorganism directly invades the joint and can be identified through joint aspiration for synovial fluid analysis. In the case presented in this report, synovial fluid cultures were

negative for bacteria and fungi. Laboratory tests for syphilis, HIV, and hepatitis were also negative, which ruled out the possibility of a sexually transmitted infection. In this context, considering that the patient responded to conservative treatment, the possibility of septic arthritis was also ruled out.

Rheumatoid arthritis (RA) is another known cause of joint inflammation, but several aspects make this diagnosis less likely. The patient had no previous history of joint swelling, and serological tests for RF and anti-CCP were both negative. In addition, the most frequently affected joints in RA are the peripheral synovial joints, such as the metacarpal and metatarsophalangeal joints, followed by the ankles and wrists<sup>7</sup>, which were not verified in this case.

Rheumatic fever, in which arthritis is a common manifestation that classically evolves in an asymmetric and migratory way<sup>8</sup>, was also considered. However, the ASLO test was negative, and the transthoracic echocardiogram showed absence of vegetation, thereby ruling out the hypothesis of rheumatic fever.

Postinfectious arthritis or reactive arthritis can be defined as sterile arthritis after an infectious condition<sup>9</sup>, in which an exacerbated immune response seems to be involved in the pathophysiology of the disease.<sup>10</sup> Some studies, although few, have investigated the role of SARS-CoV-2 in acute and chronic arthritis and pointed out similarities between the immune mechanism triggering COVID-19-related arthritis and the pathogenic mechanism of reactive arthritis<sup>11-13</sup>, corroborating our hypothesis.

In the present case, the diagnosis of reactive arthritis after COVID-19 infection was considered. Reactive arthritis is typically described as monoarticular or oligoarticular involvement of large joints of the lower limbs after urogenital or gastrointestinal infections.<sup>14</sup> However, it can also occur atypically in other infections.<sup>15</sup> In this case, the characteristics of the affected joints met the diagnostic criteria for reactive arthritis. It should be noted that approximately 50% of patients with reactive arthritis may also have arthritis in the upper limbs, a condition also presented by the patient in question.<sup>16</sup> In addition, the patient had leukocytosis with neutrophilia, increased CRP levels, and negative bacterioscopy and synovial fluid cultures, which also support the diagnosis of postinfectious arthritis.

Treatment for reactive arthritis was started on the first day of hospitalization with the NSAID ketoprofen 50 mg orally twice a day. The patient showed clinical

improvement and, after 5 days, was fully recovered and able to walk again. She was discharged from hospital with orientation to attend physical therapy sessions. One month after discharge, the patient attended an outpatient consult showing full recovery of joint mobility.

Given the limited number of publications on the subject and the patient's clinical condition, the positive molecular test for COVID-19, the negative synovial fluid cultures for bacteria and fungi, the negative serological results for autoimmune markers, and the absence of other possible diagnoses, reactive arthritis after infection with SARS-CoV-2 was considered as a diagnosis of exclusion.

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