



## CASE REPORT

# COVID-19 with baricitinib-induced symptomatic creatinine kinase elevation

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**Learning points for clinicians**

Creatinine kinase elevation should be suspected if a patient receiving baricitinib for coronavirus disease 2019 infection complains of myalgia during treatment, and the drug should be discontinued immediately.

A 56-year-old man with a history of idiopathic pulmonary fibrosis came in close contact with a coronavirus disease 2019 (COVID-19) positive case, and his polymerase chain reaction test confirmed COVID-19 infection. Due to his medical history, he was at high risk of severe disease and was admitted to our hospital.

On admission, his blood pressure, heart rate, peripheral arterial oxygen saturation (O<sub>2</sub> supply by nasal prongs at 2l/min), respiratory rate and body temperature were 160/102 mmHg, 86 beats/min, 98%, 30 breaths/min and 37.7°C, respectively. Breath sounds could not be heard during the physical examination due to infection control measures. There was no cyanosis and edema in the extremities. The blood tests revealed white blood cell count, 6900/μl with 1300/μl lymphocytes; prothrombin time, 40.3 s; D-dimer, <0.5 μg/ml; aspartate aminotransferase, 47 U/l; creatinine, 0.71 mg/dl; creatinine kinase (CK), 70 U/l; lactate dehydrogenase, 272 U/l; procalcitonin, 0.03 ng/ml; Krebs von den Lungen-6, 2242 U/ml; and ferritin, 899 ng/ml. Chest radiographs showed no new ground-glass opacity or consolidation. However, chest computed tomography (CT) revealed thickening of the bronchial walls and new consolidation in both the lung bases and the right upper lobe.

Based on the chest CT findings and the presence of fever, we diagnosed the patient with COVID-19-related pneumonia. The patient was administered dexamethasone in addition to remdesivir for 10 days upon admission because of pneumonia and increased oxygen demand. Furthermore, due to the high risk of severe disease, we commenced concomitant baricitinib administration on the third day of admission. Thereafter, respiratory symptoms, fever and oxygen demand improved with no relapse.

On the 12th day of admission, the patient complained of pain in both shoulders and the neck, and tenderness was noted. On the 16th day of admission, the CK level was found to be markedly elevated at 4595 mg/dl. This was suspected to be due to baricitinib, which was discontinued the same day. Thereafter, the CK levels gradually decreased and were normalized on the 27th day of admission. With a decrease in CK, myalgia also resolved (Figure 1).

Although CK elevation with Janus kinase inhibitors, such as baricitinib, has been reported, symptomatic cases are uncommon. There have been few reports of symptomatic CK elevation with baricitinib; Anjara et al.<sup>1</sup> reported the first case in rheumatoid arthritis patients. Others have reported that tofacitinib causes symptomatic CK elevations in patients with ulcerative colitis.<sup>2</sup> This is the first report in a patient with COVID-19 infection.

In such cases, it is important to consider the cause of CK elevation. Following hospitalization, the patient was administered with remdesivir and dexamethasone. There have been no reports of CK elevation due to remdesivir. The clinical diversity of steroid-induced myopathy, particularly early-onset

Submitted: 4 January 2022

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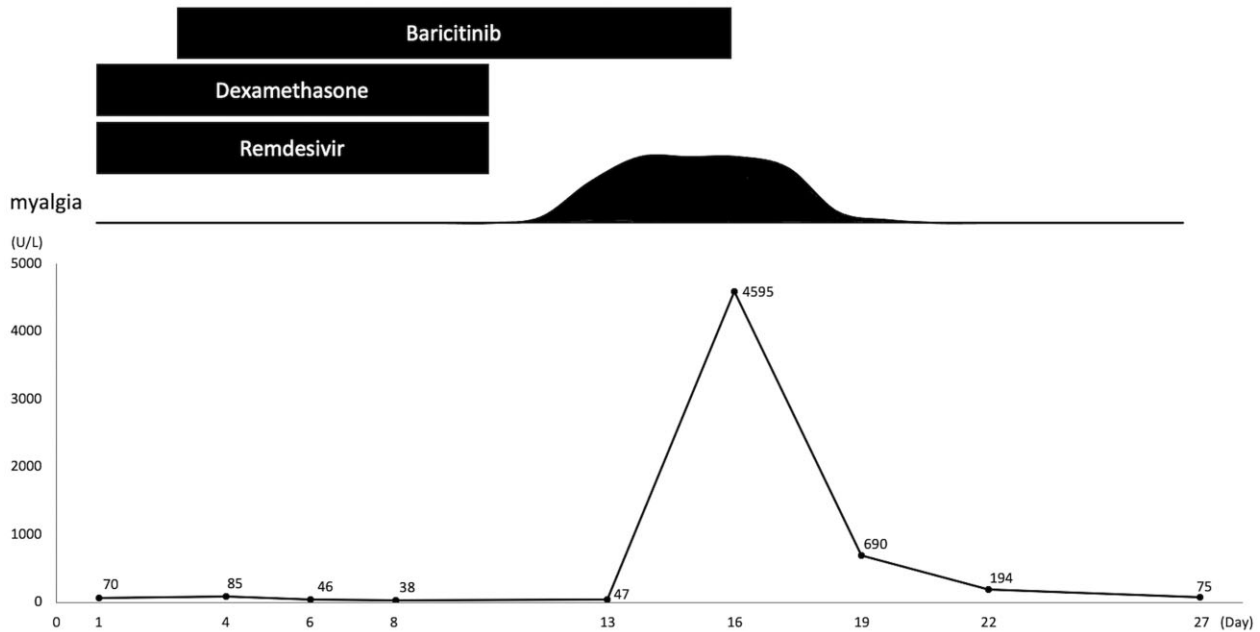


Figure 1. Changes in myalgia and creatine kinase during admission.

myopathy, is so great that their involvement cannot be completely ruled out. However, the fact that myalgia began after dexamethasone was stopped, and CK levels quickly dropped after baricitinib administration was discontinued is inconsistent with previous reports of early-onset myopathy.<sup>3</sup> CK elevation can also be caused by COVID-19 infection. In a cohort study conducted in China,<sup>4</sup> 13% patients had elevated CK levels while undergoing COVID-19 treatment. Another cohort study<sup>5</sup> discovered that CK elevation caused by COVID-19 infection peaked 8–12 days after viral exposure, with a peak value of 279.3 U/l. In the present case, viral exposure was estimated to be 3 days prior to hospitalization; hence, the possibility of CK elevation due to COVID-19 infection is low.

According to the findings of this study, CK elevation should be suspected if a patient complains of myalgia while receiving baricitinib for COVID-19 infection, and the drug should be discontinued immediately.

Conflict of interest. None declared.

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