



# COVID-19 Related Myositis in a Patient Recently Diagnosed with Pre B Cell Acute Lymphoblastic Leukemia

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## Abstract

Myositis is not a common finding in patients diagnosed with COVID-19. Up to now, a few cases of COVID-19 associated with myositis have been reported.

A 26-year-old man was referred to the hematology clinic due to leukocytosis and bicytopenia in his lab tests. The patient had no symptoms at the visit session. Following the evaluation, he was hospitalized with the diagnosis of pre-B cell Acute Lymphoblastic Leukemia (ALL) and was considered a chemotherapy regimen consisting of vincristine, methotrexate, cytarabine, and prednisolone. Prior to initiating the treatment, he was diagnosed with COVID-19 with manifestations of fever and dyspnea on the 20th day of hospitalization. The positive Polymerase Chain Reaction (PCR) test confirmed the diagnosis. On the 8th day of COVID-19 related clinical and paraclinical manifestations, the patient was complaining about a vague severe pain in the pelvic region predominantly around his hips. A pelvic MRI was performed to rule out critical etiologies and perimuscular and intramuscular edema was revealed. Creatine Phosphokinase (CPK) and Lactate Dehydrogenase (LDH) were elevated in the lab tests. His pain was diminished in few days spontaneously and diagnosis of myositis was confirmed.

Myositis can be one of the extra-pulmonary manifestations of COVID-19. Therefore, finding out the association between myositis and COVID-19 can be beneficial for the early diagnosis and prevention of misleading.

**Keywords:** Acute lymphoblastic leukemia, COVID 19, Myositis

## Introduction

A Coronavirus disease (COVID-19) is an infectious disease that is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus strain. A broad range of manifestations can be caused by COVID-19 (1). The most common symptoms are fever, dry cough, and tiredness. Less common symptoms include aches and pains, sore throat, diarrhea, conjunctivitis, headache, loss of taste or smell, skin rashes and discoloration of fingers or toes (2-4). Musculoskeletal presentations could also be observed in some patients diagnosed with COVID-19 (5). The symptoms can vary from myalgia to more severe forms like rhabdomyolysis (6). Myositis is not a common finding in patients diagnosed with COVID-19. Up to now, a few cases of COVID-19 linked to myositis have been reported. The exact mechanisms that lead to muscle injury are not recognized yet, but they are supposed to be due to autoimmune reactions (7).

Here we discuss an interesting case of a patient with pre-B cell ALL who was diagnosed with COVID-19 on the 20th day of hospitalization presenting with myositis due to COVID-19.

## Case presentation

A 26-year-old man was referred to the hematology clinic of a tertiary hospital since leukocytosis and bicytopenia

were detected in the lab tests (Table 1). The patient had no symptoms at the visit session. In the clinical examination, mild splenomegaly was evident while there was no sign of lymphadenopathy. Bone Marrow Aspiration and Biopsy (BM A/B) were conducted and represented 15% blast cells. Other diagnostic tests that comprised cytology, Cerebrospinal Fluid (CSF), and BCR-ABL analyses indicated no abnormality. Finally, the patient was diagnosed as pre-B cell ALL and considered a chemotherapy regimen consisting of vincristine, methotrexate, cytarabine, and prednisolone. Additionally, due to the impaired Liver Function Tests (LFT), hepatitis viral markers were checked for the patient and positive anti-HBc immunoglobulin M was detected.

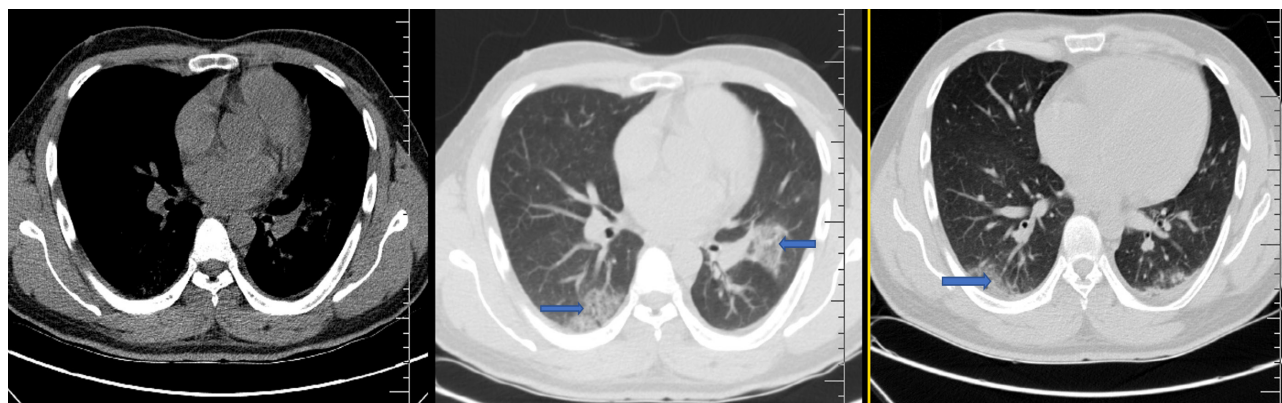
Prior to any therapeutic processes, on the 20th day of hospitalization, the patient manifested fever and dyspnea. Spiral chest CT scan exhibited bilateral ground-glass opacities highly suggestive of COVID-19 (Figure1). The positive Polymerase Chain Reaction (PCR) test confirmed the diagnosis.

The patient was admitted to the COVID-19 ward and received standard doses of tenofovir (300 mg daily), ciprofloxacin (750 mg daily), and cotrimoxazole (480 mg daily).

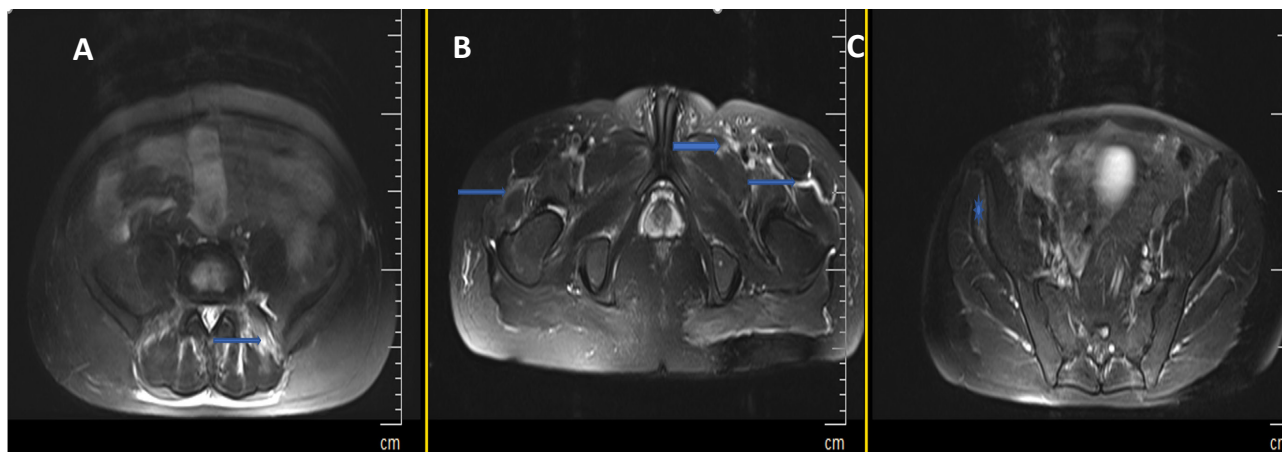
On the 8th day of COVID19, our patient experienced a vague pain in the pelvic region more along his hips and was suspected for a critical process as Avascular

**Table 1.** Laboratory test

WBC $10^3/\mu\text{L}$	16400	AST	45	CPK	330
Hb—g/dl	5/2	ALT	48	LDH	718
Plt-- $10^9/\text{L}$	43000	ALP	145	ESR	115



**Figure 1.** Chest CT scan shows ground glass patches (arrows) in both lungs suggestive of COVID19.



**Figure 2.** MRI of the pelvis shows perimuscular edema in pelvic muscles (iliocostal muscles: arrow in A, bilateral vastus lateralis and left pectineus muscles: arrows in B) and intramuscular edema in Gluteus minimus (\*inC).

Necrosis (AVN) or arthritis. A pelvic MRI was performed for the patient. Interestingly, MRI imaging represented prominent perimuscular and intramuscular fluid and edema along with bilateral iliopsoas, paraspinal, vastus lateralis, rectus femoris, sartorius adductor muscles, and external obturator muscle with intramuscular edema along with the bilateral gluteus minimus muscles (Figure 2).

No obvious collection or evidence of arthritis was observed. CPK and LDH were mildly elevated. These radiologic features along with clinical manifestations suggested myositis/fasciitis secondary to infectious process (more likely COVID19- related). However, underlying disease or less drug-related side effects were in the differential diagnosis. The patient was spontaneously relieved from the pain in a few days without any additional treatment and transferred with the stable general condition to the hematology ward, thus post-infectious myositis was the most probability.

## Discussion

COVID-19 can lead to musculoskeletal symptoms including myalgia, arthralgia, and fatigue (7). According to the study conducted by Lechien *et al*, myalgia has been reported in more than half of the patients and arthralgia in 31% of the patients (8). So far, a few cases of myositis, associated with COVID-19, have been reported. But there are no accurate statistics on the prevalence of myositis in patients diagnosed with COVID-19 (7).

Etiologies like infection, genetics, autoimmune

mechanisms, endocrinopathies, and electrolyte imbalances can result in myositis (9). Patients with myositis experience more severe pain than myalgia. Myositis may uncommonly lead to rhabdomyolysis and subsequent renal failure. Myositis is a common finding in viral infections, especially influenza A and B. Other viruses including enteroviruses, human immunodeficiency virus, human T-cell leukemia-lymphoma virus, and hepatitis viruses (B and C) can also cause myositis but they are less common (3). Myositis can either be caused by a direct invasion of the virus or immune mechanisms (10).

Muscle enzymes usually increase during myositis (11-14). Findings may be observed on the electromyogram suggestive of myositis. A biopsy is not necessary to diagnose myositis and the diagnosis of myositis is based on clinical findings (6,15) Findings seen on the electromyogram can be suggestive of myositis. A biopsy is not necessary to diagnose myositis and the diagnosis of myositis is based on clinical findings (16). In this study, the patient diagnosed with COVID19 experienced a vague pain in the pelvic region. We conducted MRI for the patient to rule out musculoskeletal problems. Incredibly, no bone involvements were found in MRI. We observed edematous changes compatible with myositis in the patient's MRI.

## Conclusion

Myositis can be one of the extra-pulmonary manifestations of COVID-19. Therefore, knowing the association between myositis and COVID-19 can

be beneficial for the early diagnosis and probable better prognosis of the disease. In the future, exact mechanisms of myositis and its true prevalence may be determined.

#### **Ethics approval & consent to participate & consent for publication**

The patient in this case report signed informed consent. The context of the consent forms were included that the clinical information and images would be reported in a journal without mentioning his/her name.

#### **Availability of data and material & Code availability**

Not applicable

#### **Conflicts of Interest**

The authors declare no conflicts of interest.

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