



# Paraspinal myositis and COVID-19, a case report

*Miositis paraespinal y COVID-19, reporte de caso*

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**ABSTRACT.** Viral myositis is characterized by the presence of fever, anorexia, myalgia, and muscle weakness. Few reports have described paraspinal myositis and myositis complicated with rhabdomyolysis as a manifestation of SARS-CoV-2 infection in adults. We present the case of a patient who developed paraspinal myositis secondary to COVID-19, confirmed by magnetic resonance imaging, characterized by intramuscular edema in paravertebral muscles. COVID-19 severe immune reaction and subsequent cytokine storm activation might play an important physiological role in muscle damage. Hence, in this pandemic, clinicians should consider COVID-19 myositis or rhabdomyolysis as a differential diagnosis in patients with focal muscle pain and fatigue.

**Keywords:** SARS-CoV-2, COVID-19, myositis, rhabdomyolysis, myalgia.

**RESUMEN.** La miositis viral se caracteriza por la presencia de fiebre, anorexia, mialgia y debilidad muscular. Pocos informes han descrito la miositis paraespinal y la miositis complicada con rabdomiolisis como manifestación de la infección por SARS-CoV-2 en adultos. Presentamos el caso de una paciente que desarrolló una miositis paraespinal secundaria a COVID-19, confirmada por resonancia magnética, caracterizada por un edema intramuscular en los músculos paravertebrales. La grave reacción inmunitaria de la COVID-19 y la posterior activación de la tormenta de citoquinas podrían desempeñar un importante papel fisiológico en el daño muscular. Por lo tanto, en esta pandemia, los clínicos deberían considerar la miositis o la rabdomiolisis como diagnóstico diferencial en pacientes con dolor muscular focal y fatiga.

**Palabras clave:** SARS-CoV-2, COVID-19, miositis, rabdomiolisis, mialgia.

## INTRODUCTION

Viral myositis is characterized by fever, anorexia, myalgia, and muscle weakness, most frequently localized in the back and lower extremities, following an upper respiratory tract infection. Although the most frequently associated agents are Influenza A and B and enterovirus,<sup>1</sup> it has been observed that the SARS-CoV-2 virus can also be a potential cause of paraspinal myositis in adult patients.<sup>2</sup> In this report, we present the case of a patient who developed paraspinal myositis secondary to COVID-19, confirmed by magnetic resonance imaging.

## CLINICAL CASE

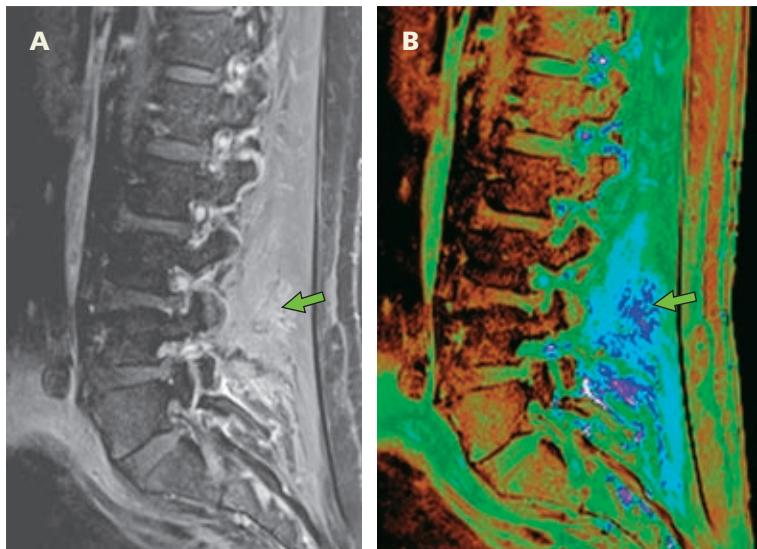
A 71-year-old male with a history of diabetes, hypertension, and chronic heart failure with reduced ejection fraction (LVEF 32%) was admitted to our hospital with worsening respiratory distress and oxygen saturation of 88%. Chest X-ray revealed interstitial infiltrate with a diffuse distribution in both hemithorax with ground-glass opacity presumably consistent with COVID-19. Remarkable laboratory findings at his admission were DHL 387 U/L, D-dimer 524 µg/mL, CRP 274 mg/L, NT proBNP 2,484. A positive RT-PCR test for SARS-CoV-2 was obtained.

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On day 22 of hospitalization, proximal muscle weakness and pain in lower extremities without CK elevation were disclosed. A



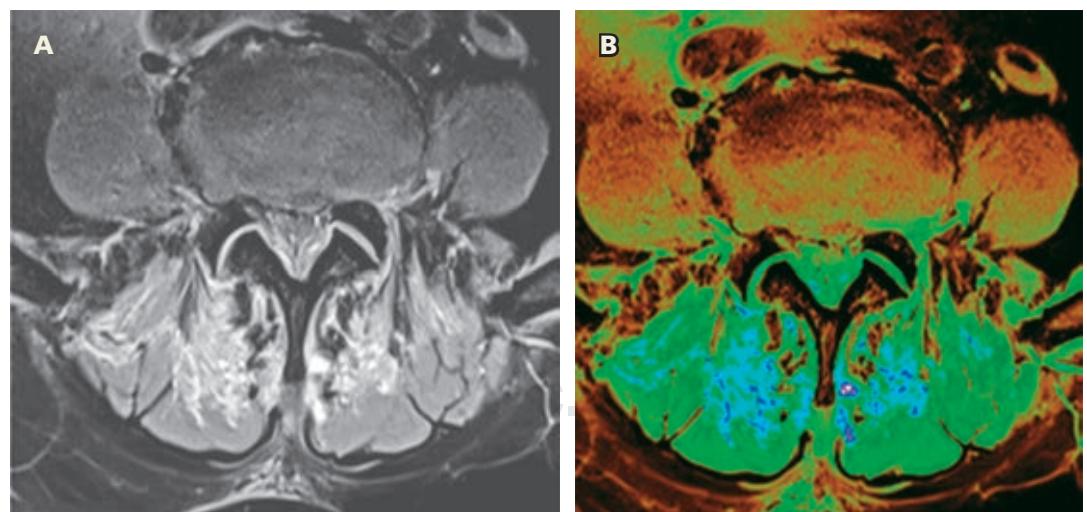
**Figure 1:** 71-year-old man with SARS-CoV-2. **A)** Fat-suppressed contrast enhanced T1-weighted sagittal MR image and **B)** color map, shows diffusely increased signal in paravertebral muscles of lumbosacral region at level to L3-L5 (green arrow), predominantly in rotators lumbar muscles, multifidus, lumbar iliocostals as well as, the lower insertion of longissimus thoracis muscle of bilateral form, suggesting acute myositis.

contrasted MRI reported L4-L5 and L5-S1 discs herniation and edema in the medullary canal, compatible with acute myositis in paravertebral muscles (*Figures 1 and 2*). Prednisone 20 mg and Pregabalin 150 mg were prescribed. Three days later, the patient was discharged without further complications.

## DISCUSSION

Among muscular COVID-related manifestations, myalgia, muscle weakness, and elevated alkaline phosphatase<sup>3</sup> are the most commonly found in adult patients. Myalgia prevalence was established to be between 35.86 and 50%,<sup>2</sup> while muscle weakness accounted for up to 30%. This muscular pain is usually symmetrical and involves trunk, proximal extremities, and neck muscles, persisting for up to 23 days after viral elimination.<sup>4</sup>

Besides the underlying SARS-CoV-2 pathogenic mechanism in muscular damage remains unclear, it has been hypothesized that skeletal muscle ACE-2 receptors and cytokine storm are involved. Viral infection induces immune T cells activation and clonal expansion, generating macrophage-mediated auto invasion of muscle fibers with abundant proinflammatory cytokines



**Figure 2:** 71-year-old man with SARS-CoV-2. **A)** Fat-suppressed contrast enhanced T1-weighted axial MR image and **B)** color map, shows a reliable increase in the volumen and size of the intrinsic muscles of the lumbosacral region. Also, asymmetric bulging of the intervertebral disc can be observed.

in turn.<sup>1</sup> Nevertheless, no direct muscle infection has been demonstrated.<sup>1,5</sup> Thus, it is still unknown whether the mechanism of muscle necrosis and nerve tissue damage is due to direct viral infection, myotoxic immunological damage induced by cytokine release, or secondary to metabolic and systemic complications in view of a worsened underlying chronic disease.<sup>6,7</sup>

The present case is consistent with those reported by Mehan et al., where seven out of nine patients with COVID-19 presented intramuscular edema and myositis in MRI located bilaterally in the lumbar spine. In addition, the absence of spinal trauma discarded critical illness myopathy,<sup>2</sup> raising SARS-CoV-2 related viral myocarditis feasibility.

In this regard, pathological studies found a variable degree of focal necrosis on postmortem myofibrils without evidence of viral particles during the SARS pandemic in 2002,<sup>8</sup> suggesting that the most important physiological role of muscle damage is mediated by severe immune reaction and cytokine storm activation, which is recognized to occur in COVID-19.<sup>6,9</sup>

In conclusion, SARS-CoV-2 induced myocarditis and rhabdomyolysis should be considered a feasible differential diagnosis in those patients who present with focal muscle pain and fatigue,<sup>10</sup> as well as any patient with myositis or encephalomyelitis, an acute paralytic illness resembling Guillain-Barré syndrome, even in the absence of respiratory or systemic symptoms.<sup>1</sup> Still, due to COVID-19 novelty, studies are needed to elucidate the underlying viral pathogenesis and disease progression to tailor patient-targeted strategies for its diagnosis and management.

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## Ethical disclosures

Protection of human and animal subjects:

The authors declare that no experiments were performed on humans or animals for this study.

**Confidentiality of data:** The authors declare that they have followed the protocols of their work center on the publication of patient data.

**Right to privacy and informed consent:** The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

## Declarations

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