

CLINICAL PICTURE

COVID-19 vaccine-related myositis

A 56-year-old non-diabetic woman with no evidence of prior SARS-CoV-2 infection presented with profound left upper arm pain, soreness and curtailed movement. Because of disabling pain she could hardly carry her handbag. The patient reported no unaccustomed or vigorous exercise or heavy manual labor prior to the onset of symptoms. Pain had developed 8 days after a second dose of COVID-19 vaccine into her deltoid muscle and produced decreased range of motion and progressive weakness. She had no systemic symptoms as malaise and fever. Upon physical examination, there were no signs of skin erythema or swelling. There was tenderness over the deltoid muscle, guarding and decreased abduction of the shoulder and arm. Serologic testing yielded increased serum creatine kinase concentration suggesting skeletal muscle damage. Urine analysis excluded myoglobinuria. At MRI for investigation of muscle pain and dysfunction, middle head of the deltoid muscle appeared severely edematous, with no apparent tearing or abscess (Figure 1a). Deltoid muscle architecture was preserved and edema appeared to track along the muscle fascicles. On contrast-enhanced MR images, affected muscle exhibited prominent enhancement indicating inflammation (myositis) (Figure 1b). Management consisted of rest, cryotherapy, compression and NSAIDs to decrease subjective pain. Symptoms resolved over the course of 6 weeks with no residual loss of function. Interestingly, MR findings persisted almost 2 months past resolution of symptoms.

With intramuscular vaccination, muscle is exposed to modified contaminant agents through direct inoculation, which elicit an immune response to the injected antigen. When present, induced muscle toxicity may relate to the inciting agent, its components and the host's immune or inflammatory response.^{1–3} Although in our attempt to eliminate needle myopathy⁴ in our patient, we performed no muscle biopsy, the temporal link between symptoms and vaccination procedure, coupled with reversible toxicity suggests diagnosis of COVID-19 vaccine-associated myopathy as the cause of symptoms. We presume that in addition to minor muscle injury at the site of injection, toxic myopathy may indeed comprise the underlying cause for reported pain⁵ of a variable severity at the vaccination site. Although similar to the COVID-19 infection itself the exact mechanism⁶ causing damage to the injected muscle is not known, it is worth reporting our observation of myositis

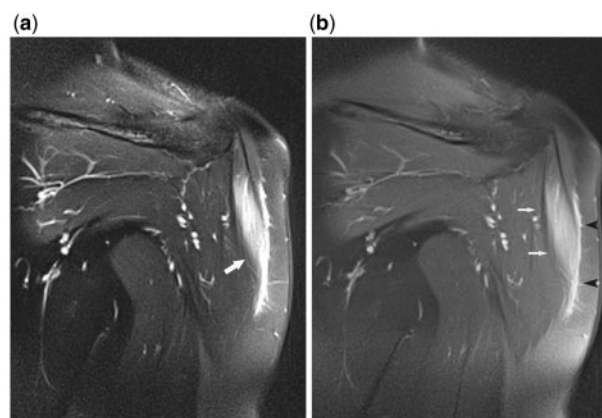


Figure 1. MR images in a 56-year-old woman with COVID-19 vaccine-related painful myopathy. (a) Coronal T2-weighted MR image with fat saturation shows diffuse edema infiltrating the deltoid muscle (arrows), as well as adjacent per fascial fluid (arrowheads). (b) Coronal T1-weighted MR image with fat saturation after gadolinium administration reveals intense focal enhancement of affected deltoid muscle (arrow).

suggesting a causal relationship to the novel, modified mRNA COVID-19 vaccine-adverse event, myalgia.

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References

1. Theodorou DJ, Theodorou SJ, Kakitsubata Y. Skeletal muscle disease: patterns of MRI appearances. *Br J Radiol* 2012; **85**: e1298–1308. 10.1259/bjr/14063641

2. Dalakas MC. Peripheral neuropathy and antiretroviral drugs. *J Peripher Nerv Syst* 2001; **6**:14–20. 10.1046/j.1529-8027.2001.006001014.x.
3. Valiyil R, Christopher-Stine L. Drug-related myopathies of which the clinician should be aware. *Curr Rheumatol Rep* 2010; **12**:213–20. 10.1007/s11926-010-0104-
4. Dalakas MC. Toxic and drug-induced myopathies. *J Neurol Neurosurg Psychiatry* 2009; **80**:832–8. 10.1136/jnnp.2008.168294
5. Fact Sheet for Healthcare Providers Administering Vaccine. *Emergency Use Authorization (EUA) of the Pfizer-Biontech COVID-19 Vaccine to Prevent Coronavirus Disease 2019 (COVID-19)*. New York, NY, Pfizer Inc; Mainz, Germany, BioNTech Manufacturing GmbH, 2020.
6. Paliwal VK, Garg RK, Gupta A, Tejan N. Neuromuscular presentations in patients with COVID-19. *Neurol Sci* 2020; **41**:3039–56. 10.1007/s10072-020-04708-8