

Parsonage–Turner Syndrome Following COVID-19 Vaccine

A 30-year-old male received the first dose of the Covishield 19 vaccine (recombinant, replication-deficient chimpanzee adenovirus vector encoding the SARS-CoV-2 spike 10 glycoprotein; AstraZeneca) *via* intramuscular injection in his left arm on July 8, 2021. After one hour of injection, he started to develop pain (Numerical rating scale-NRS rating 4) at the injection site, which radiated from the scapular region to all

of the fingers. The pain gradually increased in intensity for approximately 7 days (NRC rating 8).

The patient took non-steroidal anti-inflammatory drugs (NSAIDS) medications by himself and applied cold compression over the arm, which bought him some relief. He experienced a decrease in the power of the left scapular muscles

after almost 3 weeks. Over the next 3 months, muscle bulk was gradually lost in the left scapular region. These complaints did not lead him to a hospital visit. He received the second dose on October 13, 2021, which was uneventful. He visited our hospital 1 week after receiving the second dose and complained of reduced muscle strength in his left upper limb.

On clinical examination, there was a decreased muscle mass in the left scapular region. Sensory examinations, including pain and temperature, were normal. There was a mild reduction in the touch sensation on the lateral aspect of the left forearm. The power in shoulder abduction was 3/5, elbow flexion/extension was 3/5, but finger flexion/extension was 5/5. A decrease was observed in deep tendon reflexes in the deltoid, biceps brachialis, and brachioradialis, with values of 2/5, 3/5, and 3/5, respectively. Motor and sensory examinations on the right upper limb were normal. Further evaluation, including a plain radiograph of the shoulder and magnetic resonance imaging (MRI) of the cervical spine, brachial plexus, and shoulder joint, indicated no abnormalities either in the cord [Figure 1a] or brachial plexus [Figure 1b].

The left supraspinatus, infraspinatus, and teres major muscles exhibited edematous changes and atrophy [Figure 2a–d]. On electromyography (EMG), there was no insertional or spontaneous activity, a large unit motor action potential, and reduced interference together with the distribution of the suprascapular nerve. The sensory nerve studies showed decreased amplitude and nerve conduction velocities in the anterior interosseous and lateral antebrachial cutaneous nerve. Based on the clinical findings, electromyography (EMG), nerve conduction velocities (NCV) study, and MRI findings, Parsonage–Turner syndrome (PTS) was diagnosed. Physical therapy was recommended for the patient to regain muscle strength and range of motion.

DISCUSSION

PTS is a rare neurological disorder characterized by rapid onset of neurotic pain in the upper extremity followed by muscle weakness and wasting. It mostly affects the brachial plexus and the muscles supplied by it. There are various associations

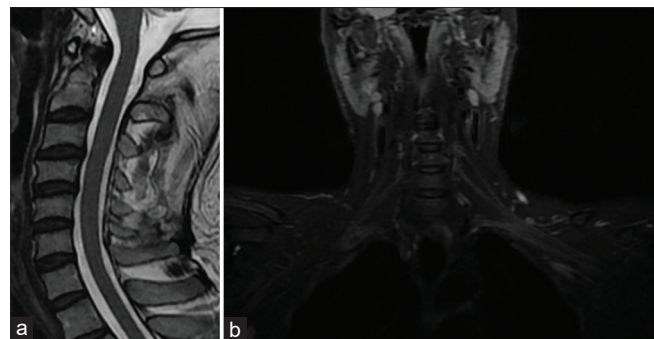


Figure 1: (a) Sagittal image from MRI of the cervical spine showing no significant disc herniation or cord compression. (b) Coronal image from brachial plexus neurography showing grossly normal signals in the brachial plexus, without any obvious neuropathy

of PTS ranging from idiopathic infections to vaccinations. Most commonly, it is associated with tetanus vaccination, but COVID-19, human papillomavirus, influenza, shingles, and tick-borne encephalitis vaccines may also lead to its development.^[1] However, the onset of PTS after COVID-19 vaccination is a rare occurrence. This is highly unusual for our patient to develop symptoms on the same day of receiving the COVID-19 vaccination. The literature has rarely reported the onset of symptoms on the same day as vaccination.^[1] Although there is no proven theory for this unusual phenomenon, the possible hypotheses include the following: (1) the pain experienced by the patient on the day of vaccination may be due to the injection or due to the onset of brachial neuropathy, which is likely due to an asymptomatic COVID-19 infection in the past that went unnoticed and the immunological response to the first vaccination was triggered, resulting in hyperacute pain, (2) the temporal association between the events which indicates that vaccination may have acted as a trigger for such patients, or (3) immune-mediated mechanisms such as molecular mimicry and bystander activation triggered by infection or vaccination. The mRNA vaccines activate type I interferon responses that induce inflammation and are related to an increased risk of autoimmune reactions. (4) Perhaps, although unlikely, the onset of pain on the same day could be because the injection was given close to the nerve/intra-neural injection.

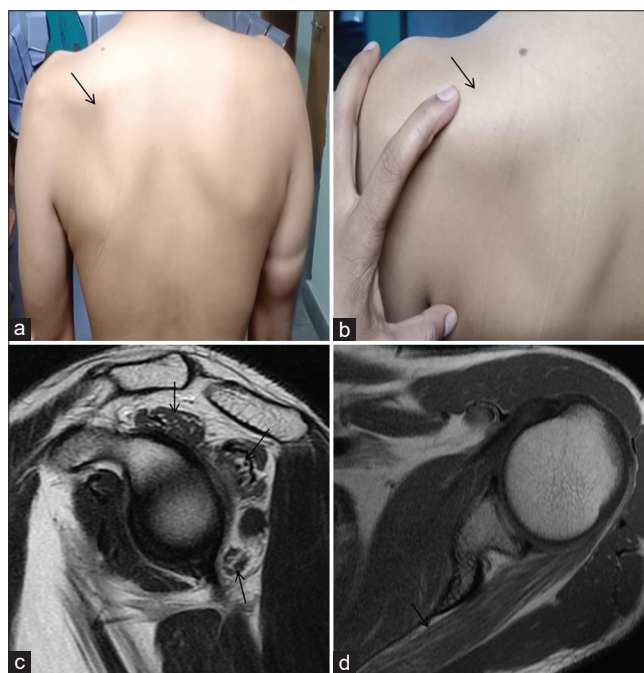


Figure 2: (a and b) clinical images showing loss of muscle bulk over the left scapular region resulting in depression over the left shoulder region (black arrow) as compared to the right side. (c) MRI of the left shoulder joint; T2 weighted images, sagittal section demonstrating muscle atrophy of the supraspinatus, infraspinatus, and teres major muscles (consecutive superior to inferior black arrows) in the form of sparsely placed muscle fibers with increased intramuscular fat signal intensity. (d) MRI of the left shoulder joint; T1 weighted axial section demonstrating atrophy of the infraspinatus muscle (black arrow)

The patient presents with persistent excruciating pain extending from the shoulder joint or scapular region or neck to the axilla, arm, forearm, or hand, with gradual onset of muscle weakness and atrophy within 2–5 weeks.^[2] These symptoms can simulate other conditions such as rotator cuff pathology or cervical radiculopathy. Magnetic resonance neurography has an essential role as it beautifully illustrates the entire brachial plexus and the muscles innervated by it. This modality can be used to diagnose both traumatic and non-traumatic pathologies of peripheral nerves, including those in the brachial plexus, due to its excellent soft-tissue contrast. In the acute phase, the affected nerve fibers appear thickened and show hyperintense signals on T2 and STIR sequences; however, it may normalize in subacute or chronic phases. EMG and NCV may show changes in acute denervation in the brachial plexus distribution. Based on the previous reports, the most common EMG abnormalities of PTS are in the distribution of the suprascapular nerve, which is a branch of the superior trunk of the brachial plexus^[3] These findings are in line with ours, in which the supraspinatus and infraspinatus muscles, which are innervated by the suprascapular nerve, were most commonly involved. According to a case report, PTS cases increased during the first 6 months of 2021, which was later found to be related to COVID-19 vaccination.^[4] Whereas the current literature shows cases from Italy and the United States, this manuscript illustrates one of the few, if not the first, reports of PTS following COVID-19 vaccination in India. Therefore, practitioners in India should consider post-COVID-19 vaccination sequelae when dealing with cases of brachial neuritis.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other

clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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REFERENCES

1. Queler SC, Towbin AJ, Milani C, Whang J, Sneag DB. Parsonage-Turner syndrome following COVID-19 vaccination. *MR Neurography. Radiology* 2022;302:84-7.
2. van Alfen N, van Engelen BG. The clinical spectrum of neuralgic amyotrophy in 246 cases. *Brain* 2006;129:438-50.
3. Beghi E, Kurland LT, Mulder DW, Nicolosi A. Brachial plexus neuropathy in the population of Rochester, Minnesota, 1970–1981. *Ann Neurol* 1985;18:320-3.
4. Shields LB, Iyer VG, Zhang YP, Burger JT, Shields CB. Parsonage-Turner syndrome following COVID-19 vaccination: Clinical and electromyographic findings in 6 patients. *Case Rep Neurol* 2022;14:58-67.

Submitted: 08-Apr-2022 **Revised:** 25-Jun-2022 **Accepted:** 26-Jun-2022

Published: 31-Oct-2022

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DOI: 10.4103/aian.aian_354_22