

Parsonage-Turner Syndrome Following COVID-19 Vaccination: Clinical, Electromyographic Findings and Rehabilitation Approach

COVID-19 Aşılması Sonrası Parsonage-Turner Sendromu: Klinik, Elektromiyografik Bulgular ve Rehabilitasyon Yaklaşımı

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ABSTRACT Parsonage-Turner syndrome (PTS) following coronavirus disease-2019 (COVID-19) infection or vaccination is rare. The pathophysiology may involve an immune-mediated inflammatory reaction against brachial plexus nerve fibers in a genetically predisposed individual. We describe the clinical and electromyographic features of 1 patients presenting with the clinical picture of PTS following COVID-19 vaccination. The patient had received the COVID-19 vaccine within one week prior to the onset of symptoms. Patient underwent detailed neurological examination followed by nerve conduction and electromyography study. The patient attained complete resolution of the arm pain at follow up and had recovery in strength. PTS may occur after the COVID-19 vaccine and should be suspected in patients with symptoms and signs suggestive of acute brachial plexopathy.

Keywords: Parsonage-Turner syndrome; COVID-19 vaccination; neurological events; brachial plexopathy; electromyographic studies

ÖZET Parsonage-Turner sendromu (PTS), koronavirüs hastalığı-2019 [coronavirus disease-2019 (COVID-19)] enfeksiyonu veya aşısını takiben nadir görülen bir durumdur. Patofizyoloji, genetik yatkınlığı olan bireylerde brakial pleksus sinir liflerine karşı bağışıklık aracılı inflammatuar reaksiyonu içerebilir. Bu yazıda, COVID-19 aşısını takiben PTS klinik tablosuyla başvuran bir hastanın klinik ve elektromiyografik özelliklerini tanımlıyoruz. Hastanın semptomları başlamadan bir hafta önce COVID-19 aşısı uygulanmıştı. Hastaya detaylı nörolojik muayene ve ardından sinir iletim ve elektromiyografi çalışması yapıldı. Hastanın takip muayenesinde kol ağrısında tam iyileşme ve kas güçlerinde düzelme sağlandı. PTS, COVID-19 aşısından sonra ortaya çıkabilir ve akut brakial pleksopatiye işaret eden semptom ve bulguları olan hastalarda düşünülmelidir.

Anahtar Kelimeler: Parsonage-Turner sendromu; COVID-19 aşısı; nörolojik olaylar; brakial pleksopati; elektromiyografik çalışma

Parsonage-Turner syndrome (PTS) is a rare condition characterized by the abrupt onset of shoulder pain, followed by progressive motor weakness, dysesthesia, and numbness in the upper extremities. It has an incidence of approximately 1.64 cases per

100,000 individuals.^{1,2} While PTS can affect any peripheral nerve, the upper trunk of the brachial plexus is commonly involved, with nerves such as the axillary nerve, suprascapular nerve, long thoracic nerve, and musculocutaneous nerve frequently affected.³

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Despite its clinical significance, the precise pathophysiology and etiology of PTS remain poorly understood. However, the prevailing theory attributes the condition to an immune-mediated inflammatory response against brachial plexus nerve fibers, particularly in individuals with a genetic predisposition.² Various triggers have been associated with PTS, including prior viral infections, vaccination, surgery, and trauma. Notably, recent immunization has been identified as a risk factor in approximately 15% of PTS cases.³

Here, we present a noteworthy case of PTS in a 51-year-old male patient with no significant past medical or surgical history. The patient reported experiencing acute shoulder and neck pain following vaccination. Informed written consent was obtained from the patient for the purpose of this report.

CASE REPORT

A 51-year-old man, with no history of significant medical conditions or prior trauma, awoke with a sudden onset of pain in both shoulder girdles, chest, and neck, along with difficulty raising his arms. These symptoms emerged seven days after receiving the first dose of the Pfizer-BioNTech (Germany) coronavirus disease-2019 (COVID-19) vaccine, administered in the left deltoid muscle. It is pertinent to note that the symptoms manifested on the same side as the vaccination injection site. Subsequently, the patient sought medical attention at the emergency service, presenting with new-onset, painless left arm weakness, numbness, paresthesias, and limited movement. These symptoms also affected the right arm. The patient denied any recent history of neurologic disorders, allergies, or recent trauma or infections.

Upon evaluation by a neurologist, the patient exhibited weakness in left wrist extension and hypoesthesia in the right deltoid. Cervical spine magnetic resonance imaging (MRI) did not reveal any abnormalities that could explain the motor or sensory deficits. However, brachial plexus MRI indicated “thickening and irregularity” in the lower fiber group of the left brachial plexus, suggestive of plexitis. Subsequent examinations, including lung evaluations and abdominal computed tomography scans, did not iden-

tify any lung lesions or paraneoplastic conditions associated with brachial plexitis. Doppler ultrasound results for the left upper and lower extremities were unremarkable, while right shoulder MRI indicated mild degeneration in the acromioclavicular joint and tendinosis in the supraspinatus tendon.

Following consultation with the neurologist, the patient received vitamin B₁₂ supplementation and acematacin. Additionally, a physical medicine and rehabilitation program was prescribed. However, after ten sessions of treatment, the patient discontinued the program due to a lack of improvement in his symptoms. Subsequently, the patient was referred to a hand surgeon for further evaluation. Electrodiagnostic evaluation revealed an axonal and demyelinating posterior cord lesion of the left brachial plexus, along with a mild partial lesion of the median nerve.

The patient then sought the continuation of the physical therapy and rehabilitation program at our center. During a detailed physical examination, the patient was found to be in good general condition, with vitals within normal limits, and cooperatively oriented to the examination. Muscle strength in the upper extremities was full on the right side and graded as C6, C8, T1 2/5 on the left arm. No systemic pathological findings were detected, and no significant abnormalities were noted during the inspection of the upper extremities. While shoulder range of motion was slightly limited, no restrictions were observed in other shoulder movements. Some hypoesthesia was noted in specific areas, and deep tendon reflexes were symmetrical.

The patient received an additional 20 sessions of physical therapy, and a dynamic and static wrist splint was applied. After the completion of the treatment, comprehensive blood tests were performed under the supervision of the neurologist, and repeated brachial plexus MRI and electromyography (EMG) were carried out, all of which showed normal results. Laboratory investigations, including C-reactive protein, erythrocyte sedimentation rate, creatine kinase, antinuclear antibody, rheumatoid factor, and anti-GM1 ganglioside antibodies, were all negative. Following examination by the hand surgeon, surgical intervention was not recommended, and the patient

was advised to continue the physical therapy and rehabilitation program. The use of a resting splint during the night was suggested, and a follow-up appointment was scheduled for three months later.

DISCUSSION

PTS is a relatively uncommon clinical syndrome characterized by the acute onset of severe shoulder and upper arm pain, typically affecting one side of the body. Alongside pain, patients may present with neurological deficits, such as weakness and sensory abnormalities.⁴ Atypical cases of PTS may lack pain and have limited or no sensory complaints, making it imperative to conduct a detailed and accurate history-taking and physical examination for proper diagnosis.⁵ To confirm the diagnosis and localize the lesion in the brachial plexus, electroneuromyography (ENMG) and brachial plexus MRI are valuable diagnostic tools. ENMG findings become evident approximately three weeks after the onset of symptoms.³

Given the diverse array of presenting symptoms, the differential diagnosis for PTS includes cervical radiculopathy, adhesive capsulitis, rotator cuff or labral tears of the shoulder, glenohumeral osteoarthritis, malignancy, and paraneoplastic syndrome.⁶ Diagnostic imaging, such as X-rays or MRI, can help rule out shoulder-related issues, while cervical MRI, chest X-ray, lung tomography, and abdominal ultrasonography and tomography may be employed to exclude other potential causes.⁷

The exact etiology of PTS remains elusive; however, several triggering risk factors have been identified, including infections (herpes simplex virus, vesicular stomatitis virus, human immunodeficiency virus, Parvovirus, etc.), surgery, orthopedic conditions, vaccination, intense exercise, underlying arthritis, vasculitis, or connective tissue diseases.^{8,9} While the overall incidence of PTS is approximately 1 in 100,000, the incidence of PTS following vaccination is estimated to be low.^{8,9} The exact mechanism by which vaccinations may induce PTS is not fully understood, but it has been hypothesized that viral antigens in the vaccine might trigger the development of the syndrome.¹⁰⁻¹²

This report contributes to the limited data on PTS following COVID-19 vaccination, shedding light on its unique manifestations in the neurological and musculoskeletal systems. Objective findings from physical examinations were corroborated by EMG, nerve conduction studies, and MRI. While PTS typically resolves on its own without the need for surgical intervention, medical management may involve the use of corticosteroids, opioids, nonsteroidal anti-inflammatory drugs, and physical therapy. Long-term prognosis varies, with approximately 70-80% of patients showing improvement in muscle strength after 2-3 years, but around 70% experiencing some degree of residual weakness.^{13,14} In cases where imaging reveals hourglass-like constrictions, surgical treatment may be considered for persistent weakness.¹⁵

Neurological complications following COVID-19 vaccination, though rare, have been reported in some cases. These adverse events can be classified into those affecting the nervous systems. Mild complications, such as headaches, are the most common, typically presenting within the first few hours of vaccination and resolving spontaneously.¹⁶⁻¹⁸ However, more severe neurological events, including Guillain-Barré syndrome, encephalitis, seizures, and cerebrovascular incidents like ischemic stroke and cerebral venous sinus thrombosis, have been observed. Additionally, transverse myelitis, a rare but serious inflammatory condition affecting the spinal cord, has been linked to both mRNA and viral vector vaccines, though the evidence is still inconclusive.¹⁶⁻¹⁸

As of now, only a few case reports and series have been published on PTS as a sequelae of COVID-19 infection or vaccination. Our case adds to the growing body of knowledge on PTS following COVID-19 vaccination, emphasizing the importance of heightened awareness among clinicians for accurate diagnosis, evaluation, management, and prognosis.¹⁰⁻¹²

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or mem-

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