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# Parsonage Turner syndrome after COVID-19 vaccination

## 1 | INTRODUCTION

Parsonage Turner syndrome (PTS, brachial neuritis or neuralgic amyotrophy), is a clinical syndrome typically characterized by acute onset of unilateral severe pain in the shoulder and upper arm, followed by weakness in the proximal mid-arm or distal upper limb, often in the distribution of individual nerves (multiple mononeuropathies).[1,2] Symptoms are commonly preceded by a triggering event, such as infection, surgery, or less commonly, vaccination.[2-4] Initial trials on safety and efficacy of the mRNA derived severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (coronavirus disease 2019 [COVID-19]) BNT162b2 (Pfizer, New York City, NY) vaccination have not reported significant neurological complications.[5] We describe a case report of PTS that developed a few days after administration of this vaccination.

## 2 | CASE REPORT

A 50-y-old healthy male developed sudden onset of severe left periscapular pain 1 wk after receiving the first dose of the COVID-19 BNT162b2 vaccination in the left deltoid muscle. Although pain initially decreased with the use of NSAIDs, pain symptoms flared after receiving the second dose, extending into the forearm and disrupting sleep. One week after the second dose, the patient developed left hand grip and left wrist extension weakness. There were no sensory disturbances or other symptoms. Physical examination showed weakness of left finger extension and left hand grip. Weak muscles included the left dorsal interossei, extensor digitorum, extensor indicis, and flexor carpi ulnaris (Medical Research Council grade 3). Other muscles, including the deltoid and periscapular muscles, had full strength. Muscle stretch reflexes were mildly brisk bilaterally but symmetrical. No sensory deficits, bulbar weakness, or pathological upper motor neuron signs were seen. Nerve conduction studies of the right and left radial, median, and ulnar sensory and motor nerves performed 4 days after onset of weakness were normal and symmetrical. Needle electromyography showed decreased motor unit recruitment in the left first dorsal interosseous, flexor carpi ulnaris, abductor digiti minimi, extensor digitorum, and extensor indicis muscles only.

Blood tests showed negative Herpes simplex 1/2 and Varicella zoster viral immunoglobulin M titers. Erythrocyte sedimentation rate, C-reactive protein, and creatine kinase levels were normal. Serum ANCA, myeloperoxidase, proteinase-3, and anti-GM-1 antibodies were negative. MRI of the cervical spine and left brachial plexus without contrast done immediately after onset of weakness were normal. Treatment with oral prednisone 40 mg/d, was initiated when pain flared after the second vaccine dose. This resulted in significant improvement in pain and slight improvement in hand weakness. Subsequently, steroids were tapered to 5 mg/d over 5 weeks and occupational therapy started to maintain range of motion and facilitate ADLs.

## 3 | DISCUSSION

We describe a case report of PTS following administration of the COVID-19 BNT162b2 vaccine. Our patient's clinical presentation, electrodiagnostic findings of reduced recruitment in related myotomes, and improvement of symptoms after initiation of steroids support the diagnosis of PTS.

The overall incidence of PTS is estimated to be about 1 in 1000.[2,6] The incidence of post vaccination PTS is not known, but is considered to be very rare. For reference, only 18 cases of brachial neuritis following administration of seasonal influenza vaccination were reported in the Vaccine Adverse Effect Reporting System from 2018 to 2020, during which time nearly 350 million vaccinations were administered.[7] With the administration of over 140 million COVID vaccine doses in the US alone, it remains to be seen whether the incidence of COVID-19 vaccine triggered PTS will remain comparable to or rise above the incidence of influenza vaccine associated PTS. It is also important to emphasize that reports thus far of PTS following vaccination have not established causality. Systematically analyzing data from this pandemic for the occurrence of this complication might provide further insight to assess the incidence of PTS triggered by a vaccination.

The global COVID-19 vaccination effort is critical in providing and ensuring public health and safety against the SARS-CoV-2 virus infection. Increased awareness of such associations may encourage further investigation of the pathophysiological impact of immunogenic events on nerve function, and may help prompt early initiation of treatment with steroids and improve clinical outcomes. With increasing administration of the SARS-CoV-2 BNT162b2 vaccination around the globe, it is likely that more patients will present with PTS. Timely recognition and management is recommended.

## CONFLICT OF INTEREST

None of the authors have any conflict of interest to disclose.

## ETHICAL PUBLICATION STATEMENT

The authors confirm that we have read the Journal's position on issues involved in ethical publication and effort them that this report is consistent with those guidelines.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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**Abbreviations**: ADLs, activities of daily living; CDC, Centers for Disease Control and Prevention; EMG, electromyography; NSAIDs, non-steroidal anti-inflammatory drugs; PTS, Parsonage Turner syndrome; VAERS, Vaccine Adverse Event Reporting System.

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## REFERENCES

1. Ferrante MA, Wilbourn AJ. Lesion distribution among 281 patients with sporadic neuralgic amyotrophy. *Muscle Nerve*. 2017;55:858-861. https://doi.org/10.1002/mus.25422.
2. Van Eijk JJ, Groothuis JT, Van Alfen N. Neuralgic amyotrophy: an update on diagnosis, pathophysiology, and treatment. *Muscle Nerve*. 2016;53(3):337-350.
3. Tsairis P, Dyck PJ, Mulder DW. Natural history of brachial plexus neuropathy. Report on 99 patients. *Arch Neurol*. 1972;27(2):109-117. https://doi.org/10.1001/archneur.1972.00490140013004.
4. Siepmann T, Kitzler HH, Lueck C, Platzek I, Reichmann H, Barlinn K. Neuralgic amyotrophy following infection with SARS-CoV-2. *Muscle Nerve*. 2020;62:E68-E70. https://doi.org/10.1002/mus.27035.
5. Polack FP, Thomas SJ, Kitchin N, et al. Safety and efficacy of the BNT162b2 mRNA COVID-19 vaccine. *N Engl J Med*. 2020;383:2603-2615. https://doi.org/10.1056/NEJMoa2034577.
6. Van Alfen N, van Eijk JJ, Ennik T, et al. Incidence of neuralgic amyotrophy (Parsonage Turner syndrome) in a primary care setting—a prospective cohort study. *PLoS One*. 2015;10(5):e0128361. https://doi.org/10.1371/journal.pone.0128361.
7. Vaccine adverse effect reporting system (VAERS). United States Department of Health and Human Services (DHHS), Public Health Service (PHS), Centers for Disease Control (CDC)/Food and Drug Administration (FDA), Vaccine Adverse Reporting System (VAERS) 1990-3/19/2021, CDC Wonder On-line Database. http://wonder.cdc.gov/vaers.html. Accessed March 29, 2021.