Malaysian Family Physician
Official Journal of the Academy of Family Physicians of Malaysia
and Family Medicine Specialist Association of Malaysia

CASE REPORT

Parsonage–Turner syndrome: A case report of a rare side effect of COVID-19 booster vaccination

Zi Yi Yeoh, Siti Nurkamilla Ramdzan

Yeoh ZY, Ramdzan SN. Parsonage–Turner syndrome: A case report of a rare side effect of COVID-19 booster vaccination. *Malays Fam Physician.* 2023;18:21. https://doi.org/10.51866/cr.184

Keywords:
COVID-19 vaccines, Brachial plexus neuritis, Primary healthcare

Authors:

Zi Yi Yeoh
(Corresponding author)
MB ChB (UOO, NZ)
Department of Primary Care Medicine, University Malaya Medical Centre, Lembah Pantai, Kuala Lumpur, Malaysia.
Email: yeohziyi@ummc.edu.my

Siti Nurkamilla Ramdzan
MBBS (UM), MFamMed (UM), PhD (Edin, UK)
Department of Primary Care Medicine, Faculty of Medicine, University Malaya, Kuala Lumpur, Malaysia.

Abstract

The mass vaccination against COVID-19 has saved millions of lives globally. The majority of people experience short-term mild side effects; however, in rare cases, some develop long-term severe adverse events. This case report illustrates the case of a middle-aged man with Parsonage–Turner syndrome, a rare adverse event following COVID-19 immunisation. The patient presented with pain and weakness of the right upper arm for 2 months, which developed 5 days after he received his mRNA COVID-19 booster vaccine. He sought medical attention after 9 weeks of experiencing weakness with obvious muscle wasting. He reported his condition only via a phone application, as he thought that his condition was self-limiting and will improve with time. Herein, we discuss the syndrome and highlight the importance of patient education and early recognition of serious adverse events related to vaccinations in the primary care setting.

Introduction

COVID-19 vaccination is one of the notable advancements in science, which has benefitted billions of people worldwide.[1] As of January 2023, 69% of the world population has received at least one dose of a COVID-19 vaccine; 13 billion doses have been administered globally; and 2 million doses are being administered daily.[2] With the unprecedented rise in the global vaccination rates following the COVID-19 pandemic, primary care physicians are seeing an increasing number of patients with adverse events following immunisations (AEFIs). In a 2021 phone survey of adult primary care patients, 50% reported at least one adverse event post-COVID-19 vaccination.[3] COVID-19 vaccination can cause a range of effects, from mild side effects, such as injection site pain and myalgia, to severe adverse reactions, such as myocarditis and pericarditis. Rare adverse events are usually scarce. However, in the setting of an exponential rise in the global vaccination rates, many more patients may present to primary care settings. Primary care physicians must be able to differentiate mild side effects from rare severe AEFIs. Timely referral for further management of severe AEFIs could improve outcomes. Herein, we report a case of late presentation of Parsonage–Turner syndrome after mRNA COVID-19 vaccination.

Case presentation

The patient was a 50-year-old man who presented to a primary care clinic with right arm pain and weakness persisting for 9 weeks. These symptoms started 5 days after mRNA COVID-19 booster vaccination to his right deltoid as a persistent moderate-to-severe ache over the injection site, radiating to the ipsilateral neck with a pain score of 6/10. Thereafter, he had gradual progressive right shoulder and elbow weakness and occasional right hand paraesthesia.

He reported his symptoms through the National COVID-19 Vaccination Programme's official smartphone application 'MySejahtera' a few times. He sought medical attention only at 9 weeks from symptom onset when the symptoms worsened to a point wherein he needed assistance from his wife and children in performing activities of daily living such as showering and putting on clothing. There were no other symptoms or history of trauma, weight loss, back pain or insect bite.

The patient was previously well without any medical conditions. He completed two doses of an inactivated COVID-19 vaccine 7 months before mRNA COVID-19 booster vaccination. He worked as a local city council officer, had a 20-pack-year smoking history, was married and had four children.

On examination, his right deltoid, supraspinatus, infraspinatus and bicep muscles were wasted (**Figures 1 and 2**). There

were neither skin changes, fasciculations, warmth, effusion nor tenderness.

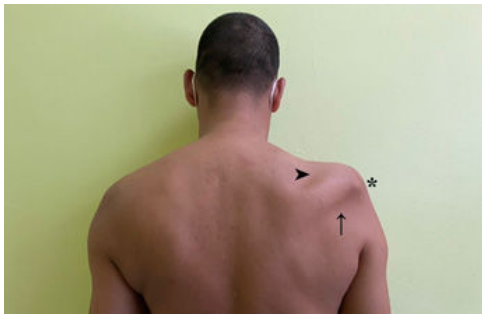

Figure 1. Right supraspinatus (arrowhead), infraspinatus (arrow) and deltoid (asterisk) muscle wasting.

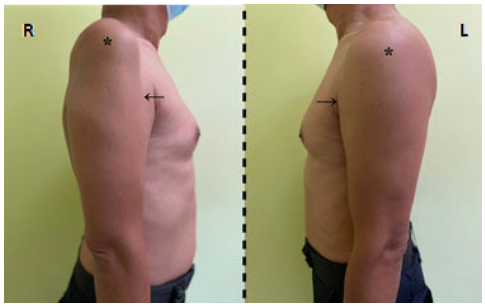

Figure 2. Right deltoid (asterisk) and bicep (arrow) muscle wasting, with a left side view for comparison.

The muscle power during right shoulder abduction and flexion and elbow flexion was only Medical Research Council (MRC) grade 1, while that during shoulder external rotation and forearm supination was only MRC grade 2. Further, there were right arm hypotonia and areflexia. The intrinsic muscle power and muscle bulk of his hand and the passive range of motion of his right upper limb were normal. Sensation to light touch was reduced at the right neck and shoulder regions (supplied by the right supraclavicular nerve) and upper arm region (supplied by the axillary nerve).

We arranged for a nerve conduction study after discussion with a neurologist. The nerve conduction study suggested a patchy brachial plexopathy involving the suprascapular nerve (from the brachial plexus's superior trunk, which innervates the supraspinatus and infraspinatus muscles), musculocutaneous nerve (from the brachial plexus's lateral cord, which innervates the biceps brachii muscle) and axillary nerve (from the brachial plexus's posterior cord, which innervates the deltoid muscle). The test showed reduced compound muscle unit action potential amplitudes of his right median and ulnar nerves compared with those of his left nerves, with preserved conduction velocity, which indicated axonal loss rather than demyelination. Electromyography showed discrete and markedly reduced recruitment of his right deltoid and bicep muscles, respectively, with increased muscle unit action potentials, indicating neuronal loss rather than myopathy. There was also no activity of his right supraspinatus and infraspinatus muscles, which indicated marked atrophy.

The patient's fasting blood sugar level, metabolic profile and brachial plexus magnetic resonance imaging findings were normal, which yielded the exclusion of hereditary, traumatic, neoplastic, radiation-induced and diabetic-related brachial plexopathies. We then made a diagnosis of Parsonage–Turner syndrome related to COVID-19 vaccination.

The patient was managed by a multidisciplinary team involving orthopaedic hand surgeons, acute pain specialists, physiotherapists, occupational therapists and rehabilitation specialists. Following minimal improvement, right brachial plexus exploration and neurolysis of C5 and C6 and the upper trunk were performed at 46 weeks from symptom onset. Postoperatively, he underwent 10 sessions of low-level laser therapy along his right brachial plexus. At 1 month after surgery, his pain score improved from 6 to 0; right shoulder abduction muscle power from grade 1 to 4; and right elbow flexion muscle power from grade 1 to 2. He was still undergoing active treatment when this manuscript was submitted.

Discussion

Parsonage–Turner syndrome is a rare idiopathic brachial plexopathy with an estimated incidence of 1.64 cases per 100,000 population per year.[4] It is also known as neuralgic amyotrophy, acute brachial radiculitis or neuralgic amyotrophy. Classically, this syndrome presents with an acute onset of upper limb pain followed by ipsilateral weakness. It has a preference for the motor nerves over the sensory nerves and the upper or middle trunk nerves over the lower trunk nerves. Therefore, the suprascapular, axillary and musculocutaneous nerves are more affected than other nerves,[5] typically causing more proximal weakness than distal weakness. The syndrome is a clinical diagnosis primarily supported by neurophysiology testing.

Parsonage–Turner syndrome is postulated to

be of an autoimmune origin in a genetically susceptible person.[6] Approximately 50% of patients have reported a precipitant, the most common of which was infection (44%), followed by exercise (17%), surgery (14%), puerperium (9%) and vaccination (4%).[7] However, only 8% of patients had a full recovery, and 27% remained unable to work for 3 years or more from symptom onset.[7]

In a 2013 survey of 248 patients with Parsonage–Turner syndrome, 62% had persistent pain at 6 months from disease onset, and standard physical therapy was reported to be ineffective.[8] A Cochrane review has found no randomised trials on the treatment modalities for Parsonage–Turner syndrome, but there was an open-label retrospective series that suggested that oral administration of prednisolone in the first month may improve recovery.[9] These findings indicate the possible importance of early recognition by primary care physicians.

Our report illustrates an improvement in a patient after 10 months of minimal recovery: Our patient underwent neurolysis and improved. A 2015 review has revealed only a handful of Parsonage–Turner syndrome cases treated surgically with neurolysis or resection with grafting. Thus, further research is required to demonstrate whether peripheral nerve surgery can become a standard course of treatment for selected patients with Parsonage–Turner syndrome.[6] Surgery may be considered in cases with severe axillary nerve damage and no signs of recovery after 6–9 months.[6]

According to a 2022 National Pharmaceutical Regulatory Agency report, the incidence of serious adverse events post-COVID-19 vaccination is 26 cases per 1,000,000 doses of vaccines.[10] AEFIs are monitored in Malaysia by the National Pharmaceutical Regulatory Agency through passive surveillance. Practising healthcare professionals should report AEFIs to this agency through their online reporting form. Additionally, for COVID-19 vaccines, the National COVID-19 Immunisation Programme's smartphone application MySejahtera also collects self-reports of AEFIs from vaccine recipients. Vaccine recipients should be informed that these reporting pathways should not replace medical consultation if AEFIs are serious or persistent.

Our case illustrates the late seeking behaviour of a vaccine recipient for an AEFI. The patient was unaware that his symptoms were unusual and that he needed to seek treatment for them. Therefore, it is crucial that vaccine recipients receive adequate education about possible AEFIs. Before administering vaccines, frontline healthcare professionals need to educate vaccine recipients about common AEFIs, advise recipients to report minor AEFIs and, most importantly, seek medical attention if AEFIs are serious or persistent. This will empower vaccine recipients to present early in the case of a serious AEFI. With the increasing rollout rates of vaccinations globally in the setting of a pandemic, primary care physicians need to be aware of common vaccination side effects and be able to recognise and manage rare serious AEFIs accordingly.

Conclusion

Most side effects post-vaccinations are mild; however, rare serious AEFIs can also occur. In a setting of increasing vaccination rates globally in response to a pandemic, it is important that primary healthcare workers educate vaccine recipients about possible AEFIs and provide them with a plan on the appropriate actions needed if they develop any symptoms. Appropriate health-seeking behaviours on symptoms that develop after vaccination are crucial for early detection and management of AEFIs.

Acknowledgements

We would like to thank the patient for his permission to share his condition and publish this article.

Conflicts of interest

The authors declare no conflicts of interest.

Author contributions

Dr Zi Yi Yeoh was involved in the direct care of the patient and write-up of this manuscript. Dr Siti Nurkamilla Ramdzan was the Family Medicine Specialist whom Dr Zi Yi Yeoh consulted and she provided critical revision and editing of the manuscript.

Patient's consent for the use of images and content for publication

We obtained written consent and permission from the patient prior to submitting this article.

What is new in this case report compared to the previous literature?

- COVID-19 immunisation can precipitate Parsonage–Turner syndrome. The global rollout of vaccination programmes may yield an increase in the incidence of Parsonage–Turner syndrome.
- The treatment of Parsonage–Turner syndrome is not well established. We report a case that improved with surgical neurolysis.

What is the implication to patients?

- The findings highlight the importance of awareness and early recognition of serious adverse events following vaccination; education among vaccine recipients for seeking medical treatment early if in doubt of symptoms developed after vaccination; and appropriate consultation and examination.

References

1. Park A, Ducharme J. Heroes of the Year Vaccine Scientists and the Miracle of mRNA. Time. 2021.

2. Mathieu E, Ritchie H, Ortiz-Ospina E, et al. A global database of COVID-19 vaccinations. *Nat Hum Behav*. 2021. Updated January 19, 2023. Accessed January 19, 2023. https://ourworldindata.org/covid-vaccinations

3. Al Ghafri TS, Al Balushi L, Al Balushi Z, et al. Reporting at least one adverse effect post-COVID-19 vaccination from primary health care in Muscat. *Cureus*. 2021 Aug 10;13(8):e17055. doi:10.7759/cureus.17055.

4. Beghi E, Kurland LT, Mulder DW, Nicolosi A. Brachial plexus neuropathy in the population of Rochester, Minnesota, 1970-1981. *Ann Neurol*. 1985;18(3):320. doi:10.1002/ana.410180308

5. Ferrante MA, Wilbourn AJ. The lesion distribution among 281 patients with sporadic neuralgic amyotrophy. *Muscle Nerve*. 2017;55(6):858. doi:10.1002/mus.25422

6. Van Eijk JJ, Groothuis JT, Van Alfen N. Neuralgic amyotrophy: an update on diagnosis, pathophysiology, and treatment. *Muscle Nerve*. 2016 Mar;53(3):337–350. doi:10.1002/mus.25008.

7. van Alfen N, van Engelen BG. The clinical spectrum of neuralgic amyotrophy in 246 cases. *Brain*. 2006 Feb;129(Pt 2):438–450. doi:10.1093/brain/awh722.

8. Cup EH, Ijspeert J, Janssen RJ, et al. Residual complaints after neuralgic amyotrophy. *Arch Phys Med Rehabil*. 2013 Jan;94(1):67–73. doi:10.1016/j.apmr.2012.07.014.

9. van Alfen N, van Engelen BGM, Hughes RAC. Treatment for neuralgic amyotrophy. *Cochrane Database Syst Rev*. 2009;2009(3):CD006976. Published 2009 Jul 8. doi:10.1002/14651858.CD006976.pub2

10. National Pharmaceutical Regulatory Agency. Summary Report on Adverse Events Following Immunisation of COVID-19 Vaccines in Malaysia. Ministry of Health. June 10, 2022. Accessed January 19, 2023. https://www.npra.gov.my/easyarticles/images/users/1066/AEFI%20Summary/COVID-19-Vaccines_AEFI-Summary-Report-data-as-of-20220610.pdf