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CLINICAL LETTER

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Painless idiopathic neuralgic amyotrophy after COVID-19 vaccination: A case report

On December 11, 2020, the Food and Drug Administration issued an emergency use authorization of the Pfizer-BioNtech COVID-19 vaccine for coronavirus disease 2019 (COVID-19) infection prevention, consisting of two intramuscularly administered doses 21 days apart.[1] Large-scale placebo-controlled studies showed a 95% efficacy for COVID-19 infection prevention, with injection-site pain, fatigue, and headaches being commonly reported adverse events.[2] Although idiopathic neuralgic amyotrophy (INA) has been reported after COVID-19 infection, there are currently no published cases of INA occurring after COVID-19 vaccination.[3]

A 35-year-old left-hand dominant woman presented with new-onset painless left-arm weakness, numbness, and paresthesias 9 days after receiving the Pfizer-BioNtech COVID-19 vaccine in the right deltoid. She had no history of neurologic diseases or allergies and denied recent trauma or infection. A detailed physical examination showed left upper extremity decreased antigravity strength in the deltoid, supraspinatus, biceps brachii, triceps brachii, extensor carpi radialis, extensor digitorum communis, extensor indicis proprius, flexor digitorum superficialis, and flexor digitorum profundus. Left-arm light touch sensation was decreased in the lateral antebrachial cutaneous (LAC), radial, and median nerve distributions. Hyporeflexia of the left biceps, brachioradialis, and triceps deep-tendon reflexes was present. Normal strength, sensation, and reflexes were present in the right upper extremity, without increased tone, fasciculations, or atrophy. She exhibited left medial scapular winging, with negative provocative tests for radiculopathy, musculoskeletal shoulder pathology, and peripheral nerve entrapment.

Cervical spine computed tomography showed mild degenerative changes without foraminal narrowing. She was started on high-dose prednisone after neurology and physiatry evaluations, with paresthesia improvement and weakness stabilization within 1 week of medication initiation. Serologic evaluation including C-reactive protein, erythrocyte sedimentation rate, antinuclear antibody, rheumatoid factor, Lyme antibodies, and angiotensin-converting enzyme was negative. COVID-19 IgG and IgM antibodies were detected.

The patient was reevaluated 6 weeks after symptom onset with significant strength improvement and resolved numbness and paresthesias. She underwent electrodiagnostic evaluation showing an axonal and demyelinating brachial plexopathy, primarily involving the upper trunk (Table 1). Nerve conduction studies were normal, except for decreased amplitude, prolonged latency, and decreased conduction velocity of the left LAC sensory nerve action potential. Peripheral nerves with C5-C6 root contributions showed neuropathic changes and active denervation, including dorsal scapular, suprascapular, musculocutaneous, axillary, and radial nerves. This supported a diagnosis of post-vaccination INA and was reported through the Vaccine Adverse Event Reporting System (VAERS).

INA, also known as Parsonage-Turner syndrome, is an uncommon peripheral nerve disorder characterized by the rapid onset of upper extremity pain followed by weakness, atrophy, and sensory disturbances.[3] Although INA classically presents with severe upper extremity or neck pain, painless INA has been described with an identical disease course,[4] as seen in the presented case. INA has a reported incidence of 1.64/100,000 individuals, although the actual incidence is thought to be 20-30/100,000 because of misdiagnosis and decreased clinician recognition.[3,4] An inciting event frequently proceeds symptom onset by 3-14 days, including trauma, infection, autoimmune disease, strenuous exercise, radiation, and vaccination.[3] Recent immunization is a known risk factor, reported in about 15% of patients who develop INA.[3,5] Although the pathophysiology of INA is poorly understood, an immune-mediated inflammatory reaction against the brachial plexus nerve fibers in a genetically predisposed individual is the currently accepted cause.[4,5] INA can be misdiagnosed as cervical radiculopathy, spinal cord compression, adhesive capsulitis, rotator cuff impingement, labral tear, glenohumeral osteoarthritis, malignancy, and amyotrophic lateral sclerosis.[3]

Although INA is primarily a clinical diagnosis, electrodiagnostic evaluation can support the diagnosis and exclude other etiologies.[4,5] Electrodiagnostic studies can show patchy damage to any nerve within the brachial plexus.[5] Upper trunk involvement is most common, with suprascapular, long thoracic, axillary, musculocutaneous, LAC, and radial peripheral nerve involvement, as seen in this case.[5] Electrodiagnostic abnormalities are usually not present until 3 weeks after symptom onset.[4] Overall, patients with INA experience 80%-90% muscle strength recovery 2-3 years

TABLE 1 Electrodiagnostic evaluation of the left upper extremity

Nerve Conduction Study							
	Onset latency (ms)		**Amplitude (mV)**	**Segment**			**Velocity (m/s)**
Motor nerve							
Median	Wrist	3.3	8.2	Wrist to APB			–
	Elbow	6.4	8.0	Elbow to wrist			58
Ulnar	Wrist	2.8	10.4	Wrist to ADM			–
	Below elbow	6.1	9.5	Below elbow to wrist			61
	Above elbow	8.2	9.3	Above to below elbow			68
Sensory nerve							
Median	2.3		13.6	Wrist to digit 2			61
Ulnar	2.2		13.1	Wrist to digit 5			64
Radial	1.7		30.2	Wrist to base of digit 1			59
LAC[a]	2.8		9.0	Elbow to lateral forearm			36
MAC	2.0		18.5	Elbow to medial forearm			50
Needle electromyography							
Muscle	Nerve	Root	Insertional Activity	Fibs and PSW	MUAP Amp	MUAP Duration	Recruitment Pattern
Cervical paraspinals	Posterior primary rami	C1-T1	Normal	None	Normal	Normal	Normal
Rhomboid major	Dorsal scapular	C5	Inc	1+	Inc	Inc	Decreased, Neuropathic
Supraspinatus	Suprascapular	C5-C6	Normal	1+	Inc	Inc	Decreased, Neuropathic
Deltoid	Axillary	C5-C6	Inc	1+	Inc	Inc	Decreased, Neuropathic
Biceps brachii	Musculocutaneous	C5-C6	Normal	None	Inc	Inc	Decreased, Neuropathic
Triceps brachii	Radial	C6-C8	Inc	Inc	Inc	Inc	Decreased, Neuropathic
FPL	Anterior interosseous	C8-T1	Normal	None	Normal	Normal	Normal
FDS	Median	C7-T1	Normal	None	Normal	Normal	Normal
ECR	Radial	C6-C7	Inc	1+	Inc	Inc	Decreased, Neuropathic
APB	Median	C8-T1	Normal	None	Normal	Normal	Normal
FDI	Ulnar	C8-T1	Normal	None	Normal	Normal	Normal

Abbreviations: APB, abductor pollicis brevis; ADM, abductor digiti minimi; ECR, extensor carpi radialis; FDS, flexor digitorum superficialis; FDI, first dorsal interossei; Fib, fibrillation; FPL, flexor pollicis longus; Inc, increased; LAC, lateral antebrachial cutaneous; MAC, medial antebrachial cutaneous; MUAP, motor unit action potential; PSW, positive sharp wave.

[a]Right-sided LAC study showed onset latency 2.0 ms, amplitude 22.1 μV, and velocity of 50 m/s.

after symptom onset, with ≥70% experiencing residual exercise intolerance and paresis.[3,4] Anecdotal evidence supports oral prednisone within the first month of symptom onset to decrease painful symptom duration and accelerate recovery.[4] Treatment is supportive, as there are currently no evidence-based pharmacologic or rehabilitation interventions.[4]

Approximately 29 ,585 ,627 Pfizer-BioNtech COVID-19 vaccine doses have been administered in the United States as of February 19, 2021.[6] Four INA cases after the Pfizer-BioNtech COVID-19 vaccine have been listed on VAERS[7] as either "radiculitis brachial" or "brachial plexus injury," including the presented case. As large-scale COVID-19 vaccinations continue, additional cases of postvaccination INA will likely be reported. Increased clinician awareness of INA after COVID-19 vaccination is essential for proper diagnosis, evaluation, management, and outcome prognostication.

DISCLOSURES

Nicole Diaz-Segarra, Arline Edmond, Courtney Gilbert, Ondrea McKay, Carolyn Kloepping, and Peter Yonclas have nothing to disclose. The case presented was original and used only after written informed consent was obtained from the patient. The adverse event detailed in the manuscript has been reported to the appropriate regulatory agencies.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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