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New-Onset Amyotrophic Lateral Sclerosis in a Patient who Received the J&J/Janssen COVID-19 Vaccine

Elio Junior Feghali, M.D., Abhiram Challa, M.D., Mahmoud Mahdi, M.D., Eric Acosta, M.D., Jennifer Jackson, M.D., FACP
University of Kansas School of Medicine-Wichita, Wichita, KS
Department of Internal Medicine

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INTRODUCTION

Amyotrophic lateral sclerosis (ALS), also known as motor neuron disease, is a rapidly progressive neurodegenerative disease characterized by the degeneration of both upper and lower motor neurons.[1,2] This leads to progressive muscle weakness and eventual paralysis, with respiratory paralysis as the leading cause of death. It is considered to be an incurable disease with death occurring within two to five years of symptom onset.[3] Treatment usually targets symptom control with muscle relaxants for spasticity and speech therapy for dysarthria, involving a multidisciplinary team that can work on bulbar dysfunction, fatigue, and depression.[2]

Since first emerging as a pathogen at the end of 2019, Coronavirus 2019 (COVID-19) has caused significant global morbidity and mortality. As a result, safe and effective prophylactic vaccines were developed to contain this pandemic and curb its medical and economic consequences. Currently, there are three U.S. Food and Drug Administration-issued authorizations for the emergency use of the Pfizer-BioNTech, Moderna, and Janssen/Johnson & Johnson (J&J) COVID-19 vaccines. Data from large clinical trials indicated that the approved COVID-19 vaccines are safe and effective for most people.[4-6] However, the vaccines have been associated with multiple side effects, ranging from mild side effects such as headaches and fatigue to more severe side effects including anaphylaxis,[7] Guillain-Barré Syndrome, immune thrombotic thrombocytopenia, and myocarditis. We present one of the first cases of a previously healthy male who started experiencing symptoms of ALS after receiving the J&J viral vector COVID-19 vaccine.

CASE REPORT

A 47-year-old-male presented to the clinic with left-sided weakness, declining speech, dysphagia, and recurrent falls for nine months. His symptoms began one day after receiving the J&J/Janssen viral vector COVID-19 vaccine. Before the vaccine, he was a healthy right-handed mailman with no functional disability who walked about 10 miles every day. He had a past medical history of depression, anxiety, hypertension, and obesity, with a family history of diabetes, hypertension, and coronary artery disease in his mother, and amyotrophic lateral sclerosis (ALS) in his grandmother.

After receiving the J&J/Janssen COVID vaccine, the patient noticed symptoms on his left side. He first developed painful and tender inflammation at the injection site. Within one week, his symptoms developed into left-sided arm weakness and a weak hand grip. Over the next several months, this progressed to left upper and lower extremity weakness, declining speech dysphagia, and recurrent falls. Magnetic resonance imaging of his entire spine and brain was negative except for age-related degenerative defects and left-sided foraminal narrowing at C4-C5 and C5-C6.

On examination, he was found to have left arm fasciculations, left arm atrophy, spasticity, and hyperreflexia. Babinski's sign and Hoffman's sign were present bilaterally. He had spastic dysarthria, a sustained clonus at both ankles, and a pseudobulbar affect with intact sensory symptoms, coordination, and gait. Labs were unremarkable.

He was eventually referred to a neurologist and diagnosed with ALS with a pseudobulbar affect after electromyography. He was prescribed riluzole and followed up as an out-patient.

DISCUSSION

The presented case, although previously healthy, started experiencing symptoms of amyotrophic lateral sclerosis after administering the J&J viral vector COVID-19 vaccine. Although he was asymptomatic prior to the administration of the vaccine, he had a strong family history with his grandmother having a diagnosis of ALS.

Although the COVID vaccine remains the best preventive strategy for COVID-19, it has been associated with multiple side effects.[8-11] A recent study used the U.S Vaccine Adverse Event Reporting System (VAERS) and reported adverse events in 0.10% of patients receiving any COVID-19 vaccine. Of these, 33% were neurological symptoms representing 0.03% of all administered vaccines. Most of the neurological symptoms were mild. These included headaches, dizziness, and fatigue, most of which were reported after receiving the Janssen vaccine. However, some patients experienced serious adverse effects such as Guillain Barré Syndrome, transverse myelitis, cerebral venous thrombosis, and acute disseminated encephalomyelitis. They reported a weak association between ALS and the COVID vaccine with an incidence of 0.02, 0.01, and 0.00 cases per 1,000,000, respectively, for Pfizer, Moderna, and J&J Vaccines.[12]

A cumulative analysis review of post-vaccination adverse events was prepared by Pfizer after collecting cases reported to the health authorities. From December 1, 2020 through February 28, 2021, 501 cases of neurologic adverse events of special interest were studied (1.2% of the total adverse events). These cases included serious neurologic conditions such as, but not limited to, epilepsy, generalized tonic-clonic seizure, Guillain-Barré syndrome, multiple sclerosis relapse, and optic neuritis with no reports of ALS.[13]

We reported an unusual case of a newly diagnosed ALS following the J&J COVID-19 vaccination in a previously healthy individual. Although the precise pathophysiology remained unclear, it may be related to the enhanced immune response observed after administering the vaccine. This could trigger a neuroinflammatory response, ultimately leading to neurodegeneration and ALS. One study reported the rapid functional decline of two patients with slowly progressive ALS contracting COVID-19.[14] The authors theorized that the accelerated decline might be explained by the ability of COVID-19 to trigger neuroinflammation, hence supporting the hypothesis that the trigger could be either the virus itself or the immune response.

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It is important to note that this patient's grandmother also had ALS, which may indicate a genetic predisposition. Further research is required to assess appropriate patient selection for administering the COVID-19 vaccine in patients with a past medical or family history of ALS.

With billions of vaccines delivered worldwide, rare adverse events and neuroinflammatory and neurodegenerative diseases increasingly are being reported. It is reasonable to consider that these adverse events temporally are associated with the vaccine instead of direct causation. Hence, the main limitation of our case report was the temporal relationship between COVID-19 vaccination and the onset of ALS.

CONCLUSIONS

This report highlighted several important teaching points. Firstly, it emphasized the need for ongoing surveillance and monitoring of adverse events following vaccination, especially in populations with unique medical histories or conditions. Secondly, it underscored the importance of conducting further research to understand the potential link between the vaccine and the development of ALS, particularly in light of the patient's family history. Finally, the case highlighted the importance of ongoing education and training for healthcare providers to stay informed about the latest research, guidelines, and best practices related to vaccine administration and safety.

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