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Guillain-Barré Syndrome Following AstraZeneca COVID-19 Vaccine

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Abstract

It's been more than two years since the first case of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was reported in Wuhan, China, in December 2019, and still Coronavirus-19 (COVID-19) is an ongoing burden in many parts of the world. Currently, few vaccines are approved by the World Health Organization (WHO) and are being administered to people to boost their immunity. Since the outbreak of this disease, the number of patients getting vaccinated is increasing with every passing day. Understanding the burden of the disease and the adverse effects due to its vaccination is very crucial. We report a case of Guillain-Barre Syndrome after receiving the first dose of the AstraZeneca-COVID-19 vaccine.

Subject Areas

Immunology, Infectious Diseases

Keywords

COVID-19, Coronavirus, Vaccination, Guillain-Barre Syndrome, AstraZeneca

1. Introduction

A case of pneumonia caused by an unknown organism was identified in Wuhan, China. The pathogen was later identified as a novel enveloped RNA beta corona Virus and was named SARS-COV-2 [1]. The World Health Organization Declared COVID-19 infection a public health emergency [2]. COVID-19 mainly causes respiratory symptoms which can vary from mild illness present with

complaints of myalgia, sore throat, cough, fever, anosmia, and diarrhea or moderate to severe symptoms like acute respiratory distress syndrome, or multi-organ failure [3]. The people most at risk to develop severe disease associated with COVID-19 or even death include the elder population aged more than 60 years, or having underlying chronic diseases like diabetes, hypertension, cardiovascular disease, chronic respiratory disease, and cancer [4].

Multiple vaccines were developed in recent times to limit the spread and mortality associated with COVID. Few mild side effects after getting the vaccines have been reported but major ones are not common [5]. Nevertheless, it is very important to know the rare complications associated with it. Complications caused by COVID vaccination are yet to be established and researchers are continuing to explore and discover new associations every day. Guillain-Barre Syndrome (GBS) is defined as a neurological disorder in which the body's immune system attacks part of its peripheral nervous system and symptoms of it can vary from mild weakness to disastrous paralysis, which can even make the person unable to breathe spontaneously [6]. GBS is often caused by an infection either bacterial or viral but it can also be triggered by the administration of vaccination [7]. A case of GBS was reported after taking the first dose of the Pfizer vaccine [8]. As vaccination is an established cause of GBS [9], we are describing a case of GBS following the first dose of the AstraZeneca vaccine administered for the prevention of COVID-19 infection. Few cases of GBS following the AstraZeneca vaccine have already been published from different parts of the world [9] [10] [11].

2. Case Presentation

A 59 years old highly functional male known case of ischemic heart disease for four years, diabetes mellitus (on oral hypoglycemic drugs), and hypertension for three years each. He is a banker by profession. He presented in emergency department complaining of numbness and paresthesias in the lower limbs for the last 10 days along with difficulty in standing and ambulating started seven days ago. The neurological symptoms started with acute progressive paresthesias of the distal lower extremities and generalized malaise and body aches. He has no history of recent trauma or fall and reported no autonomic abnormalities like bowel or bladder dysfunction. His weakness was ascending in nature. He didn't report any prior episode of diarrheal illness or fever in recent times. Although he mentioned that he had his first dose of the AstraZeneca vaccine around two weeks back and according to the patient after five days of his 1st dose, he started developing above mentioned symptoms. His past medical history was negative for any prior neurological illness, stroke, respiratory or GI infection, or malignancy.

On Examination, the patient was alert and oriented to time, place, and person with the vitals of blood pressure 145/75 mmhg, heart rate 77 bpm, respiratory rate 20/min, SpO_2 98% on room air. Neurological examination revealed power was Medical research council (MRC) 5/5 in bilateral upper limb proximally as well as distally while the power in bilateral lower limbs was 2/5 proximally and

3/5 distally. Deep tendon reflexes and babinski signs were absent in both lower limbs. The rest of the systemic examination was unremarkable.

All the routine tests including blood tests, electrocardiogram, chest X-ray, and plain CT scan brain were normal. With the suspicion of acute flaccid paralysis, the patient was admitted to the intensive care unit (ICU) and specialized diagnostic tests were performed. All the causes of reversible neurological weakness including vitamin B 12 deficiency, thyroid dysfunction have been ruled out. Cerebrospinal fluid (CSF) analysis showed glucose 141 mg/dl, chloride 124 meq/l, protein 304 mg/dl (raised), WBCs 0.044 with lymphocytes 97% and polymorph 3%, RBCs 0.001, pus cell nil (Albumino-cytological Dissociation). CSF bio fire was also sent which was negative. Electromyography (EMG) and nerve conduction velocity (NCV) study was planned which showed right median and ulnar motor nerves with low amplitudes, decreased velocities, and prolonged distal latencies. Bilateral tibial and deep peroneal motor nerves had low amplitudes, decreased velocities, and prolonged distal latencies. F Latencies were prolonged Table 1. The sensory study showed that right median, and ulnar sensory nerves had low amplitude while bilateral sural sensory nerves were not recordable Table 2. These findings were suggestive of acute demyelinating with secondary axonal sensory-motor polyneuropathy.

He was treated with therapeutic plasma exchange. A total of five sessions were done during his hospital stay. The progression of weakness stopped and subsequently, his lower limb weakness became improved. After one week, he started regaining strength in his bilateral lower limbs. Repeated neurological examination suggested the power of MRC 5/5 in both the lower limbs at the time

Table 1. Motor conduction studies of a patient.

NERVE Right	[1]D. LAT (ms)	[2]AMPT (mV)	NCV (M/S)	[3]F. LAT (ms)	[4]TD/[5]CB	NERVE Left	[1]D. LAT (ms)	[2]AMPT (mV)	NCV (M/S)	[3]F. LAT (ms)	[4]TD/[5]CB
Median Distal	5. 0	2.6	35. 0	38. 0		Median Distal					
Proximal		2.4				Proximal					
Ulnar Distal	6. 0	1.9	34. 0	37. 0		Ulnar Distal					
Proximal		1. 0				Proximal					
Radial						Radial					
Tibial	7. 0	2. 0	37. 0	67. 0		Tibial	8.9	1.9	35	69. 0	
Proximal		1.8				Proximal		1.4			
Peroneal Distal	11. 0	0.7	39. 0	69. 0		Peroneal Distal	10. 0	0.8	36. 0	70. 0	
Proximal		0.8				Proximal		0.7			
Femoral						Femoral					
Axillary						Axillary					
Musculocutaneous						Musculocutaneous					

[1]D. Lat: distal latency, [2]AMPT: amplitude, [3]F. Lat: F latency.

Table 2. Sensory conduction studies of a patient.

NERVE Right	D. LAT (ms)	AMPT (mV)	NCV (M/S)	NERVE Left	D. LAT (ms)	AMPT (mV)	NCV (M/S)
Median	3. 0	11. 0	61. 0	Median			
Mix. median				Mix. median			
Mix. ulnar				Mix. ulnar			
Ulnar	2.9	12. 0	60. 0	Ulnar			
Radial				Radial			
Sural	*NR			Sural			

*NR: Not Recordable.

of discharge. His total hospital stay was two weeks.

3. Discussion

The diagnosis of GBS was made in our patient by Brighton criteria. As our patient did not have any identifiable trigger like a recent infection and the other possible causes of neurological manifestations were ruled out, therefore, AstraZeneca vaccine was a possible trigger of GBS in this particular patient. There are a few other cases of GBS reported following the AstraZeneca vaccine [9] [10] [11], which gives us a clue of a possible association between the two.

There are several shreds of evidence that suggested GBS after COVID-19 infection [12]. Considering that vaccines that induce antibodies against SARS-COV 2 spikes glycoprotein can imitate an actual COVID infection and theoretically produce GBS. Adenovirus which causes infection in humans is known to cause GBS [13]. Simian adenovirus, which is used as a vector in AstraZeneca can also be the possible trigger of GBS following the administration of this vaccine.

Although rare cases of serious adverse effects were reported following the administration of this vaccine. AstraZeneca is well tolerated and effective against COVID-19, it generates antibodies and cellular immune response against the spike glycoprotein [14].

4. Conclusion

We have reported one of the complications following administration of the first dose of the AstraZeneca vaccine. The risk of adverse effects after COVID-19 vaccination is very low and the benefits/advantages of vaccination overweight the side effects. As we are all aware that the number of people who are getting vaccinated is increasing with every passing day, early recognition of the disease and treatment can result in better recovery.

Conflicts of Interest

The authors declare no conflicts of interest.

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