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CASE REPORT

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Guillain-Barré syndrome following ChAdOx1 nCoV-19 COVID-19 vaccination: A case series

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Abstract

ChAdOx1 nCoV-19 is an effective and well-tolerated coronavirus disease 2019 (COVID-19) vaccine. Rare cases of serious adverse events have been reported with this vaccine. We report three patients who developed Guillain-Barré syndrome following ChAdOx1 nCoV-19 vaccination, who did not have active or prior COVID-19 infection. The neurological illness in all patients had an onset of 11-13 days after the first dose of vaccine. All were characterized by sensorimotor weakness of the upper and lower limbs, with facial diplegia in one and dysautonomia in the other. Nerve conduction studies were consistent with demyelination in two and axonopathy in one. Cerebrospinal fluid analysis showed albuminocytological dissociation in two patients. All patients had moderate-to-severe disability. They were treated with intravenous immunoglobulin, with stabilization of the disease. Proper monitoring and prompt reporting of such cases is required to ensure safety of the vaccine.

KEYWORDS

autoimmune neuropathy, ChAdOx1 COVID-19 vaccine, COVID-19, Guillain-Barré syndrome, vaccination

1 | INTRODUCTION

As per World Health Organization, there are more than 150 million confirmed cases of coronavirus disease 2019 (COVID-19) with more than 3 million deaths as of May 2021. Since December 2020, several vaccines have been approved on an emergency basis to curb down the pandemic. The ChAdOx1 nCoV-19 vaccine consists of a replication-deficient chimpanzee adenoviral vector, containing the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) surface spike protein, and has an efficacy of 70.4% after two standard doses.[1] However, serious adverse events such as transverse myelitis and thrombotic thrombocytopenia after vaccination have been a cause for concern.[2] Here, we report three patients who developed Guillain-Barré syndrome (GBS) after the first dose of ChAdOx1 nCoV-19 vaccination.

2 | CASE REPORTS

Patient 1 was a 60 years-old male who developed numbness of fingers and toes 11 days after the first dose of ChAdOx1 nCoV-19 vaccine. 3 days later, he developed proximal weakness of the upper and lower limbs. Subsequently, numbness progressed and ascended up to the ankles in the lower limbs and up to the wrist in the upper limbs. Weakness also progressed to involve the trunk and neck. Neurological examination revealed lower motor neuron bifacial palsy. Upper limb power was Medical Research Council (MRC) grade 2/5 proximally and grade 4/5 distally with weak hand grips. Lower limb power was grade 2/5 proximally and grade 4+/5 distally. Upper limb reflexes were normal, lower limb reflexes were absent, and plantar reflexes were flexor bilaterally. Sensory examination was normal. Nerve conduction study (NCS) showed sensorimotor axonal

neuropathy. Cerebrospinal fluid (CSF) analysis showed elevated protein, normal sugar, and no cells (Table 1). MRI of the spine was normal. He was treated with intravenous immunoglobulin (IVIG) 2 g/kg divided over five days. The progression of the illness got arrested, and subsequently, the upper limb power improved. However, the lower limb weakness was persisting at the time of discharge.

Patient 2 was a 66 years-old male who presented with numbness of fingers and toes with weakness 12 days after the first dose ChAdOx1 nCoV-19 vaccine. Subsequently, numbness ascended up to the knees in the lower limbs and up to the wrist in the upper limbs. Weakness, which started proximally in the lower limbs, progressed in severity and later involved the hands. On 8th day of the illness, he developed urinary retention. On examination, blood pressure was 187/100 mm Hg (with wide fluctuations). Neurological examination showed weak hand grips, MRC grade 5/5 power in rest of the upper limbs, grade 3/5 power in the lower limbs proximally and distally, global areflexia with absent plantar reflexes, and reduced sensations below knees in the lower limbs and hands in the upper limbs. NCS showed sensorimotor demyelinating neuropathy with secondary axonopathy. CSF analysis showed elevated protein, normal sugar, and no cells. MRI of the spine showed a tiny hyperintensity in the right anterolateral spinal cord in C4-C5 intervertebral disk level without contrast enhancement. (Figure 1). He was treated with IVIG at 2 g/kg. In view of mild progression despite standard dose of IVIG, he was given two booster doses of IVIG and pulse methylprednisolone 1000 mg for three days and his condition stabilized.

Patient 3 was a 54 years-old female who developed numbness of left hand and both feet 13 days after the first dose of vaccination with ChAdOx1 nCoV-19. Next day, numbness progressed to involve the entire left upper limb. On day 3, she noticed weakness of both hands, left more than right. Subsequently, the hand weakness increased and weakness also developed in both the lower limbs in the form of buckling of knees and difficulty standing. On day 5, she developed truncal weakness and mild neck weakness. On day 6, she developed mild dysphagia and weak cough. On examination, her single breath count was 15. Cranial nerves were normal. Power was MRC grade 3/5 in the right shoulder, grade 1/5 in the left shoulder, and grade 4-/5 in both elbows and wrists with weak hand grips. In the lower limbs, power was grade 2/5 in both hips and knees and grade 4+/5 in both ankles. All deep tendon reflexes were absent,

TABLE 1 Clinical summary of the patients

Characteristics		Patient 1	Patient 2	Patient 3
Age		60 y	66 y	54 y
Sex		Male	Male	Female
Comorbidities		COPD	Nil	Mastectomy 25 y back for carcinoma breast
Time from vaccination to onset of illness		11 d	12 d	13 d
Postvaccination symptoms		Nil	Nil	Headache, fatigue, and myalgia
Clinical features		Sensorimotor weakness Proximal upper and lower limbs.	Sensorimotor weakness Proximal lower limb with mild hand grip weakness	Sensorimotor weakness Proximal upper and lower limbs with weak hand grips. Trunk and neck weakness. Early respiratory involvement
Cranial nerve involvement		Bifacial weakness	Nil	Mild dysphagia and weak cough
Associated symptoms		Pain over torso	Pain over torso Urinary retention BP fluctuations	Pain over torso
mRS at nadir of illness		4	4	4
NCS		Axonopathy	Demyelination with secondary axonopathy	Demyelination with secondary axonopathy
CSF	Cells	Nil	Nil	Not done
	Protein (mg/dl)	149	84	
Anti-ganglioside antibodies		Not done	Not done	Negative
SARS-CoV-2 RT-PCR		Negative	Negative	Negative
Treatment given		IVIG	IVIG, methylprednisolone	IVIG, methylprednisolone
Time from onset of illness to treatment initiation		16 d	8 d	6 d
Outcome at 3 wk		Upper limb power improved. Needs assistance to sit in bed. mRS 4.	Can sit unassisted. Cannot stand without support. mRS 4.	Can sit unassisted. Stands without support. Cannot walk mRS 4.

Note: Abbreviation: BP, Blood pressure; COPD, Chronic obstructive pulmonary disease;
mRS, Modified Rankin score; NCS, Nerve conduction study; CSF, Cerebrospinal fluid; IVIG, Intravenous immunoglobulin

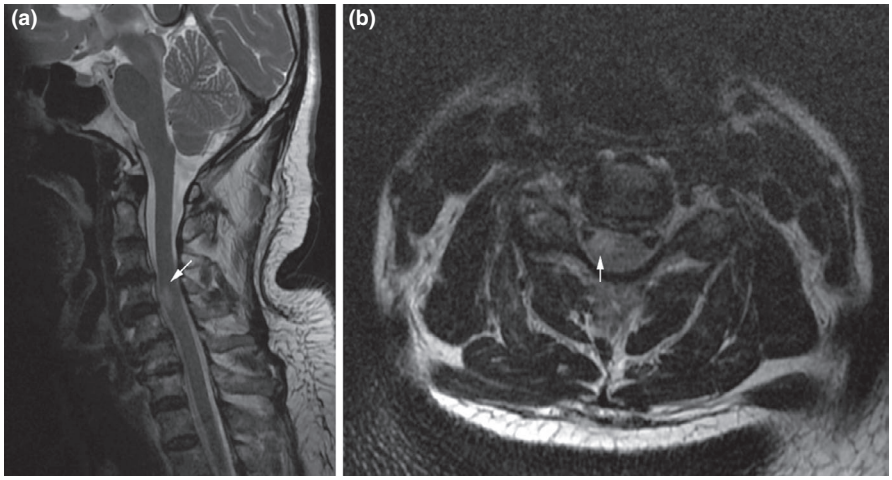

FIGURE 1 (A) Sagittal T2-weighted MRI of patient 2 showing small hyperintensity at the C4-C5 intervertebral disk level (arrow). (B) Axial T2-weighted MRI of patient 2 showing hyperintensity confined to the right anterior aspect of the spinal cord (arrow)

and plantar reflexes were mute bilaterally. Sensory examination was normal. NCS showed sensorimotor demyelinating neuropathy with secondary axonopathy. MRI of the spine was normal. She was treated with IVIG at 2 g/kg and pulse methylprednisolone 1000 mg for three days. She responded well, dysphagia subsided, and power of the upper and lower limbs improved.

3 | DISCUSSION

The diagnosis of GBS was established in our patients by Brighton criteria. Even though spinal cord MRI in the second patient showed a small hyperintensity in the cervical cord, the restriction of lesion to the anterior part, unilaterality and limited length, despite clinically extensive and bilaterally symmetric weakness with areflexia and sensory impairment and abnormal nerve conduction studies, deemed the lesion unrelated to the present illness. Urinary retention and fluctuations in blood pressure seen in this patient are likely due to autonomic dysfunction, which is seen in up to two-third cases of Guillain-Barré syndrome.[3]

In all patients, the onset of neurological illness 11-13 days after vaccination and a lack of history of any recent infections including COVID-19 or other vaccinations make ChAdOx1 nCoV-19 vaccine a possible trigger for GBS. There are reports of GBS after COVID-19 infection.[4] The ChAdOx1 nCoV-19 vaccine, which induces antibodies against SARS-CoV-2 spike glycoprotein, can mimic an actual infection and theoretically produce GBS. Human adenoviral infections can produce GBS.[5] Simian adenovirus, the vector used in ChAdOx1 nCoV-19 vaccine, may also be the trigger for GBS. GBS after vaccination is rare and is reported with many vaccines, but the association is especially strong with influenza vaccination. The incidence of Guillain-Barré syndrome after influenza A (H1N1) vaccination is 1.6 per million.[6] Three cases of GBS have been reported with COVID-19 vaccines, including one with ChAdOx1 nCoV-19 vaccine.[7-9] In some cases of vaccine-related autoimmunity, rechallenge with booster doses of the vaccine resulted in recurrence or worsening of the disease; hence, it is prudent to avoid the second dose of vaccine in such patients. As the number of vaccinations increases, there must be an active surveillance for such cases, since early recognition and treatment can result in better recovery.

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CONFLICTS OF INTERESTS

The authors declare no conflicts of interests for this article.

CONSENT STATEMENT

Written informed consent was obtained from all the participants for inclusion in this study.

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