

## COVID-19 vaccine induced Guillain-Barre syndrome: a case report

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### ABSTRACT

Guillain-Barre syndrome (GBS) is a rare immune mediated clinical disorder of the peripheral nerves. A number of vaccines including COVID-19 vaccine have been shown to be associated with an increased risk of GBS. We reported a case of Corbevax<sup>®</sup> (COVID-19 vaccine) induced GBS. A 12 years old girl presented to the paediatric emergency with 2 days history of progressive weakness of all four limbs. The weakness started after one day of patient received her first dose of Corbevax<sup>®</sup>. Neurological examination findings were weakness, decreased muscles tone, decreased muscles power, diminished or absent deep tendon reflexes of all four limbs. The findings of cerebrospinal fluid showed increase in protein and normal cell count. The diagnosis of GBS was confirmed by nerve conduction studies. After confirmation of the diagnosis, she was given intravenous immunoglobulin (IVIG) with the dose of 2 g/kg body weight divided over 5 consecutive days. Then the patient was examined, clinical condition was improved dramatically. GBS rarely caused by COVID-19 vaccination. GBS may become life threatening due to respiratory muscles involvement. In about 30% of cases may require admission in Intensive Care Unit and need for mechanical ventilatory support. So careful monitoring is required after administration of COVID-19 vaccine. This case report never discourages the vaccine rollout, but monitoring of evolving data should be carried on by manufacturers and independent authorities coming to a definite conclusion.

**Keywords:** COVID-19 vaccine, COVID-19, Corbevax<sup>®</sup>, Guillain-Barre syndrome

### INTRODUCTION

Guillain-Barre syndrome (GBS) is a rare immune mediated clinical disorder of the peripheral nerves. It is also known as acute inflammatory demyelinating polyradiculopathy (AIDP). Although exact cause is not known, but often follows bacterial and viral infections. A number of vaccines including COVID-19 vaccine have been shown to be associated with an increased risk of GBS.<sup>1</sup> Although pathogenesis is not completely understood but some studies suggest that it is due to autoimmune destruction of the myelin sheath and/or axonal damage resulting functional blockade of nerve conduction. The disease results in severe and sometimes prolonged paralysis. About one-third of patients with GBS

develops respiratory failure, requiring intensive care unit admission and ventilatory support.<sup>2</sup> It is a fatal in 3-5% of patients of GBS.<sup>3</sup> And about two third of patients develop residual disability. It is shown that among identifiable organisms *Campylobacter jejuni* is the most common cause.<sup>4</sup> Here we reported a case of Corbevax<sup>®</sup> (COVID-19 vaccine) induced Guillain-Barre Syndrome.

### CASE REPORT

A 12 years old girl presented to the paediatric emergency with 2 days history of progressive weakness of all four limbs. Initially distal muscles were involved which was progressed to proximal muscles of both lower limbs. After that both upper limb muscles were also involved in the

same fashion. The weakness started after one day of patient received her first dose of COVID-19 vaccine. She had no previous history of any neurological abnormalities. She had no history of any trauma. She had no previous history of COVID-19 infection. RT-PCR for SARS COV-2 was negative.

**Clinical examinations**

*General examinations*

Patient was conscious, oriented and afebrile. No pallor, icterus, clubbing, cyanosis and lymphadenopathy were found. Pulse- 80/min, BP-110/70 mmHg, respiratory rate-18/min and spO<sub>2</sub>- 99% were noted.

*Neurological examinations*

*Cranial nerve examinations*

The examination revealed neurological findings as normal.

*Sensory examinations*

All sensory parameters were normal.

*Autonomic nervous system*

No any involvement of autonomic nervous systems.

*Motor examinations*

Motor examination showed flaccid paralysis of both lower and upper limbs. Lower limbs were more affected than upper limbs. Details of findings of motor examinations have been mentioned in Table 1.

**Diagnosis**

Diagnosis was based on clinical examinations and confirmed by CSF examinations and Nerve Conduction studies. All routine investigations were within normal limit.

**CSF examination**

In CSF examination protein level was increased whereas total cells count slightly elevated (in some case of GBS total cells count may be up to 50 cells/μl). So, in this case Albuminocytological dissociation was seen. Details of Findings of CSF examinations have been mentioned in Table 2.

**Nerve conduction studies**

Nerve conduction studies showed pure motor neuropathy. All sensory responses were normal. These studies confirm the diagnosis of GBS. Details of findings of nerve conduction studies have been mentioned in Table 3.

**Treatment and outcome**

After confirmation of the diagnosis, she was given intravenous immunoglobulin (IVIG) with the dose of 2 g/kg body weight divided over 5 consecutive days. Then the patient was examined, clinical condition was improved dramatically.

Muscles weakness was also improved progressively. And other parameters of motor examination were also improved progressively.

**Table 1: Findings of motor examinations.**

Motor examinations	Right		Left	
	Leg	Arm	Leg	Arm
Muscles weakness	+++	++	+++	++
*Muscles power	2/5	3/5	2/5	3/5
Muscles tone	↓↓	↓	↓↓	↓
Deep tendon reflex	Absent	↓	Absent	↓
Plantar response	Flexor	Flexor	Flexor	Flexor

Note: \*Medical Research Council (MRC) grading of muscles power; 0- no muscles contraction visible, 1- flicker of contraction but no movement, 2- joint movement when effect of gravity eliminated, 3- movement against gravity but not against resistance, 4- movement against resistance but weaker than normal, 5- normal power; reverse arrow: findings decreased.

**Table 2: Findings of CSF examinations**

Investigations	Results	Reference range
Glucose	67 mg/dl	50-75 mg/dl (60-70% of blood glucose level)
Proteins	138 mg/dl	20-40 mg/dl
Total cells (WBC)	18 cells/μl	0-5 cells/μl
Polymorphs	10%	-
Lymphocytes	90%	Mostly

**Table 3: Findings of nerve conduction studies.**

Neuro-logical examinations	Right		Left	
	Leg	Arm	Leg	Arm
Motors				
Compound muscles action potential (CMAP)	↓↓ Peroneal nerve	↓ Median nerve and ulnar nerve	↓↓ Peroneal nerve	↓ Median nerve and ulnar
Sensory	Normal	Normal	Normal	Normal

Reverse arrow denotes findings decreased.

## DISCUSSION

GBS is an acute severe immune mediated polyradiculoneuropathy.<sup>4</sup> It is a rapidly progressing motor paralysis with or without sensory involvement. GBS is an ascending paralysis, the legs are usually more affected than the arms. It is rarely associated with COVID-19 vaccine. A case report by Waheed et al described the first case of GBS after the initial dose of the COVID-19 vaccine. Albuminocytological dissociation, raised protein with normal white cell count in CSF is a hallmark of GBS.<sup>5</sup> Diagnosis is based on clinical history of the patient, clinical examinations and CSF examination, and confirmed by Nerve Conduction Studies. IVIG is a definitive treatment. Glucocorticoids have no role.<sup>6</sup> It may be life threatening due to respiratory muscles involvement. About 30% of cases may require admission in ICU and need for mechanical ventilatory support.<sup>7</sup> Deaths are usually caused by respiratory failure. Overall mortality in childhood due to GBS is about <5%.<sup>7</sup>

## CONCLUSION

GBS is a progressive, ascending flaccid weakness of more than one extremity. It is a rapidly progressing motor paralysis with or without sensory involvement. Although it is an ascending paralysis, but legs are usually more affected than the arms. It is rarely caused by COVID-19 vaccination. GBS may become life threatening due to respiratory muscles involvement. In 30% of cases may require admission in ICU and need for mechanical ventilatory support. So careful monitoring is required after administration of COVID-19 vaccine. This case report never discourages the vaccine rollout, but monitoring of evolving data should be carried on by manufacturers and independent authorities coming to a definite conclusion.

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