Guillain-Barré Syndrome Following Tetanus Toxoid Vaccination: A Rare Case Report From A Tertiary Care Centre

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ABSTRACT

Guillain-Barré syndrome is an acute inflammatory polyneuropathy characterized by rapidly progressive, symmetric, ascending weakness often triggered by infection or rarely vaccination. Although influenza and Corona Virus Disease-19 vaccines have been more commonly implicated, there are limited reports of Guillain–Barré syndrome following tetanus- toxoid vaccination. We report a case of 12-years-old male who developed bilateral lower limbs weakness and hoarseness of voice 3 weeks after receiving tetanus toxoid vaccine given after injury. Neurological examination revealed bilateral hypotonia in lower limb. Cerebrospinal fluid analysis showed albuminocytologic dissociation. Nerve conduction studies were consistent with acute inflammatory demyelinating polyradiculoneuropathy. The patient was treated with intravenous immunoglobulin at 0.4 g/kg/day for 5 days and discharged on 10th day of admission. This case highlights a possible temporal association between tetanus toxoid vaccination and Guillain–Barré syndrome, though the causality cannot be definitively established. Further studies are required to clarify this potential link.

KEY WORDS

Guillain-Barré syndrome, Pediatrics, Tetanus toxoid, Vaccination

INTRODUCTION

Guillain–Barré Syndrome (GBS) is an acute-onset inflammatory polyneuropathy characterized by rapidly progressive, symmetric, ascending weakness with areflexia in a previously healthy child. GBS is the most common cause of acute flaccid paralysis in children.[1] The annual incidence of GBS is 0.3-1.3 cases per 100,000 persons.[2] Many specific pathogens such as Campylobacter jejuni, and influenza A virus, have been reported to be associated with GBS.[3] Moreover, there have been reports of GBS cases occurring occasionally after vaccination with older versions of rabies, influenza, combined diphtheria, tetanus, pertussis vaccine (DTP), and COVID-19 vaccine.[4] GBS is divided into various subtypes, major two; acute motor axonal neuropathy (AMAN) and acute inflammatory demyelinating polyneuropathy (AIDP).[1] Here, we report a case of 12-years-old male presented with bilateral lower limbs weakness for 5 days and hoarseness of voice for 3 days following the administration of tetanus toxoid (TT) vaccine given after fall-related injury.

CASE REPORT

A 12 year old male sustained a fall injury while playing, resulting in pain and bleeding over right upper leg. He was managed conservatively and received a TT vaccination on the same day. Approximately three weeks after the initial

injury he presented with complaints of weakness over bilateral lower limbs and pain over thigh for 5 days along with hoarseness of voice for 3 days. On third day of illness, he experienced frequent falls, initially while climbing stairs, later on while walking on level of ground. He developed gradual weakness of both lower limbs and was unable to stand. He also developed muffled voice- gradual in onset and progressive course, and were not relieved on taking oral medication. He also complained of tingling and numbness in both hands. He had no history of preceding gastrointestinal or respiratory illness.

On examination, the patient was active alert, oriented to time place and person. His body temperature was 98°F ,blood pressure 140/100 mmHg , respiratory rate 18 breaths/min , pulse rate 120 beats/min and oxygen saturation 95% on room air. Central nervous system examination revealed bilateral hypotonia in lower limb with motor power graded 1/5 on MRC scale-indicating trace contractility without joint movement. Deep Tendon Reflexes were absent. The neurological examination was notable for swallowing difficulty and hoarseness of voice. Due to presence of lower limbs weakness, vocal cord involvement, and areflexia a diagnosis of Guillain-Barré Syndrome was suspected. The hemogram and metabolic profile were unremarkable. Lumbar puncture revealed albuminocytological dissociation (elevated protein with normal white blood cell count) (Table 1).

Table 1. Cerebrospinal fluid analysis report

Cerebrospinal Fluid Analysis	Values	Reference Range
Protein	114.7 mg/dl	15- 40 mg/dl
Glucose	59.3 mg/dl	50- 80 mg/dl
TLC	Nil	
RBC	Nil	

Compound mixed (motor) and sensory nerve studies of right and left median, right and left ulnar, right and left radial, right and left tibial, right and left common peroneal, right and left sural nerves and their respective F-waves were performed in clinical neurophysiology laboratory. The electrophysiological impression suggests motor, mixed polyneuropathy(axonal and demyelinating type) is present involving bilateral median, ulnar, radial, and common peroneal nerve . Motor axonal neuropathy is also noted the in bilateral tibial nerve. Sensory (bilateral median, ulnar and radial) nerve were inexcitable. Magnetic Resonance Imaging was not done due to financial constraints.

The patient was treated with intravenous immunoglobulin(IVIG) over 5 days at 0.4 g/kg/day. Physiotherapy was initiated, and neurological symptoms gradually improved. The patient was discharged after achieving clinical and hemodynamic stability on 10th day of admission.

DISCUSSION

Guillain–Barré Syndrome presents with acute-onset weakness, difficulty walking and rising from a sitting position, fatigue, pain, and paresthesia. The onset of weakness usually follows a nonspecific gastrointestinal infection (especially Campylobacter jejuni) or respiratory infection, or recent vaccination.[1] Bhagat et al. conducted a study that identified the most common antecedent event as respiratory tract infection (29%) followed by surgery (9.7%) and recent vaccination (6.5%). The most common symptom of GBS was ascending paralysis followed by sensory symptoms, respiratory failure, and dysphagia.[5]

To the best of our knowledge, this is the first reported case of presumptive GBS following TT vaccination in Nepal. Similar case reported by Pan et al. in 20 month old child revealed that there is a temporal correlation between the GBS and the Diphtheria, Tetanus and acellular Pertussis (DTaP) vaccination, but the exact causal relationship between the two is still controversial.[6] A study done by Gligorov et al. showed that GBS may be a rare but potentially severe adverse event that can occur in the first few weeks after vaccination whatever its nature.[7] Ammar reported a case of Guillain-Barré syndrome in a 40-year-old man following the tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) vaccine, while Dhadwad et al. reported GBS in a 21-year-old pregnant woman after tetanus vaccination.[8,9] Both patients were managed with IVIG.[8,9] The Advisory Committee on Immunization Practice considers development of GBS less than six weeks after receiving a tetanus toxoid-containing vaccine a precaution for subsequent tetanus toxoid-containing vaccinations.[8]

The AMAN variant is more common in Southeast Asia whereas AIDP in North America and Europe.[2] In contrast to the regional trend, our patient presented with the AIDP subtype, confirmed via Nerve conduction study. In our case, the child developed hypertension and tachycardia which is consistent with findings of Francis et al. who reported hypertension in 69% and tachycardia in 77% cases as part of autonomic dysfunction.[10] The CSF analysis revealed albumin-cytologic dissociation which is consistent with a study by Patel et al. reporting it in 62% of patients.[11]

The treatment of GBS includes either high-dose intravenous immunoglobulin or plasmapheresis, both recommended soon after diagnosis.[2] Our case was managed with IVIG. Studies done by Saad et al. reports that IVIG is generally well tolerated, with side effects such as headache, muscle pain, flushing, and paresthesia being relatively mild and temporary whereas plasmapheresis may cause more serious side effects such as hypotension, cardiac arrhythmias, and abdominal pain, which require closer monitoring and may be more difficult to manage in resource limited setting.[12] While Sharshar et al. reported that 43% of patients with Guillain–Barré syndrome required mechanical ventilation,

our case did not necessitate such intervention.[13] A study performed by Devi et al. found that 95% achieved favorable neurological recovery (Hughes disability score 0–1) after a median of 3 years.[14]

This case highlights a possible temporal association between TT vaccination and GBS, though the causality cannot be definitively established. Further studies are required to clarify this potential link. Our experience with this pediatric GBS case in a resource-limited setting highlights that early diagnosis and timely administration of IVIG can lead to better patient outcomes. There is scope for further pediatric studies on risk factors and predictors of the severity of GBS which can help in prevention of the complication and decrease morbidity.

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