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CASE REPORT

Tetanus Toxoid Immunization Induced Gullian Barre Syndrome during Early Second Trimester of Pregnancy: A Unique Clinical Presentation

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ABSTRACT

Guillain-Barre syndrome (GBS) is a rare neurological disorder which manifests as a symmetrical motor paralysis that gradually ascends upward involving diaphragm and other respiratory muscles leaving the person unable to breathe on their own and landing upon catastrophe. A 23-year-old primigravida with 16 weeks of gestation presented to emergency room with bilateral progressive lower limb weakness, along with history of tetanus toxoid vaccination 4-5 days prior to this event. She developed respiratory failure in virtue of diaphragmatic involvement and was managed in critical care setting with airway management, ventilatory assistance along with multidisciplinary approach. She was successfully discharged from hospital after receiving immunoglobulin therapy and other supportive measures. Management of GBS in pregnancy has been discussed.

KEYWORDS

• GBS • Pregnancy • Intravenous immunoglobulin • Plasma exchange • Tetanus toxoid vaccination

INTRODUCTION

Gullian Barr Syndrome (GBS) is a rare autoimmune neurological disorder in which a person's immune system erroneously attacks the part of their own peripheral nervous systemaffecting the impulse transmission to the motor end[1]. Incidence varies from 1.2 and 1.9 cases/100,000 people annually. It carries high maternal risk and may complicate the pregnancy. Nearly 10% of maternal mortality

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rate can be attributed to GBS and approximately 35% of this particular subset requires intensive care assistance in form of ventilatory and oxygen support.[2,3] Clinical forms of Guillain barre syndrome includes acute inflammatory demyelinating polyradiculopathy, acute motor axonal neuropathy, acute sensory and motor axonal neuropathy, miller fisher variant. The symptoms of GBS may manifest during any trimester of pregnancy or shortly after childbirth. The management of GBS in pregnancy involves a multidisciplinary collaborative approach, involving neurologists, obstetricians, and other healthcare professionals. The association of tetanus toxoid vaccination with GBS triggers remains elusive in virtue of scarcity of substantial evidence, although there are primary case reports suggesting individual with apparently unusual susceptibility to GBS.

CASE REPORT

A 23-year-old primigravida at 16 weeks of pregnancy presented with 2 weeks of progressive bilateral lower limb weakness, difficulty walking, sitting, and standing from a supine position. Symptoms began suddenly on 15/10/23 with lower limb weakness, decreased sensation, and knee buckling, worsening over 6 hours. Within 12 hours, upper limb weakness (distal to proximal) developed, without radicular pain. After 4-5 days, she had difficulty swallowing, hypophonia, nasal speech, and trouble closing both eyes (right worse than left), but no sensory complaints. She had received the first dose of TTV 4-5 days prior to symptom onset. No other significant medical history was reported.

Initial Assessment and Diagnostic investigation:

Patients' vital signs and general appearance were stable on the day of admission and saturation was 98% on room air. Electrocardiogram (ECG) showed normal sinus rhythm and Glasgow Coma Scale score (GCS) was E_4 V_5 M_6. Patient was conscious and oriented to time, place and person at the time of admission. Bulbar weakness along with hypotonia was present in all four limbs. In reflexes, deep tendon reflexes were absent B/L, B/L planter reflexes were mute bilateral and abdominal reflexes were present. The routine laboratory evaluation, hematological test, biochemical tests, and urine evaluation didn't reveal any abnormality. Patient's Hb was 12.8mg/dl at admissión which decreased to 9.6mg/dl in account of sepsis onset. Laboratory studies for hepatitis B and C, human immunodeficiency virus (HIV), Anti-TPO and anti-nuclear antibody (ANA) were negative. CNS examination was done revealing B/L lower motor neuron (LMN) facial palsy with decreased bilateral gag reflex and absent jaw jerk. For further evaluation in view of LMN quadriparesis with areflexia, she underwent nerve conduction study (NCS) which was suggestive of AIDP and Cerebrospinal fluid (CSF) suggestive of albumin cytological dissociation. She developed fever during ICU stay, central venous catheter tip culture was sent and found to be Methicillin-resistant coagulase-negative staphylococci (MR-CONS) positive.

Treatment given:

Patient was admitted in Neurology Intensive care unit (ICU) for airway management and bulbar weakness symptoms. Later on, she was intubated and started on mechanical ventilation. Antenatal scan was done which was suggestive of normal heart rate of baby. Ganglioside panel was sent (which came negative) and her power deteriorated to 0/5 in B/L proximal upper and lower limbs with 1/5 in distal upper and lower limbs. She underwent one session of PE later on developed high grade fever. In view of that, central line was removed and antibiotic has started as she had MR-CONS positive on catheter tip culture and sensitivity. Patient was started on antibiotic piptaz, colistin, clindamycin, linezolid as per the safest spectrum in pregnant woman along with supplemental vitamins. In view of the expected prolonged requirement of ventilator support, tracheostomy was done. Repeat NCS was done which was suggestive of decrease in motor compound muscle action potential (CMAP) in comparison to previously done investigation. For baby, repeated Ultrasonography (USG) was done which was suggestive of fetal well-being. Infusion Intravenous Immunoglobulin (IVIg) was given for five consecutive days without significant improvement (power 0/5 in all 4 limbs) in her power. IVIg doses was given according to patient's body weight, total dose was 100 gm over 5 days (20gm/day) and was given as per patient's weight (50 kg). IVIg 0.4 g/kg /day for five days regimen was

used as per Hughes *et al*. study[2]. Gradually, she was weaned and shifted on room air from ventilatory support and motor power improved to 4/5 in B/L upper limb and 2/5 in B/L lower limb with no active infections. After 5 weeks of admission, antenatal anomaly scan was done. Findings were suggestive of single, intrauterine live fetus corresponding to 21 weeks 4 day of gestation with right pyelectasis. Physiotherapy consultation was taken by involving physiotherapist from physical, medical and rehabilitation department. Size of tracheostomy was downsized and she was discharged with stable vitals, tracheostomy tube, nasogastric tube, foley's catheter insitu. Patient and her relative were advised for further follow up.

Patient's outcome at the time discharge:

- No bed sore/pressure ulcer
- Hypotonia was present in all 4 limbs
- Power in upper limb was 4/5 and in lower limb was 2/5
- Areflexia with B/L planter mute present
- The Modified Rankin Scale (MRS) - Score was 05
- RT and Foley's catheter were changed and insitu.
- Water swallowing test was positive so orally allowed
- Tracheostomy was removed.
- Counselling was done for home care.
- Health education was given regarding RT feeding, Physiotherapy, personal care, prevention of bed sore as she was bed ridden, medication, nutrition and follow-up.

DISCUSSION

GBS disorder in pregnancy is mainly associated with an increased demand for ventilator support and chances of maternal mortality is high.[4,5] Advisory Committee on Immunization Practice (ACIP) recommends that GBS occurring within less than 6 weeks after receiving tetanus toxoid vaccine is a precaution and alarming sign for further administration of tetanus toxoid vaccines.[6]

The Centers for Disease Control and Prevention (CDC) recommend a "precaution" for tetanus vaccination if an individual developed GBS within six weeks of receiving a tetanus-containing vaccine. In such cases, they should exercise caution with future tetanus vaccinations. However, if the GBS episode occurred more than six weeks after a tetanus vaccination, the person can proceed with vaccination.[7]

Study conducted by Jessica Tuttle showed that the evidence supported a potential causal link between tetanus toxoid (and by extension, tetanus-toxoid-containing vaccines or TTCVs) and Guillain-Barré Syndrome (GBS). This conclusion was drawn based on biological plausibility and a notable case report from 1978, involving a 42-year-old man who received tetanus toxoid three times over a 13-year span and experienced a self-limiting episode of GBS following each vaccination.[8]

A meta-analysis found a statistically significant association between Guillain-Barré Syndrome (GBS) and influenza vaccines. However, the link between GBS and DTP vaccines (which include tetanus toxoid-containing vaccines) remains uncertain. While some studies have suggested a causal connection between tetanus toxoid-containing vaccines and GBS, concrete evidence linking the DTP vaccine to GBS is still lacking, despite occasional reports of GBS cases following DTP vaccination. Therefore, further research is needed to clarify the relationship between GBS and DTP vaccines.[9]

Electrophysiological studies provide evidence of peripheral nerve system dysfunction and can distinguish between the different types of GBS.[10] GBS incidence relatively increases in third trimester of pregnancy compared with the first and second trimester.[11] Contrary to this, present case was reported in early 2nd trimester of pregnancy.

Management of GBS in pregnancy is similar to treatment of GBS in nonpregnant people which includes PE, IVIg and ventilator support. IVIg and plasmapheresis (removal of plasma from blood by using specialized machine) are the treatment of choice for GBS. IVIg is preferred due to lesser complications compared with plasmapheresis.[12] In a systematic review (Richard AC Hughes *et al,* 2019). IVIg and PE had shown a similar level of improvement in disabilityamong the 536 samples during trial. In one trial of this study, involving 249 samples who received PE or IVIg after receiving PE, there was more improvement seen in recovery

among participants who received PE and IVIg both.[13]

CONCLUSION

In conclusion, this case highlights the clinical challenges of managing Guillain-Barré Syndrome (GBS) during pregnancy, stressing the importance of a multidisciplinary approach. Pregnancy-related GBS poses risks to both mother and fetus, including respiratory failure and prolonged recovery. Early diagnosis and prompt treatment with IVIG or plasmapheresis are crucial to improving maternal outcomes. Timely intervention can reduce morbidity and prevent long-term complications. Clinicians must differentiate GBS from other causes of weakness, especially in the presence of infections. A tailored care plan, with close monitoring throughout pregnancy and postpartum, is essential for optimizing both maternal and fetal health. Effective management requires coordinated care between obstetricians, neurologists, and intensivists.

Holistic approach to provide care:

Care of GBS patient require extensive and holistic care which includes medical care, nursing care, physiotherapy, nutrition, psychosocial support, pain management etc. Medical therapy in isolation may not be effective for treating this population as per the given complex nature of the disease.

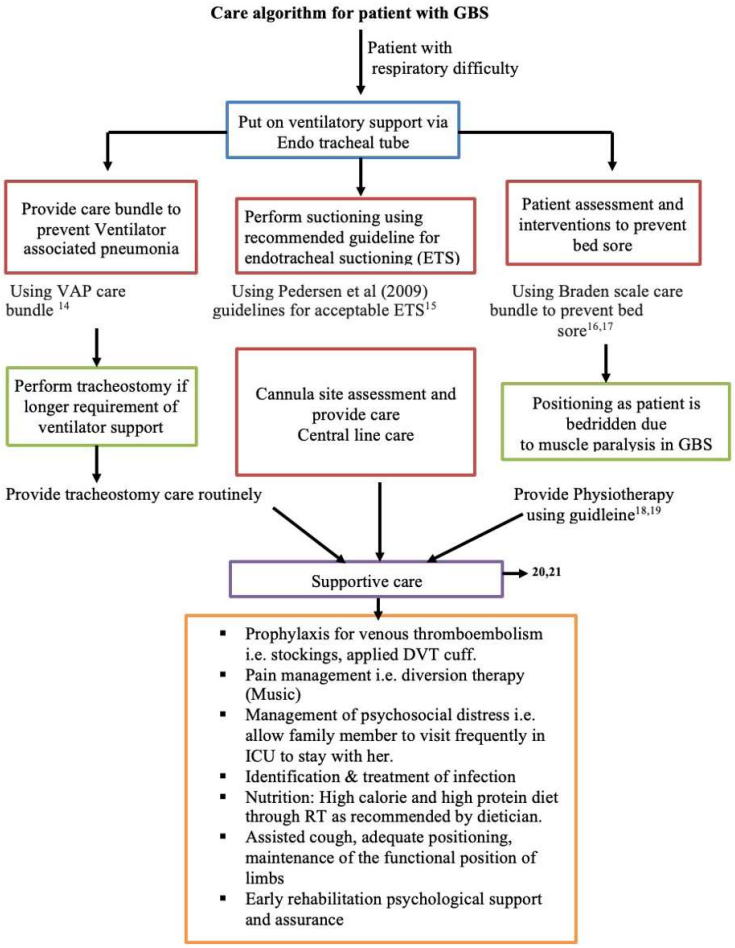

Figure 1: Supportive and extensive care of Patient with GBS in pregnancy

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given her consent for herclinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity.

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