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Management of Patients with Guillain-Barré Syndrome in the Intensive Care Unit

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ABSTRACT

Introduction: Guillain-Barré Syndrome (GBS) is an autoimmune disorder that affects the peripheral nervous system, commonly presenting with tetraplegia with or without sensory disturbances. This condition manifests as progressive muscle weakness and areflexia, leading to respiratory muscle weakness in severe cases, which often requires mechanical ventilation. ICU complications such as nosocomial infections, hospital-acquired pneumonia (HAP), ventilator-associated pneumonia (VAP), and sepsis are commonly encountered in prolonged hospitalizations. Plasmapheresis therapy is a primary treatment option for GBS, alongside intravenous immunoglobulin (IVIG).
Case Report: We report the case of a 42-year-old male patient diagnosed with GBS, who developed respiratory failure and was treated with plasmapheresis. The patient showed significant clinical improvement following three cycles of plasmapheresis, leading to earlier recovery. The patient was successfully weaned off mechanical ventilation after four days.
Conclusion: GBS is an autoimmune disorder following infection, leading to nerve cell destruction. Severe muscle weakness can result in respiratory failure, necessitating mechanical ventilation therapy.

Guillain-Barré syndrome, Plasmapheresis, Mechanical ventilation, Respiratory failure, Autoimmune disorder

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INTRODUCTION

Guillain–Barré syndrome (GBS) is an acute polyneuropathy characterised by flaccid paralysis with or without sensory/autonomic dysfunction. It occurs in approximately 1 in 100,000 people worldwide [1]. GBS often leads to respiratory failure due to progressive weakness of the respiratory muscles, with approximately 30% of patients requiring mechanical ventilation [2]. Two-thirds of GBS cases are preceded by symptoms of respiratory or gastrointestinal infections [3]. This condition is characterised by acute neuromuscular paralysis, often resulting in respiratory failure, with approximately 25% of patients requiring mechanical ventilation and intensive care unit (ICU) admission [6].

We present a case report of a patient with GBS who developed respiratory failure and subsequently required ICU care. During their ICU stay, the patient experienced significant clinical improvement following plasmapheresis therapy over three cycles, ultimately enabling the patient to be discharged from the ICU.

GBS is commonly associated with immune-mediated damage to the peripheral nerves and is often triggered by viral or bacterial infections. The pathophysiology involves the body's immune system attacking the myelin sheath of peripheral nerves, leading to impaired nerve conduction and characteristic motor weakness [1]. The clinical presentation of GBS typically progresses over days to weeks, with patients initially presenting with symmetrical limb weakness that may extend to the respiratory muscles and cranial nerves. Early detection and prompt intervention are crucial, as GBS progression can lead to life-threatening

complications, including respiratory failure and autonomic dysfunction. Treatment strategies such as plasmapheresis and intravenous immunoglobulin (IVIG) have been shown to be effective in improving outcomes, especially when initiated early in the disease course [2]. In this case, timely administration of plasmapheresis played a significant role in stabilising the patient and facilitating recovery from the critical phase of the illness.

CASE REPORT

A 42-year-old male was referred to our hospital with complaints of weakness in all four limbs. He was initially diagnosed with Guillain-Barré Syndrome (GBS) at RS A Cimahi based on the Erasmus GBS Respiratory Insufficiency Score (EGRIS) which exceeded 4, indicating the need for further management in the ICU. The patient reported that the weakness started 4 days prior to admission, with difficulty moving his limbs, and progressively worsened, initially affecting the lower extremities and then the upper limbs, followed by difficulty swallowing and a nasal-sounding voice. On arrival, the patient was fully conscious but exhibited increased respiratory effort with a respiratory rate of 36 breaths per minute and an oxygen saturation of 92% with non-rebreather oxygen supplementation at 15 L/min. He was diagnosed with respiratory failure due to GBS and leukocytosis (11,870/µL).

Table 1. Patient Status During ICU Care

Day	Clinical Status	Vitals	Laboratory Results	Interventions
1	Respiratory failure (GBS)	TDS: 96-104 mmHg, HR: 90 bpm, RR: 20 breaths/min	Hb: 13.9 g/dL, WBC: 13,150/mm3, GDS: 118 mg/dL	Midazolam, Ceftazidime, Levofloxacin, Plasmapheresis planned
2	Improved respiratory status	TDS: 130-140 mmHg, HR: 96-113 bpm, RR: 19-22 breaths/min	Hb: 12.3 g/dL, WBC: 13,380/mm3, GDS: 101 mg/dL	Plasmapheresis cycle 1, continued sedation
3	Improved consciousness	TDS: 118-123 mmHg, HR: 89-93 bpm, RR: 16-22 breaths/min	Hb: 14.5 g/dL, WBC: 15,240/mm3, GDS: 96 mg/dL	Plasmapheresis cycle 2, Diet started
4	Stable, extubated	TDS: 130-136 mmHg, HR: 90-115 bpm, RR: 16-18 breaths/min	Hb: 14.9 g/dL, WBC: 11,790/mm3, GDS: 92 mg/dL	Plasmapheresis cycle 3, weaning from sedation
5	Ready for transfer	TDS: 125-138 mmHg, HR: 82-98 bpm, RR: 20 breaths/min	Hb: 15.7 g/dL, WBC: 10,410/mm3	Transfer to HCU, nutrition support continued

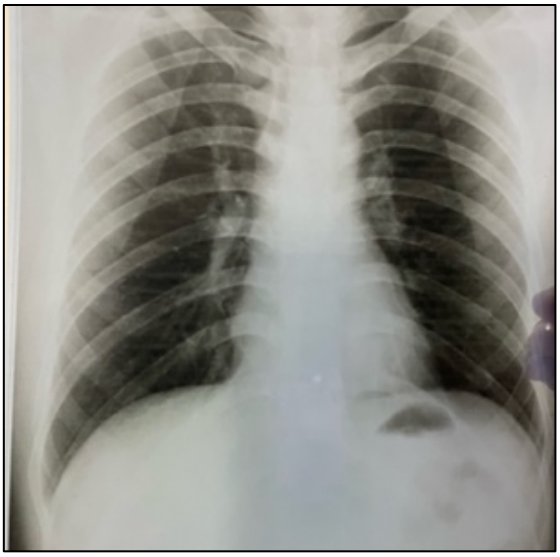

Figure 1. Chest X-ray During ICU Care

The patient was intubated and placed on mechanical ventilation (MV). Broad-spectrum antibiotics, ulcer prophylaxis, and fluid and nutritional support were initiated based on the patient's condition. Additionally, early physiotherapy was initiated for thromboprophylaxis. Initial ICU management included continuous sedation with midazolam (5 mg/h) and antibiotics, including Ceftazidime and Levofloxacin. The X-ray results showed no significant findings, and the patient was scheduled for plasmapheresis for the treatment of GBS.
By day 3 of ICU care, the patient had completed three cycles of plasmapheresis and showed significant improvement in respiratory parameters. The patient was successfully weaned off mechanical ventilation on day 5 and transferred to the High Care Unit (HCU) for continued therapy. The patient's laboratory results were closely monitored, showing progressive improvement in blood gas levels, complete blood count, and electrolyte balance.

The patient's recovery was marked by successful weaning from mechanical ventilation by day 5 following three cycles of plasmapheresis. The improvement in clinical status, coupled with appropriate laboratory and radiological monitoring, allowed transfer to the HCU for continued rehabilitation and care.

DISCUSSION

Guillain-Barré Syndrome (GBS) is a rare, potentially life-threatening immune-mediated peripheral neuropathy. The clinical course of GBS typically begins with distal paraesthesia, followed by progressive limb weakness, which may lead to respiratory failure in severe cases [6,7]. The disease is often triggered by preceding respiratory or gastrointestinal infections, with Campylobacter jejuni being the most common causative agent. GBS pathophysiology involves an autoimmune response that targets peripheral nerves, leading to demyelination and/or axonal degeneration, which can present as different subtypes, including Acute Inflammatory Demyelinating Polyneuropathy (AIDP), Acute Motor Axonal Neuropathy (AMAN), and acute motor sensory axonal neuropathy (AMSAN) [9].

This case highlights the significant clinical challenges associated with GBS, particularly in terms of respiratory involvement. As observed in our patient, GBS led to respiratory failure requiring intubation and mechanical ventilation [10]. The patient's initial symptoms included progressive weakness of both the upper and lower limbs, difficulty swallowing, and nasal speech, which led to the diagnosis of GBS. Due to the rapid progression of respiratory failure and an Erasmus GBS Respiratory Insufficiency Score (EGRIS) of 4, the patient was transferred to the ICU for urgent care, including intubation and mechanical ventilation. The need for intensive care in GBS patients is common, with approximately 50% of patients requiring ICU admission because of respiratory issues and autonomic dysfunction [11,12].

GBS treatment primarily involves immunotherapy, including Therapeutic Plasma Exchange (TPE) and intravenous immunoglobulin (IVIg), both of which have shown efficacy in improving outcomes. TPE, performed over three consecutive days in our patient, resulted in significant clinical improvement, particularly in respiratory parameters, which allowed for successful weaning from mechanical ventilation by day 5 of ICU care. TPE works by removing pathogenic antibodies and immune complexes from the blood, which can significantly shorten the time spent on a ventilator and improve functional recovery. The use of TPE in GBS is well documented, with early initiation (within two weeks of symptom onset) being crucial for optimal results [13].

In addition to immunotherapy, supportive care, including appropriate antibiotic therapy, nutritional support, and thromboprophylaxis, is vital for managing patients with GBS in the ICU. Our patient received broad-spectrum antibiotics as prophylaxis, appropriate fluid management, and early physiotherapy to prevent complications, such as deep vein thrombosis (DVT) and muscle atrophy. Nutritional support was also essential, as enteral feeding was initiated early to prevent muscle mass loss and support recovery. The patients' nutritional needs were carefully calculated, and the goal was to meet 100% of caloric needs with high protein intake, which is essential for muscle recovery in critically ill patients [13].

The decision to initiate mechanical ventilation in patients with GBS is crucial and is based on factors such as the rapid progression of respiratory weakness, bulbar involvement, and failure to maintain adequate ventilation [9]. In this patient, the need for mechanical ventilation was indicated by rapid respiratory decline,

with an EGRIS score of 4, placing him in the intermediate-risk category for requiring ventilation. Additionally, early tracheostomy should be considered for patients at high risk of prolonged mechanical ventilation, as it can provide comfort, facilitate early enteral nutrition, and improve oral hygiene and mobility [14].

In conclusion, this case emphasises the importance of the early recognition and aggressive management of GBS, particularly in patients with respiratory failure. TPE has proven to be an effective treatment when administered early, improving both respiratory function and the time required for mechanical ventilation. Supportive care, including adequate nutrition, antibiotic prophylaxis, and monitoring for complications, remains essential in managing critically ill patients with GBS. Further studies are needed to refine the timing and protocols for immunotherapy and ventilatory support to improve the long-term outcomes in patients with GBS.

CONCLUSION

Guillain-Barré Syndrome (GBS) is a peripheral polyneuropathy that causes acute limb weakness after infection, leading to respiratory muscle dysfunction, airway obstruction, ineffective coughing, and increasing pulmonary complications. Current treatments, including intravenous immunoglobulin (IVIG) and plasmapheresis, neutralise and remove circulating antibodies with equal effectiveness. Early intervention and the FASTHUG framework are essential for preventing complications. GBS, an autoimmune disease post-infection, results in nerve cell destruction, with muscle weakness potentially leading to respiratory failure that requires mechanical ventilation. Plasmapheresis is often preferred to IVIG treatment.

DECLARATIONS

None

CONSENT FOR PUBLICATION

The Authors agree to be published in the Journal of the Society of Medicine.

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The authors declare no conflicts of interest in this case report.

AUTHORS' CONTRIBUTIONS

All authors contributed to the study, including data analysis, drafting, and review of the article. They approved the final version and were accountable for all the aspects.

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