PLASMAPHERESIS AND MULTIDISCIPLINARY INTENSIVE CARE MANAGEMENT FOR GUILLAIN-BARRÉ SYNDROME WITH PROLONGED MECHANICAL VENTILATION: A CASE REPORT

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Abstract

Guillain-Barré syndrome (GBS) is a rare, acute autoimmune peripheral neuropathy often triggered by infections. It leads to rapid-onset muscle weakness and, in severe cases, respiratory failure requiring mechanical ventilation. Plasmapheresis is recommended to reduce circulating autoantibodies that damage peripheral nerves. Guidelines suggest that early initiation of plasmapheresis may improve clinical outcomes, especially in patients with significant motor weakness. A 41-year-old female was referred to the emergency room with progressive ascending bilateral limb weakness, sensory deficits, and urinary incontinence. Symptoms emerged 26 days prior and treatments from previous hospitals were ineffective. Physical examination revealed cranial nerve involvement, proprioceptive disturbance, and reduced deep tendon reflexes. Laboratory tests showed leukocytosis, thrombocytosis, hypoalbuminemia, electrolyte imbalance, and elevated D-dimer. Cerebrospinal fluid analysis was normal. The patient was diagnosed with GBS, intubated by day six post-admission due to respiratory failure and tracheotomized by day eight. The patient was admitted to the intensive care unit. Plasmapheresis, initiated on day 17, improved motor strength after three sessions spaced over 10 days. However, delayed intervals between sessions and limited access potentially impeded the recovery process. Despite improvements, the patient remained ventilator-dependent and require multidisciplinary interventions. Inhalation therapy, enteral feeding, physical rehabilitation, and psychiatric interventions were administered. The family was informed of potential long-term ventilator dependency and home care preparation. This case underscores the importance of timely plasmapheresis and coordinated, multidisciplinary ICU management in severe GBS, encompassing neurological treatment, respiratory care, nutrition management, physical rehabilitation, and psychological support for the patient and their caregivers.

Keywords

Guillain-Barré syndrome, plasmapheresis, respiratory failure, mechanical ventilation, intensive care unit

Introduction

Guillain-Barré Syndrome (GBS) is a rare, acute autoimmune disorder characterized by inflammation and damage to the peripheral nerves.[1,2] It is commonly triggered by infections, with *Campylobacter jejuni* infection being the most extensively reported.[3] GBS often progresses rapidly, causing the classic presentation of progressive, ascending, flaccid limb weakness with reduced reflexes, which can be accompanied by sensory and autonomic nerve dysfunction.[1,2] In severe cases, GBS may lead to respiratory failure necessitating mechanical ventilation and intensive care unit (ICU) admission.[4] Although the prognosis of GBS patients is generally good, long-term morbidity, and prolonged dependence are sometimes reported. [2,5] Further, a small number of patients die from GBS, with higher mortality rates found in less developed settings.[2] This evidence demands timely diagnosis and evidence-based interventions to improve outcomes and prevent severe complications.

One of the recommended treatments for GBS is plasmapheresis.[6] Plasmapheresis removes circulating autoantibodies, immune complexes, and pro-inflammatory factors, thereby limiting neural damage.[7] Studies have demonstrated its efficacy in improving motor function, reducing ventilator dependency, and shortening recovery times.[8] However, the timing and frequency of plasmapheresis sessions significantly influence its effectiveness. The currently available evidence suggests that plasmapheresis should be initiated as soon as possible in GBS patients who are unable to walk unaided. Further, giving patients four to five sessions over one to two weeks with approximately three liters of plasma administered in each session is recommended. Delays and reduction of plasmapheresis sessions are associated with poorer outcomes.[6,9]

Despite the critical role of plasmapheresis, managing severe GBS with respiratory complications requires a broader, multidisciplinary approach.[10] Nutritional optimization in patients admitted to the ICU is crucial.[11] Specifically in GBS patients, nutritional support enhances recovery by addressing the limited oral intake capabilities and hypermetabolic state associated with the disease.[12] Physical rehabilitation plays a pivotal role in restoring muscle strength, improving breathing capacities, and reducing pain.[13] Furthermore, psychological care is essential in addressing the emotional burden of prolonged ICU stays and potential long-term ventilator dependency.[10,14]

This manuscript presents a complex case of severe GBS with delayed initiation of plasmapheresis and prolonged ventilator dependency. It underscores the importance of timely plasmapheresis and comprehensive, multidisciplinary management in optimizing outcomes for critically ill patients with GBS.

Case Report

A 41-year-old female was referred to the emergency room with progressive ascending bilateral limb weakness, sensory deficits, and urinary incontinence. Her symptoms had begun 26 days prior, initially with bilateral leg weakness that hindered her ability to walk independently. She was admitted to a local hospital and diagnosed with an electrolyte imbalance. Although her condition did not improve, she was discharged. Three days before her admission to our hospital, her symptoms worsened, leading to her readmission to another facility. Treatment there also failed to alleviate her condition, prompting a referral to our hospital.

On admission, the patient exhibited weakness in all extremities, sensory deficits, and urinary incontinence. Physical examination further revealed cranial nerve involvement, proprioceptive disturbances, and diminished deep tendon reflexes. Laboratory findings showed leukocytosis, thrombocytosis, hypoalbuminemia, electrolyte imbalance, and elevated D-dimer levels, while cerebrospinal fluid analysis returned normal results. She was diagnosed with Guillain-Barré syndrome (GBS) and admitted to the intensive care unit (ICU) nine days post-admission after developing respiratory failure, necessitating intubation. By day 11, a tracheostomy was performed.

On day 17 post-admission, plasmapheresis was initiated, consisting of three sessions spaced over 10 days. Improvement in motor strength was noted after the second session; however, the delayed initiation and infrequent sessions, caused by systemic and financial constraints, may have contributed to slower recovery. Approval delays within the hospital management system, combined with financial limitations due to the restricted coverage provided by the national healthcare program, significantly hindered access to timely and adequate plasmapheresis. At 30 days post-admission, the patient remained on mechanical ventilation, requiring comprehensive multidisciplinary management.

The patient was managed with a comprehensive pharmacological regimen, including broad-spectrum antibiotics such as cefepime, meropenem, and levofloxacin, alongside anticoagulation with heparin. Respiratory management included regular bronchoscopy and inhaled bronchodilators to address sputum retention. Nutritional support was provided via enteral feeding with 1,500 kcal/day, emphasizing high protein intake and essential micronutrients. Physical rehabilitation focused on chest physiotherapy, cough assistance, and passive range-of-motion exercises to prevent muscle atrophy and enhance diaphragm function. The patient's psychosocial needs were also addressed with psychotherapy and pharmacological treatment for depression and anxiety, including sertraline, amitriptyline, and clobazam. Furthermore, her family received education on long-term ventilator dependency and preparation for home ventilator care.

Discussion

This case highlights the complex multidisciplinary intensive care management of severe GBS, particularly when delayed diagnosis and limited resources hinder timely

evidence-based intervention. Similar to the reported literature, the patient presented with classic signs of GBS progressive ascending muscle weakness and reduced physiologic reflexes.[2] Other clinical findings, such as sensory deficits, cranial nerve involvement, and autonomic dysfunction further support the diagnosis according to the modified US National Institute of Neurological Disorders and Stroke (NINDS) criteria for GBS.[2,15] Moreover, electrophysiological studies can further ascertain the diagnosis, as nerve conduction slowing indicates GBS.[2]

The patient received plasmapheresis, the recommended treatment for GBS.[6] However, the available evidence indicates that plasmapheresis should be initiated promptly in GBS patients who are unable to walk without assistance. Additionally, it is advised to administer four to five sessions over a span of one to two weeks for optimal results.[6] In the patient, plasmapheresis was initiated on day 17 post-admission, after respiratory failure had already necessitated mechanical ventilation and more than one month after the onset of bilateral leg weakness. Furthermore, only three sessions were administered to the patient, less than recommended. These restrictions were caused by financial limitations due to the restricted coverage provided by the national healthcare program and approval delays within the hospital management system. Challenges regarding Indonesia's national health insurance, especially concerning its limited financial coverage, have been noted.[16–18] This has led to suboptimal management as the accessibility of recommended diagnostic tests and treatments is restricted.[19] This issue is further exacerbated by intrahospital administrative and management delays. Healthcare delays affecting patient care have been studied previously, especially in low- and middle-income countries.[20,21] This case highlights the need for systemic improvements to reduce barriers to timely and adequate care for GBS.

The effects of delayed and insufficient plasmapheresis sessions were evident in this case. Previous studies indicate that plasmapheresis is most effective when delivered in at least four sessions; patients receiving fewer sessions often experience prolonged recovery times, including delays in regaining the ability to walk with assistance and weaning off mechanical ventilation. Furthermore, long-term outcomes are poorer, with a reduced likelihood of achieving full muscle strength within a year.[8] Thus, although some improvement in motor function was noted in the patient, the delayed initiation and limited number of sessions may have hindered optimal recovery.

The management approach also emphasized the importance of integrating intensive care strategies. Multidisciplinary management, incorporating pharmacological and non-pharmacological strategies, has improved GBS patients' outcomes.[22,23] In this patient, mechanical ventilation was essential to manage respiratory failure. This is further supported by medications, bronchoscopy, and chest physiotherapy to help address sputum retention. Moreover, supporting airway management in this case, previous studies show that tracheostomy in ventilator-dependent GBS patients is often indicated, especially in cases where prolonged mechanical ventilation is likely.[24]

The case also highlights the importance of nutritional support in critically ill GBS patients. The patient received a carefully calculated enteral feeding regimen enriched with high protein and essential micronutrients. Malnutrition in GBS can be caused by multiple factors, including swallowing difficulties and the hypermetabolic state associated with the disease.[12,25] A lack of nutritional support in GBS patients may compromise fluid and electrolyte balance, reduce immune competence, and induce muscle wasting.[26] Furthermore, as the patient is admitted to the ICU for a prolonged period, evidence suggests that she should be considered at risk for malnutrition.[11] Guidelines also recommend enteral nutrition in intensive care patients incapable of having an oral diet,[11] such as the case patient.

Another notable aspect of care was the integration of psychosocial support. Psychiatric symptoms are often associated with GBS, especially those admitted to the intensive care unit.[27,28] Findings may include anxiety, depression, fatigue, sleep disturbances, and, in some cases, psychosis.[27,28] The case patient was diagnosed with depression and anxiety. She received psychopharmacology, including sertraline, amitriptyline, and clobazam, along with supportive psychotherapy. Furthermore, education for the family on the potential for long-term ventilator dependency and preparation for home-based care also highlights the necessity of comprehensive care planning. Family support is considered paramount in aiding the recovery of GBS patients.[29] These steps show the importance and complexity of addressing the psychosocial needs of critically ill GBS patients.

Lastly, physical rehabilitation was another key component of the treatment strategy. The patient received chest physiotherapy, cough assistance, and passive range-of-motion exercises targeting the diaphragm and limb muscles. Previous studies have shown that rehabilitation is associated with better outcomes for GBS patients.[30] Physical therapy can improve motor function, muscle strength, and breathing capabilities.[31] However, it is also found that not all GBS patients with disability receive treatment by physical therapists, underlining the need for a standardized practice and increased access to such treatments.[32]

The primary takeaway from this case is that managing severe GBS in the ICU requires timely initiation of plasmapheresis and a well-coordinated multidisciplinary approach. Respiratory support, nutritional optimization, physical rehabilitation, and psychosocial care are all essential components of treatment. This case reinforces the need for a holistic approach to managing GBS, tailored to the patient's individual circumstances and available resources.

Competing Interests

There are no conflicts of interest.

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