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Case Report

Home Mechanical Ventilation in a Patient with Guillain-Barré Syndrome: Experience in a Secondary Public Hospital – A Case Report

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Abstract: Guillain-Barré syndrome (GBS) is an immune-mediated polyradiculopathy that typically presents with neurological symptoms within four weeks of a preceding infection. It is characterized by symmetrical, ascending muscle weakness and areflexia, often sparing cranial nerves. Two therapeutic modalities are currently established—intravenous immunoglobulin (IVIG) and plasmapheresis—with comparable efficacy. Despite treatment, a subset of patients may experience severe functional impairment or even mortality. We present the case of a patient with GBS who showed poor response to IVIG, developed respiratory failure, and underwent prolonged hospitalization with multiple complications. A multidisciplinary team enabled home discharge with mechanical life-support ventilation, facilitating continued rehabilitation in a safer, non-hospital environment.

Keywords: Home Mechanical Ventilation, Life-Support Ventilator, Guillain-Barré Syndrome, Demyelinating Polyneuropathy, Critical Care, Case Report.

INTRODUCTION

Guillain-Barré syndrome (GBS) is an acute, immune-mediated polyradiculoneuropathy characterized by progressive, symmetrical, and ascending weakness [1]. Symptoms typically emerge within four weeks of a triggering infection. GBS is the most frequent cause of flaccid paralysis globally, with an estimated incidence of 1–2 cases per 100,000 people annually, and a higher prevalence in males [1, 2].

Etiological factors vary by region, with up to 35% of cases associated with upper respiratory tract infections and 27% with gastrointestinal infections. Less frequently, it has been linked to vaccinations and immune checkpoint inhibitors [1].

Diagnosis is primarily clinical, based on the National Institute of Neurological Disorders and Stroke (NINDS) criteria [2, 3], and may be supported by lumbar puncture and electromyography (EMG). EMG may reveal acute inflammatory demyelinating polyneuropathy (AIDP), acute motor axonal neuropathy (AMAN), or acute sensory axonal neuropathy (ASAN). However, normal findings do not rule out GBS.

Treatment options include IVIG (0.4 g/kg/day for 5 days) and plasmapheresis, both considered equally effective [3]. Despite therapy, a significant proportion of patients do not improve within the first four weeks, often prompting changes in treatment without proven benefit [2, 3].

Recovery is prolonged in many cases, with patients requiring up to 6–12 months to regain ambulation. Mechanical ventilation may be required in 20–30% of cases, and mortality ranges from 3–10% due to complications [3].

Weaning from ventilation can be particularly challenging in GBS due to profound muscle weakness, often resulting in prolonged hospitalization and secondary complications such as ventilator-associated pneumonia (VAP). Here, we report the case of a GBS patient who required prolonged mechanical ventilation and, following complications, was successfully discharged home with life-support ventilatory assistance.

CASE PRESENTATION

A 54-year-old male patient with no history of chronic degenerative diseases presented to our service. He had a prior episode of Guillain-Barré syndrome 12 years earlier, which required invasive mechanical ventilation for 16 days, six sessions of plasmapheresis, and a tracheostomy that remained in place for six months.

The current clinical presentation began with a 2-week history of non-dysenteric diarrheal stools. He initially consulted a private physician who prescribed an unspecified antibiotic regimen, resulting in partial improvement; however, the patient discontinued the treatment. One week after stopping the antibiotics, he developed oppressive headaches that partially resolved with analgesics. Three days later, he experienced neck pain and progressive weakness in both his upper and lower limbs.

On physical examination, the patient was unable to ambulate. He was afebrile, cranial nerve function was preserved, and muscle strength was graded 1/5 proximally and 0/5 distally in all four extremities, symmetrically, according to the Daniels scale. Deep tendon reflexes were absent, while sensation was intact in all limbs. Based on the clinical history and National Institute of Neurological Disorders and Stroke (NINDS) criteria, a diagnosis of pure motor Guillain-Barré syndrome was suspected. A head computed tomography scan showed no significant abnormalities.

On the first day of hospitalization, the patient exhibited marked weakness in all extremities and reliance on accessory muscles for breathing. Additionally, sialorrhea was noted. The Erasmus Guillain-Barré Respiratory Insufficiency Score (EGRIS) was calculated at 11 points, indicating a 94% probability of inability to ambulate independently within 4 weeks, 70% at 3 months, and 51% at 6 months, and also serving as a predictor of respiratory failure. Given the high risk of respiratory compromise and clinical presentation, advanced airway management was promptly initiated.

A lumbar puncture was performed, revealing the following cerebrospinal fluid findings: glucose 97 mg/dL, protein 0.06 g/dL, clear and colorless fluid, leukocytes 1/mm³, erythrocytes 2/mm³, and a negative Gram stain. Despite the absence of significant protein elevation, the clinical presentation, medical history, and lack of infectious focus or structural brain lesions justified the diagnosis of Guillain-Barré syndrome.

The patient was admitted to the intensive care unit (ICU) and received 15 vials of 6 g intravenous immunoglobulin (IVIG). After 8 days in the ICU, persistent weakness was observed, and the patient failed multiple attempts to wean from mechanical ventilation.

The decision was made to transfer the patient from the intensive care unit to the internal medicine ward to continue the weaning protocol from mechanical ventilation.

During his stay in the internal medicine ward, the patient required several invasive procedures due to his clinical status. Initially, a urinary catheter was placed, followed by the insertion of a central venous catheter to administer total parenteral nutrition, as the patient was unable to swallow.

After 16 days of mechanical ventilation, a tracheostomy tube was placed, and one day later, a gastrostomy tube was inserted to ensure enteral nutrition. It is important to note that the patient not only underwent multiple invasive procedures but also developed several complications related to his prolonged hospitalization.

He experienced melena and a decrease in hemoglobin levels. An upper endoscopy was performed, revealing erosive esophagitis and gastritis without active bleeding, for which treatment with a proton pump inhibitor was initiated.

The patient developed a urinary tract infection characterized by a significant leukocyte response. Due to delays in culture results at our hospital and considering the typical behavior of nosocomial bacteria in our unit as well as the patient's

prior intensive care status, broad-spectrum antibiotic therapy was initiated with a glycopeptide and an antipseudomonal carbapenem, resulting in an improvement in the systemic inflammatory response.

Before completing this treatment course, the patient exhibited a new increase in leukocyte count. Urinalysis and urine cultures identified a fungal infection associated with urinary catheter use, prompting the addition of fluconazole to his regimen.

During this period, the patient was assessed by the physical rehabilitation service, showing slow progress in regaining muscle strength. He remained on spontaneous mechanical ventilation, but repeated attempts to wean him permanently from the ventilator were unsuccessful.

Subsequently, the patient developed ventilator-associated pneumonia, fulfilling criteria for acute respiratory distress syndrome (ARDS) and hemodynamic instability. This necessitated deep sedation, initiation of vasopressor support, and the start of a new antibiotic regimen. Due to previous antibiotic exposure, respiratory quinolone and piperacillin-tazobactam were administered. This complication significantly delayed his physical and pulmonary rehabilitation, and no causative pathogen was identified from cultures.

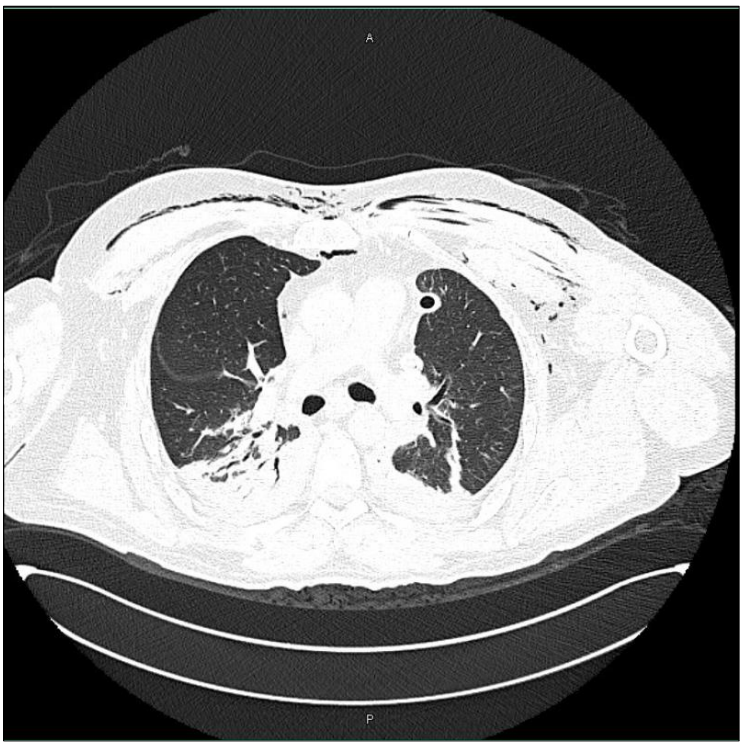

Figure 1: Computed axial tomography with right basal consolidation and air bronchogram, secondary to ventilator-associated pneumonia

Despite the pneumonia, the patient completed the antibiotic treatment, sedation was discontinued, vasopressor support was tapered off, and physical therapy was resumed. However, after a few days, he experienced respiratory deterioration again, with increased secretions through the tracheostomy tube and elevated white blood cell count. Bronchial secretion cultures isolated *Acinetobacter baumannii*, and peripheral blood cultures grew *Staphylococcus epidermidis*. Consequently, a new antibiotic regimen was initiated based on culture sensitivities, including cefepime and linezolid.

The patient's clinical situation was discussed with his family. Although unable to verbally express himself, the patient communicated a desire to no longer remain hospitalized. A multidisciplinary consultation was convened involving internal medicine, pulmonology, physical rehabilitation, nutrition, and inhalation therapy teams.

A mechanical life-support ventilator was requested for home use, and family members received training on alarm responses and troubleshooting. The ventilator was properly installed at the patient's home. The inhalation therapy team provided instruction on suctioning secretions through the tracheostomy cannula. Nutritional support was coordinated and delivered by the nutrition department. Ventilator settings were managed by pulmonology. Physical rehabilitation provided home-based exercises with follow-up coordinated by internal medicine. This comprehensive approach aimed to offer the patient a more comfortable recovery environment while minimizing further exposure to nosocomial infections.

After 83 days of hospitalization, the patient was discharged with home mechanical life-support ventilation.

At home, the patient continued receiving family care with satisfactory progress, gradually regaining strength and avoiding new infections. A few months after discharge, the patient requested removal from the ventilator due to fatigue and did not require reconnection thereafter.

The patient remains under follow-up in our internal medicine clinic, having progressed to wheelchair mobility and currently able to ambulate with some difficulty. The tracheostomy tube has been decannulated, and the gastrostomy tube removed.

DISCUSSION

We present a typical clinical case of a patient who developed Guillain-Barré syndrome following a gastrointestinal infection. The diagnosis was made according to the NINDS criteria. Although cerebrospinal fluid cytology and cytochemistry did not meet the typical protein elevation standard, it is well-known that, particularly within the first few days after symptom onset, cerebrospinal fluid protein levels may remain normal, which does not exclude the diagnosis [2, 3]. Studies have reported that up to 2–5% of patients with Guillain-Barré syndrome may experience a relapse [3]. In our patient's case, this was not considered since his previous episode occurred 12 years prior.

The patient's condition progressed rapidly, leading to respiratory failure—a complication seen in up to 30% of Guillain-Barré syndrome patients [3]. This clinical course resulted in multiple complications secondary to prolonged hospitalization and invasive procedures during his stay.

Severe muscle weakness was a critical factor contributing to failure to wean from mechanical ventilation, which in turn predisposed the patient to ventilator-associated pneumonia with acute respiratory distress syndrome, necessitating deep sedation and further complicating his recovery.

Considering the challenging extubation scenario, the prolonged rehabilitation process, and the need to avoid additional ventilation-related complications, home mechanical ventilation was deemed an appropriate management strategy.

Home mechanical ventilation is a type of noninvasive ventilation that has been described in the management of patients with various pathologies, including those associated with upper airway obstruction, such as obstructive sleep apnea syndrome (OSAS); dynamic lower airway obstruction, such as bronchomalacia; and chronic respiratory failure with hypercapnia, which includes neuromuscular diseases, motor neuron diseases, disorders of the neuromuscular junction, and muscle diseases [4].

In developing countries, where the use of home mechanical ventilation is more common, there are programs focused on the guidance and management of patients with these pathologies [4, 5]. However, in low- and middle-income countries, the use of such devices is uncommon and is largely restricted to CPAP or BiPAP devices in patients with OSAS [4].

It is well established that home mechanical ventilation reduces hospital stays, healthcare costs, and infection rates, while improving patients' quality of life [5]. Nevertheless, its use can be complex and requires a multidisciplinary approach alongside family support to achieve these benefits.

In patients using CPAP, major difficulties are uncommon; the main limitations reported involve mask size or, occasionally, young patients who have trouble adapting to the device or those with psychiatric disorders [6]. However, in our patient's particular case, due to his severe immobility, it was necessary not only to educate family members on the home ventilator but also to train them on secretion aspiration, feeding, tube care, and rehabilitation.

There are different types of home mechanical ventilators, depending on the patient's level of ventilator dependence. Patients with low ventilator needs (<10 hours per day) may use bilevel positive airway pressure technology during sleep. Those with intermediate requirements (>10 and <16 hours per day) may use BiPAP or life support ventilators [5]. Our patient, being highly dependent on mechanical ventilation (>16 hours per day) and requiring 24-hour support, was provided with a life support ventilator.

Since our unit is a public hospital, the provision of these devices is subcontracted to a private company. For this patient, a ResMed Stellar™ 150 life support ventilator was supplied, programmed with a tidal volume of 480 ml, a respiratory rate of 16 breaths per minute, FiO2 at 50%, and PEEP set at 5 cmH2O.

Patients must remain hospitalized for 72 hours after initiation on the life support ventilator to monitor adaptation and identify any complications before discharge. Following this trial period, the ventilator is installed at home with pre-programmed parameters to avoid errors by family members; the device's control panel is locked to prevent changes.

Family members are trained to recognize and troubleshoot alarms. If they cannot resolve an alarm, they have access to a telephone line connecting them with an expert for immediate guidance.

The patient was followed regularly at the internal medicine outpatient clinic. After a couple of months, the patient reported feeling strong enough to request disconnection from the ventilator via the tracheostomy tube. Subsequently, he was able to breathe effectively on his own without needing reconnection.

Gradually, he regained muscle strength, enabling him to transfer from bed to wheelchair. He also recovered speech and swallowing abilities, leading to removal of the gastrostomy tube and decannulation of the tracheostomy tube.

Currently, more than a year after the initial event, the patient is fully independent and ambulatory.

CONCLUSIONS

We present a case of home mechanical ventilation in a patient with Guillain-Barré syndrome. Following the transition to a life-support ventilator, the patient achieved a faster recovery, avoided further infections, and prevented additional hospitalizations.

Although this type of life-support ventilation is common in low- and middle-income countries, it is important to acknowledge its availability within the public healthcare sector. Our aim is to encourage the medical community to consider alternative treatment strategies. While initially this approach may seem costly, in the long term it reduces hospital stay duration, complications, and consequently, the overall costs borne by institutions or families in the private sector.

We emphasize the importance of a multidisciplinary approach, highlighting the role of multiple healthcare services in providing training and support to the family, enabling a successful recovery. Additionally, we underscore the vital role of family involvement in home care, as ultimately, those who care for the patient the most are those who love them the most.

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