

# Nutritional and Multidisciplinary Management in Guillain–Barré Syndrome: A Case Study

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## Abstract

Guillain–Barré Syndrome (GBS) is a rapidly progressive neurological disorder characterized by acute muscle weakness resulting from immune-mediated damage to the peripheral nervous system.

A 44-year-old male patient was admitted with complaints of fever, left-sided weakness, and left upper limb weakness. Electrophysiological evaluation revealed findings suggestive of motor and demyelinating polyradiculoneuropathy involving both upper and lower limbs. Due to progressive respiratory distress, the patient required mechanical ventilation, and enteral nutrition was initiated on Day 2 of hospitalization.

The treatment plan included immunoglobulin therapy and therapeutic plasma exchange, along with physiotherapy sessions conducted every six hours to support neuromuscular recovery.

A detailed Subjective Global Assessment (SGA) was performed on admission, categorizing the patient as well-nourished. Nutritional status was subsequently reassessed on a monthly basis. Enteral nutrition providing approximately 2520 kcal and 126 g of protein per day was initiated. The patient tolerated enteral feeds for the first 10 days but later developed loose stools. A semi-elemental diet was introduced; however, this was not tolerated beyond Day 14. Consequently, total parenteral nutrition (TPN) along with clear liquids and soluble fiber was initiated.

Enteral nutrition was reintroduced on Day 24 to reassess tolerance but remained poorly tolerated. By Day 27, kitchen-based feeds and easily digestible foods were gradually introduced and tolerated well. Despite these efforts, the patient experienced significant weight loss of approximately 20 kg over the first two months due to prolonged feeding intolerance.

From the third month onward, a specialized pre-digested elemental formula designed for patients with severe gastrointestinal sensitivity was prescribed. This formula was well tolerated, and the patient received approximately 50% of daily caloric intake from the formula, with the remaining calories provided through TPN and oral kitchen-based feeds for the next three months. As adequate caloric intake was achieved, TPN was gradually tapered and discontinued.

From the fourth month, oral semi-solid foods were progressively introduced to facilitate transition to solid feeding. By the sixth month, the patient was able to meet nutritional requirements through oral semi-solid meals supplemented with high-protein nutritional products, resulting in a weight gain of approximately 5 kg over six months.

After a seven-month hospital stay, the patient was discharged with a body weight of 69.6 kg. Follow-up evaluation in the eighth month showed further improvement, with the patient's weight increasing to 72 kg.

## Introduction

Guillain–Barré Syndrome (GBS) is an acute immune-mediated disorder of the peripheral nervous system characterized by rapidly progressive weakness, are flexia, and variable sensory involvement. The condition commonly follows viral or bacterial infections and may progress to respiratory failure requiring mechanical ventilation. Severe cases often necessitate prolonged intensive care support.

Beyond immunotherapy and ventilator management, nutritional care represents a fundamental yet often under-prioritized component of GBS management. Patients frequently develop dysphagia, gastrointestinal intolerance, and hypercatabolic stress due to systemic inflammation and prolonged immobilization. These factors substantially increase the risk of ICU-acquired malnutrition, which has been associated with delayed recovery, impaired wound healing, increased infection risk, and prolonged hospitalization.

Current critical care nutrition guidelines emphasize early enteral nutrition, adequate protein delivery, and individualized metabolic monitoring in neurologically compromised patients. However, literature describing long-term phased nutritional management in severe GBS remains limited. This case study describes the comprehensive nutritional and multidisciplinary management of a critically ill GBS patient over a seven-month recovery period.

## Case Description

A 44-year-old male presented with complaints of fever and progressive left-sided weakness. The patient had a recent history of eating outside food a week prior to admission and had experienced intermittent fever for five days. He developed sudden-onset weakness in the left upper limb, which progressively involved all four limbs (bilateral lower and right upper limbs). On admission, he was well-nourished with a height of 182 cm, weight of 85 kg, and BMI of 26.

## Clinical Status on Admission:

The patient was hemodynamically stable with a pulse rate of 78 beats per minute, respiratory rate of 17 breaths per minute, and blood pressure of 130/80 mmHg. He was afebrile at presentation, and the pain score was documented as 0/10.

Electrophysiological evaluation demonstrated motor demyelinating polyradiculoneuropathy consistent with acute inflammatory demyelinating polyneuropathy. Owing to progressive respiratory compromise, the patient required endotracheal intubation and mechanical ventilation. Enteral nutrition was initiated on day 2 of hospitalization.

## NCV Study Report:

Electrophysiological evaluation through nerve conduction velocity (NCV) testing revealed findings consistent with motor and demyelinating polyradiculoneuropathy involving both upper and lower limbs. The report indicated significant slowing of nerve conduction velocities and prolonged distal latencies, suggestive of widespread peripheral nerve involvement typical of acute inflammatory demyelinating polyneuropathy (AIDP), the most common subtype of GBS. These findings corroborated the clinical symptoms of symmetrical limb weakness and supported the diagnosis, prompting immediate initiation of immunomodulatory and supportive therapies.

## Physiotherapy Notes:

On initial assessment, the patient's muscle power was significantly diminished. Lower limb strength was

graded at 2/5, indicating active movement with gravity eliminated, while upper limb power was severely reduced to 1/5, reflecting only a flicker of muscle contraction without any joint movement. The physiotherapy team initiated passive range-of-motion exercises and positioning techniques to prevent contractures. Therapy sessions were conducted four times daily, focusing on maintaining joint mobility, stimulating muscle activity, and preserving circulation. As the patient progressed, bedside mobilization, sensory stimulation, and sitting balance training were gradually introduced. Despite profound initial weakness, consistent physiotherapy contributed substantially to neuromuscular recovery in later stages of care.

### Plan of Care

The patient's management strategy was multidisciplinary and aimed at immunomodulation, prevention of complications, and supportive care. Intravenous immunoglobulin (IVIG) therapy and therapeutic plasma exchange were administered to reduce circulating autoantibodies and attenuate the inflammatory response. Prophylaxis for deep vein thrombosis (DVT) was instituted using pharmacologic anticoagulation in conjunction with mechanical compression devices. Given the anticipated prolonged immobility, a comprehensive pressure injury prevention protocol was implemented. This included scheduled repositioning at two-hour intervals, utilization of pressure-relieving support surfaces, meticulous skin moisture control, and optimization of nutritional status to support tissue integrity.

### Nutritional Intervention:

Nutritional intervention focuses on a comprehensive high-calorie, high-protein diet designed for a patient diagnosed with Guillain-Barré Syndrome (GBS). The primary dietary goal is to meet elevated energy and protein needs to preserve lean body mass, enhance neuromuscular recovery, and support the immune response. Based on an ideal body weight (IBW) of 84 kg, the daily energy requirement is estimated at 2520 kcal (30 kcal/kg), while protein needs are calculated at 126 grams/day (1.5 g/kg IBW).

In addition to macronutrient optimization, immunonutrition with a focus on omega-3 fatty acids, glutamine, and arginine to modulate inflammation and improve neuronal healing. Micronutrient support includes adequate levels of vitamin B12, vitamin D, zinc, and magnesium—critical for nerve conduction, muscle strength, and immune regulation.

Depending on the patient's swallowing ability and level of consciousness, nutritional delivery is provided through oral feeding when feasible, or via enteral nutrition (tube feeding) in cases of dysphagia or severe neuromuscular compromise. This individualized approach aimed to prevent malnutrition, reduce complications, and promote functional recovery.

### Phase 1: Acute Management (Day 1 To Day 16)

**Caloric intake:** 1582 to 1075 kcal/day

During this initial period, the patient received NG feeds consisting of a standard formula, starting with 100 ml administered every two hours. The goal was to meet basic caloric needs while assessing gastrointestinal tolerance. The caloric intake gradually decreased to 1075 kcal/day by Day 11, coinciding with the onset of gastrointestinal complications.

**Protein intake:** 65.5 to 41 g/day

Initial intake was adequate (65.5 g/day). A reduction in intake to 41 g/day was observed due to decreased feed volumes after GI symptoms emerged. By Day 11, the patient developed loose stools, likely related to

formula intolerance or infection. Consequently, a semi-elemental diet was initiated to improve absorption and gut comfort. Plasma exchange therapy was started alongside symptomatic treatment.

### **Phase 2: Parenteral Nutrition Initiation (Day 17 To Day 31)**

**Caloric intake:** 1000 to 1686 kcal/day

As oral and NG bolus feeds were poorly tolerated due to gastrointestinal instability and abdominal distension, the patient was transitioned to a combination of continuous enteral feeds and Total Parenteral Nutrition (TPN). Elemental and semi-elemental formulas were preferred to reduce the risk of malabsorption and minimize gut workload. Caloric intake gradually increased from 1000 - to 1686 kcal/day as GI symptoms improved.

**Protein intake:** 30 to 68 g/day

Protein was delivered through a combination of TPN and modified enteral feeds. The transition from bolus to continuous feeding was essential due to signs of intolerance, including vomiting and abdominal girth increase. TPN was introduced to bridge the nutritional gap and support metabolic demands. During this time, the patient also developed a respiratory tract infection with *Pseudomonas*, which was managed with targeted antibiotic therapy.

### **Phase 3: Intermediate Recovery (Day 32 To Day 58)**

As the patient's clinical stability improved, NG feeding continued using semi-elemental formulas for optimal GI absorption, while small portions of oral kitchen-based soft foods were gradually introduced. Caloric intake was maintained at 1727 kcal/day.

Protein intake was increased to support muscle mass restoration and tissue repair. A combined source of protein from enteral formula, TPN, and oral meals helped reach this target. With improvement in neuromuscular function, the patient demonstrated a fair swallowing response and was able to sit with assistance. T-piece trials were also initiated for respiratory weaning.

### **Phase 4: Gastrointestinal Sensitivity Management (Month 3)**

The patient developed *Clostridium difficile* infection, resulting in severe diarrhea and impaired nutrient absorption. Nutritional support included continuous elemental formula (Vivonex), TPN, and small oral feeds, providing a total of 2500 kcal/day. The strategy focused on gut rest, improved digestibility, and microbiome restoration. Treatment included Vancomycin, Metronidazole, and VSL#3 probiotics, with close monitoring of hydration and electrolytes.

### **PHASE 5: TPN WEANING (MONTH 4 TO MONTH 5)**

**Caloric intake:** 2236 kcal/day

**Protein intake:** 120 g/day

With the resolution of gastrointestinal complications and improvement in swallowing function, the patient began to tolerate a wider variety of oral foods. The elemental formula was continued in combination with a progressively increasing oral intake of semi-solid meals and thickened fluids to reduce aspiration risk. This transition allowed for the gradual tapering of TPN support.

A structured nocturnal feeding protocol was initiated (10 PM to 6 AM) to distribute caloric intake evenly over 24 hours. The patient's tolerance of oral intake improved significantly, with minimal signs of GI distress. TPN was successfully weaned off without compromising nutritional status.

### Phase 6: Full Oral Intake (Month 6 To Month 7)

**Caloric intake:** 2240 kcal/day

**Protein intake:** 130 g/day

During this final phase, the patient successfully transitioned to a full oral diet with consistent intake of soft solid foods, well-balanced kitchen-prepared meals, and specialized oral nutritional supplements. The patient demonstrated stable gastrointestinal tolerance with no recurrence of diarrhea, vomiting, or bloating. Functional swallowing assessments confirmed the safety of various food textures, allowing for expansion of the oral diet. Hydration and micronutrient needs were also met through oral routes. This phase marked the complete resolution of gastrointestinal sensitivity and full return to oral feeding independence. Nutritional goals were consistently met, supporting continued neuromuscular recovery and improved quality of life.

### Weight Progression – Summary

Over the seven-month period, the patient's weight changes reflected the overall nutritional and metabolic recovery. The weight decreased from 85 kg at admission to 60.7 kg by Day 90, mainly due to prolonged critical illness, gastrointestinal intolerance, infections, and reduced nutritional intake. With the gradual introduction of TPN, elemental formulas, and semi-solid oral diets, the patient showed steady weight improvement. By Day 202, the weight increased to 70.1 kg, indicating significant recovery from the lowest recorded weight. This improvement coincided with better gastrointestinal tolerance, transition to full oral feeding, and improved nutritional intake.

### Discussion:

The case emphasizes the importance of individualized nutrition strategies in GBS recovery. Challenges included feeding intolerance, recurrent infections, and reliance on TPN. Successful outcomes were supported by timely interventions, including elemental feeding, probiotic therapy, nocturnal nutrition, and close monitoring. The progressive reintroduction of oral feeding aligned with physical rehabilitation and improved GI function.

### Conclusion:

A phased, multidisciplinary nutritional care plan enabled a full transition from parenteral nutrition to independent oral intake in a patient with GBS. This case underscores the value of dynamic enteral strategies and GI-targeted interventions in managing long-term critically ill patient.

### References

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