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Case Report

# Anesthetic Management of a Patient with Chronic Inflammatory Demyelinating Polyneuropathy Undergoing Emergency Umbilical Herniorrhaphy: A Case Report

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**ABSTRACT**

Neuromuscular disorders are a wide range of conditions that weaken muscles. Chronic Inflammatory Demyelinating Polyneuropathy (CIDP) is an uncommon acquired immune-mediated prejunctional disorder that is not caused by an injury. This case report presents the anesthetic management of a 48-year-old male patient diagnosed with CIDP who required an emergency umbilical herniorrhaphy. The patient, weighing 95 kg and with a height of 172 cm, presented with acute abdominal pain, nausea, and vomiting, and had a notable history of intravenous immunoglobulin (IVIg) treatment and oral opium addiction. Anesthesia was induced using rapid sequence induction techniques, and general anesthesia was maintained with total intravenous anesthesia (TIVA). The operation was completed without complications, despite the patient experiencing transient symptoms of Raynaud's phenomenon during the procedure. Postoperatively, the patient had an uneventful recovery without respiratory complications or exacerbation of CIDP symptoms. This case highlights the complexities of anesthetic management in patients with CIDP due to potential risks associated with neuromuscular weakness, muscle relaxants, and the effects of immunosuppressive therapies. Further research is warranted to standardize anesthetic protocols for this patient population.

## Introduction

The neuromuscular disorders are a group of heterogeneous diseases with the major characteristic of a decrease in muscle strength [1]. We can divide them into three categories: prejunctional disorders, junctional disorders, and postjunctional disorders [2]. Chronic inflammatory demyelinating polyneuropathy (CIPD) is a uncommon, immune-mediated prejunctional neuromuscular disorder that gets worse over time and can cause peripheral neuropathy for more than two months [3]. It is rare in adults at 1-1.9 per 100,000 and more so in children at 0.48 per 100,000 [4]. The specific etiology remains unknown [5]. The classic presentation includes a slow progressive and symmetrical combination of muscle weakness and sensory impairment in both proximal and distal parts of the extremities [6]. This condition causes large fiber sensory loss, impaired balance, and areflexia [7]. For people who have CIDP, corticosteroids are one of the recommended treatments because they stop the abnormal immune responses that lead to the condition [8]. Approximately 80% of patients with CIDP respond well to corticosteroids, intravenous immunoglobulin (IVIg), or plasma exchange [9]. Due to the rarity of CIDP, only a few reports on the anesthetic management in these patients exist, and a standard safe anesthetic management has not been established.

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## Case Report

We obtained a written informed consent from the patient for the publication of this case report.

The patient, a 48-year-old male with a height of 172cm and a weight of 95 kg, had recently been diagnosed with CIPD. The patient complained about acute umbilical pain three hours ago, accompanied by nausea and vomiting. Last defecation was a few hours before admission. He reported taking IVIg in two sessions (one month and three months prior to admission) and also a history of oral opium addiction. He didn't mention difficulty walking but mentioned requiring some assistance with his activities in daily life. The patient also reported ecchymoses in fingers, especially in upper extremities in cold situations (like Raynaud's phenomenon).

The patient wasn't febrile, and vital signs were stable. The lab tests showed that the person had a small amount of white blood cells but no anemia. The liver and kidneys were also normal (Hb=16.8g/dL, WBC=11*109/L, Plt=354*109/L, Cr=1.3mg/dL, Urea=27mg/dL, BS=125mg/dL, AST=18U/L, ALT=20U/L, ALKP= 198U/L, Ca=9.9mg/dL, P=4mg/dL, Mg=1.0mg/dL, CPK=30mcg/L, Albumin=4.3g/dL). Ultrasound findings suggested an incarcerated umbilical hernia, and the patient was scheduled for emergency umbilical herniorrhaphy.

We put the patient to sleep using standard monitors (ECG, NIBP, and pulse oximetry) and then used the rapid sequence method to put them to sleep with 1 mg of midazolam, 100 µg of fentanyl, 100 mg of lidocaine, 150 mg of propofol, and 100 mg of rocuronium. Propofol (4–5 mg/kg/h) was then used to keep them asleep. Tracheal intubation and induction of anesthesia were uneventful, and the patient was monitored during the procedure using a capnograph and BIS. After trying to establish an extra IV access using torniquet, the symptoms of Raynaud's phenomenon appeared on the right upper limb and lasts for 30 minutes after removing torniquet. We used an intraoperative warmer to maintain body temperature. We also administered morphine (10 mg) and acetaminophen (1000 mg) intravenously for postoperative analgesia. The operation lasted for 2 hours without the need for any additional muscle relaxants, and the total blood loss was minimal. The patient received a total amount of 2 liters of crystalloids and had 300 cc urine output. The patient emerged from the anesthesia and was reversed by 5 mg neostigmine and 1.5 mg atropine and was uneventfully extubated in the operating room after confirming adequate spontaneous breathing. Next, the patient was transferred to the general ward. The postoperative course was uneventful without any respiratory complications such as respiratory depression, aspiration pneumonia, and progression of CIPD symptoms, and the patient was discharged after one day of hospital observation.

## Discussion

The anesthetic management of patients with Chronic Inflammatory Demyelinating Polyneuropathy (CIDP) presents several challenges, primarily due to the prolonged effects of muscle relaxants associated with neuromuscular disorders, which consequently elevate the risk of respiratory complications after surgery [10]. Other complications include neuromuscular weakness, autonomic neuropathy [11], delayed recovery from neuraxial anesthesia [12], adverse effects from medications such as steroids or immunoglobulins, and the potential need for extended mechanical ventilation [13].

In a study by Hara et al. in 2000, it was reported that patients experienced an extended recovery period of approximately 80 minutes for a 25% return of neuromuscular function following administration of vecuronium [10]. However, additional research has indicated that the use of rocuronium, along with Sugammadex for reversal, may be safe in patients with a known diagnosis of CIDP [14-15]. A 2017 retrospective case series examined postoperative outcomes in CIDP patients who underwent general anesthesia, encompassing 17 individuals. Notably, 16 of these patients presented with muscle weakness preoperatively. Among them, 5 (29.4%) received succinylcholine, while 11 (64.7%) were treated with non-depolarizing muscle relaxants. The study highlighted one patient who experienced a sudden exacerbation of CIDP symptoms after surgery [16]. Additionally, one patient succumbed to complications during their hospital stay, and another saw a worsening of symptoms several months later. There were two cases necessitating postoperative mechanical ventilation, one of which was due to aspiration. This research emphasizes the importance of considering patient frailty, bulbar dysfunction, and complications related to immunosuppressive treatments when providing anesthesia for CIDP patients undergoing procedures.

Takekawa and colleagues described a case where a patient with CIDP underwent laparoscopic surgery managed with total intravenous anesthesia (TIVA) using remifentanil, without the administration of muscle relaxants [17].

The safety profile of regional anesthesia for patients with CIDP remains uncertain. Ritchter and colleagues documented a case of a woman with CIDP who underwent spinal anesthesia for a cesarean section, resulting in an extended neuraxial blockade [12]. Conversely, GUPTA, et al. reported the successful use of spinal anesthesia in a patient with CIDP undergoing cystolithotripsy [18].

## Conclusion

In conclusion, we effectively managed the anesthesia of a patient with CIDP who underwent open surgery, utilizing a combination of total intravenous anesthesia

and a non-depolarizing muscle relaxant, achieving this without any complications.

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