Optimized Total Intravenous Anesthesia Using Propofol and Dexmedetomidine in a Myasthenia Gravis Patient Undergoing ERCP: A Reflex Suppression and Cardiac Strategy

ABSTRACT

A 75-year-old female with Oserman Grade IIb Myasthenia Gravis, ischemic heart disease, and multiple comorbidities underwent ERCP under general anesthesia using a carefully tailored total intravenous anesthesia technique with propofol and dexmedetomidine. Preoperative optimization, continuation of pyridostigmine and steroids, and local airway topicalization with lidocaine ensured reflex suppression and avoided the need for neuromuscular blocking agents. Anesthesia was induced and maintained with propofol and dexmedetomidine, with spontaneous ventilation preserved and hemodynamics stable throughout. The patient emerged smoothly, was extubated awake, and had an uneventful recovery and same-day discharge. This case highlights the feasibility of non-relaxant TIVA in MG patients needing airway instrumentation, balancing reflex control, cardiac safety, and respiratory function [1,5].

Keywords: Myasthenia Gravis, ERCP, TIVA.

INTRODUCTION

Anesthesia and surgery in patients with Myasthenia Gravis is known to carry increased perioperative risk and severe complications [1]. Myasthenia Gravis is an autoimmune disorder in which antibodies target and destroy postsynaptic acetylcholine receptors at the neuromuscular junction, leading to impaired synaptic transmission and fluctuating skeletal muscle weakness. It is manifested as fatigable weakness of ocular, bulbar, limb, and respiratory muscles [2].

Osserman proposed placing patients with Myasthenia Gravis in five groups: I – localized (ocular), II – generalized (mild or moderate), III – acute fulminating, IV – late severe, and V – muscle atrophy. Later, Osserman divided group II into the subclassification: A (mild) and B (moderate) [2]. This classification allows one to grade the disease severity, assess the perioperative risk and possible complications, so it remains a key tool in formulating the appropriate management plan.

MG patients show profound sensitivity to non-depolarizing neuromuscular blockers resulting in potential residual weakness, which may precipitate postoperative respiratory failure [4]. Thus, avoiding neuromuscular blockers is strongly advised. GA in patients with Myasthenia Gravis is extremely challenging because most medications such as induction agents, muscle relaxants and antibiotics, and even surgical stress, have been shown to exacerbate the symptoms and deteriorate prognosis [3].

Here, we present a rare case of a patient with Myasthenia Gravis who successfully underwent Endoscopic Retrograde Cholangiopancreatography (ERCP) under tailored anesthetic management. ERCP requires either deep sedation or GA due to shared airway, risk of aspiration, prone or lateral positioning and the potential for significant autonomic and airway reflex stimulation [5,8]. Being a part of NORA, the procedure, its environment, patient’s characteristics and possible complications such as high-grade jaundice can all present obstacles for the anesthesiologist. In high-risk patients like those with Myasthenia Gravis, a comprehensive preoperative assessment, understanding of the intervention and careful anesthetic planning is imperative to maintain airway control and cardiovascular stability while minimizing respiratory complications [2]. In our case, the use of TIVA with propofol and dexmedetomidine demonstrated superior feasibility of general anesthesia without the use of muscle

relaxants [6]. Our goal was to maintain adequate ventilation, suppress airway reflexes, and ensure hemodynamic stability in such a high-risk patient.

CASE REPORT

A 75Y/F, weighing 55 kg, diagnosed with Myasthenia Gravis 3 years back was scheduled for ERCP under general anesthesia who presented with right upper quadrant pain for 1.5 months and persistent nausea with acid reflux. Laparoscopic cholecystectomy with CBD stenting was done the month prior for Mirizzi syndrome. Myasthenia Gravis was well-controlled on pyridostigmine 60 mg TDS and prednisolone 5 mg OD, and classified as Oserman Grade IIb (generalised + moderate). No past history of myasthenic crisis was elicited.

Other comorbidities included ischemic heart disease, long-standing hypertension (20 years, controlled on amlodipine 5 mg daily), type 2 diabetes (12 years, well controlled on metformin 500 mg BD), obstructive sleep apnea (13 years, using nocturnal CPAP), and hypothyroidism (25 years, well controlled on levothyroxine 75 mcg daily, with a recent TSH of 3.2 µIU/mL). Her Activity of Daily Living (ADL) score was 6 and NYHA grade III. She had no signs of respiratory distress but demonstrated mild bilateral ptosis consistent with her known Myasthenia Gravis. Airway examination revealed Mallampati II, and no cervical spine limitation was found [2].

Preoperative optimisation included continuation of pyridostigmine up to the morning of the procedure and steroid coverage (Hydrocort 100 mg + Dexa 8 mg). Emphasis was on optimizing respiratory effort via incentive spirometry and avoiding sedatives. Nebulisation of the patient was done with (lignocaine + adrenaline) to desensitize airway. Routine blood tests revealed no systemic abnormalities. Recent echocardiogram revealed LVEF 40%, concentric LVH, mild pulmonary hypertension (RVSP 35 mmHg). Secondary factors affecting muscle strength were ruled out after checking electrolytes and thyroid profile. Neurological consultation confirmed stable Oserman Grade IIb MG with no new deficits and advised continuation of regular medications [1].

ERCP of our ASA grade III patient was planned under general anesthesia using TIVA [6]. Recognizing the challenges of Oserman Grade IIb Myasthenia Gravis and an LVEF of 40%, the aim was to ensure hemodynamic stability and spontaneous breathing. To mitigate cough reflex, a multimodal approach was employed: the patient was asked to

gargle with 4% lidocaine solution, and 10% lidocaine spray was applied generously to the oropharyngeal mucosa to anesthetize the upper airway. Standard monitoring, including continuous ECG, non-invasive blood pressure measurement, pulse oximetry, and capnography, was ensured to be in place in the procedure room. Premedication included fentanyl 50 mcg IV for analgesia and sympathetic attenuation, and glycopyrrolate 0.2 mg IV to reduce secretions and lower aspiration risk [5].

Anesthesia induction was commenced with propofol 1.5 mg/kg IV, delivered slowly to avoid sudden hemodynamic depression and was carefully titrated while observing for well-defined clinical endpoints in the absence of BIS monitoring [6]. The depth of anesthesia was assessed by confirming the loss of verbal response, loss of the eyelash reflex, and the onset of apnea, ensuring that the patient had reached an adequate plane for safe airway manipulation without excessive dosing. Intravenous lidocaine at 1.5 mg/kg was administered approximately ninety seconds before induction to blunt laryngeal and tracheal reflexes, thereby further ensuring a smooth passage of the endotracheal tube without the need for neuromuscular blockade [3].

Alongside propofol, a dexmedetomidine bolus of 0.5 mcg/kg was initiated and infused over ten minutes. Following successful intubation, anesthesia was maintained using a balanced TIVA technique with propofol infused at a rate of 75 to 100 mcg/kg/min. The infusion was carefully adjusted to clinical signs and vitals, maintaining stable anesthesia without cardiovascular depression and allowing a lighter propofol dose while keeping the patient immobile and comfortable. Dexmedetomidine was continued as an infusion at 0.3 to 0.5 mcg/kg/hr, providing ongoing sedation, analgesia, and sympathetic tone reduction [7,9].

Mechanical ventilation was provided in the form of pressure support ventilation (PSV) with a pressure support level of 10 cm H_2O, allowing the patient to breathe spontaneously but with adequate assistance to offset the work of breathing. Oxygen saturation remained consistently between 99–100%, end-tidal CO_2 was maintained within normal limits (35–40 mmHg), and respiratory rate stayed steady at 16–20 breaths per minute. Hemodynamic monitoring showed stable readings, with blood pressure maintained within 110–130/65–85 mmHg and heart rate between 70 and 85 bpm. The patient tolerated the 75-minute ERCP procedure, performed in the left lateral decubitus position, without any intraoperative complications or need for additional interventions [5].

At the conclusion of the procedure, the propofol and dexmedetomidine infusions were gradually discontinued, allowing the patient to emerge smoothly from anesthesia [7]. Within 4–5 minutes, she was fully awake, able to obey verbal commands, and demonstrated an intact gag and cough reflex without excessive airway irritation — a testament to the effective yet gentle airway reflex suppression strategy employed pre-induction. Extubation was carried out in a fully awake state to ensure airway protection. Monitoring in the PACU revealed a stable, cooperative patient with a GCS of 15, normal respiratory pattern, and no signs of muscle weakness or residual sedation. Pyridostigmine and steroid therapy were resumed as per her preoperative regimen to maintain neuromuscular stability. The remainder of her postoperative course was uneventful, and she was deemed fit for same-day discharge following full recovery.

DISCUSSION

This case reinforces that patients with Myasthenia Gravis, especially those classified as Oserman Grade IIb or higher, require a tailored anesthetic plan to minimize the risk of residual paralysis and postoperative ventilatory insufficiency due to their profound sensitivity to neuromuscular blocking drugs [4]. Our approach deliberately avoided muscle relaxants to prevent residual weakness, using instead a non-relaxant TIVA technique combining propofol and dexmedetomidine, which provided safe, stable anesthesia with preserved spontaneous breathing [6,7].

A key element of this strategy was thorough preoperative optimisation, including the use of local anesthetic gargles and sprays plus IV lidocaine for multimodal airway reflex suppression. This ensured smooth intubation without coughing or hemodynamic surges, reducing cardiovascular stress — crucial in patients with ischemic heart disease and reduced ejection fraction [5]. Dexmedetomidine’s unique pharmacology — sedation, analgesia, and sympatholysis without respiratory depression — supported smooth induction, maintenance, and emergence while minimizing propofol requirements [7]. Reliance on well-established clinical endpoints such as loss of verbal response, loss of eyelash reflex, and apnea, in place of BIS monitoring, ensured precise depth of anesthesia without overdose, consistent with practical, resource-appropriate practice [6].

Overall, this experience confirms that with careful preoperative preparation, airway reflex suppression, appropriate drug titration, and vigilant monitoring, ERCP under TIVA can be safely performed in MG patients without neuromuscular blockers, lowering the

risk of myasthenic crisis or prolonged ventilatory support — validating this replicable strategy [6,7].

CONCLUSION

This case highlights that propofol-dexmedetomidine-based TIVA, combined with strategic reflex suppression and clinical depth monitoring, offers a reproducible and safe anesthetic method for high-risk Myasthenia Gravis patients undergoing ERCP under general anesthesia [6,7]. Avoiding neuromuscular blocking agents, maintaining spontaneous ventilation, and implementing effective perioperative planning can significantly reduce complications, support hemodynamic stability, and enable rapid postoperative recovery — even in patients with significant cardiac comorbidities [7,3].

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