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ANESTHETIC APPROACH TO VIDEOLAPASCOPIC SURGERY IN PATIENTS WITH MYASTHENIA GRAVIS: A CASE REPORT

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ABSTRACT

Myasthenia gravis (MG) is an autoimmune disease characterized by fatigue and weakness of skeletal muscles, that improve after rest. Its main clinical manifestations are localized weakness of the ocular muscles (diplopia and ptosis), dysarthria and dysphagia. Thus, it is a disease of great interest to the anesthesiologist, as it specifically compromises the neuromuscular system. This article seeks to report a case of a 32-year-old female patient undergoing emergency videolaparoscopy using total intravenous general anesthesia, using rocuronium for neuromuscular blockade, followed by complete reversal.

Keywords: Anesthesia general, Anesthesia intravenous, Myasthenia gravis, Laparoscopy, Autoimmune disease.

INTRODUCTION

Myasthenia Gravis (MG) is an autoimmune disease characterized by fatigue and weakness of the skeletal muscles, with improvement after rest. It primarily affects women in their third and fourth decades of life and older adults between 60 and 80 years of age. [1]

Approximately 80 to 85% of patients with MG have antibodies against nicotinic acetylcholine receptors (AChR) at the motor endplate. This leads to a reduction in the number of these postsynaptic acetylcholine receptors at the neuromuscular junction, which decreases the ability of the neuromuscular terminal plate to transmit the nerve signal. The remaining 20% show negative serology for AChRs. [2]

The production of anti-AChR antibodies is directly dependent on T cells, with CD4+ T cells stimulating B cells to produce autoantibodies—a process that occurs primarily in an intrathymic environment. Notably, most patients with MG present with thymic abnormalities, with more than 50% of anti-AChR-positive cases exhibiting thymic hyperplasia and 10–15% presenting with a thymic tumor, usually a thymoma. [3] Carcinoma has also been rarely reported in association with the disease. [4]

Its main clinical manifestations include localized weakness of the ocular muscles (diplopia and ptosis), dysarthria, and dysphagia (when the bulbar muscles are affected), as well as generalized muscle weakness with possible respiratory impairment. Diagnosis is based on

clinical history, the edrophonium test, electromyography, and the detection of anti-nicotinic acetylcholine receptor antibodies. [1]

This article aims to report a case of a patient with MG who underwent emergency laparoscopic surgery under total intravenous anesthesia, using rocuronium for neuromuscular blockade (NMB), which presents a challenge for the anesthesiologist.

CASE REPORT

A 33-year-old female patient, GQS, weighing 65 kg and 1.60 m tall, with no history of smoking or alcohol use, diagnosed with MG and on pyridostigmine 180 mg/day and azathioprine 50 mg/day. She had a history of thymectomy and underwent a cesarean section four days prior. After 24 hours of the cesarean, she was discharged from the maternity ward but later developed progressively worsening abdominal pain, refractory to simple analgesics, accompanied by loss of appetite, nausea, and vomiting.

After 72 hours, she sought emergency care in general surgery due to the pain, and a CT scan of the abdomen revealed distension of the small bowel loops and colon without an obstruction factor, significant pneumoperitoneum, and slight free fluid in the cavity. Consequently, the general surgery service of the unit recommended urgent laparoscopic surgery, which revealed a perforation of the cecum, likely caused by trauma during the cesarean section procedure, requiring cecal suturing followed by abdominal cavity lavage.

According to the pre-anesthetic assessment, total intravenous general anesthesia was chosen. Induction was performed with 150 mg of propofol, 15 mcg of sufentanil, and 60 mg of rocuronium, in a rapid sequence. Direct laryngoscopy was used, with a Cormack-Lehane grade 2A airway, and orotracheal intubation was successful on the first attempt. Anesthetic maintenance was ensured with target-controlled intravenous infusion of propofol and remifentanil.

The NMB was monitored with a train-of-four (TOF) sequence. After 90 seconds, one hour, and two hours from the rocuronium induction dose, the TOF showed deep blockade, with no need for an additional dose during the intraoperative period. After 2 hours and 30 minutes of surgery, sugammadex was administered at a dose of 200 mg, resulting in complete reversal of the blockade, with neuromuscular function restored, as indicated by a TOF ratio greater than 0.9. The patient was conscious, with a patent airway and adequate tidal volume during spontaneous ventilation (at least 5 ml/kg, with more than 14 respiratory cycles per minute). Thus, the patient was extubated and transferred to the Intensive Care Unit (ICU) without motor deficits.

In the ICU, the patient started antibiotic therapy with meropenem and vancomycin for sepsis from an abdominal focus. The total length of hospital stay from admission was 10 days, with discharge to home after completing the intravenous antibiotic therapy cycle.

DISCUSSION

The choice of anesthetic technique in patients with MG is challenging. One must consider the pathophysiology of the disease and its effect on the functioning of the motor endplate, as well as the potential interactions of various anesthetic agents on muscle function. Additionally, the treatment of MG with anticholinesterase medications may influence anesthetic management.[1]

In this regard, monitoring neuromuscular function with the train-of-four (TOF) sequence should be routine in patients with MG, and it should be initiated immediately after anesthetic

induction, as established in the monitoring of the patient in this case report. [1]

In the selection of intravenous drugs for induction and maintenance of anesthesia, propofol appears to be a better option, as it does not seem to alter neuromuscular function. Additionally, its pharmacokinetic and pharmacodynamic profile allows for rapid recovery of consciousness, airway reflexes, and return to spontaneous ventilation. [5]

Regarding the choice of opioids, those with potential for accumulation, such as fentanyl, should be avoided. Thus, remifentanil presents a suitable pharmacological profile for perioperative analgesia, with a predictable distribution model in a single compartment. [1]

As the myasthenic patient has a decreased number of cholinergic receptors, they may exhibit an abnormal response to NMB. Thus, there is increased resistance to depolarizing NMBs, such as succinylcholine, and greater sensitivity to non-depolarizing NMBs. [5]

Additionally, the use of NMBs in patients with MG has been associated with a higher rate of unsuccessful extubation and longer postoperative mechanical ventilation time. In this regard, when the use of these agents is necessary, it is recommended to choose those with a short to intermediate duration, such as atracurium, cisatracurium, and rocuronium, at a lower dose. [5]

The choice of rocuronium in the case described here was also due to the fact that this agent can be neutralized by sugammadex, a chemically modified gamma-cyclodextrin capable of encapsulating depolarizing agents, such as rocuronium. The safety and effectiveness of sugammadex in patients with MG have been demonstrated by several authors. [6]

The use of halogenated agents, such as sevoflurane, isoflurane, desflurane, and enflurane, interferes with neuromuscular transmission and increases the effects of non-depolarizing muscle relaxants. Thus, total intravenous anesthesia was chosen in the described case to avoid enhancing the effect of the neuromuscular blocker used in anesthetic induction. [1]

CONCLUSION

The anesthetic technique used, along with the choices of anesthetic agents and NMB, were effective for the patient described above. The preference for anesthetics that do not act on the motor endplate and have predictable distribution pharmacology, as well as a muscle relaxant that has a specific reversal agent, contribute to the success of the approach.

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