

Low-dose spinal anesthesia for urgent laparotomy in severe myasthenia gravis

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ABSTRACT

Myasthenia gravis (MG) is an autoimmune disease with an incidence of 2-10/100,000 cases per year, characterized by muscle weakness secondary to destruction of postsynaptic acetylcholine receptors. In these patients, important perioperative issues remain unresolved, namely, optimal administration of cholinesterase inhibitors, risks of regional anesthesia, and prediction of need of postoperative mechanical ventilation. We describe the use of a low-dose spinal anesthesia in a patient with MG who was submitted for emergency exploratory laparotomy. The utilization of low-dose spinal anesthesia allowed us to perform surgery with no adverse respiratory or cardiovascular events in this patient.

Key words: *Bupivacaine, myasthenia gravis, postoperative mechanical ventilation, respiratory complications, spinal anesthesia, low dose spinal anesthesia*

INTRODUCTION

Myasthenia gravis (MG) is an autoimmune disease with an incidence of 2-10/100,000 cases per year, characterized by varying degrees of muscle weakness, progressive muscle fatigue, ptosis, ophthalmoplegia, and bulbar symptoms, secondary to destruction of postsynaptic acetylcholine receptors.^[1] In these patients, important perioperative issues remain unresolved, namely, optimal administration of cholinesterase inhibitors, risks and benefits of regional anesthesia, and prediction of need of postoperative mechanical ventilation.^[1,2] Although many procedures in MG patients are performed using peripheral nerve block, general anesthesia or the combination of total intravenous/volatile anesthesia and epidural analgesia is usually performed in MG patients undergoing abdominal surgery. In this case report, we describe the use of a low-dose spinal anesthesia in a patient with severe MG

who was submitted for emergency exploratory laparotomy in our hospital.

CASE REPORT

An 84-year-old woman was admitted to our hospital with the diagnosis of abdominal pain, nausea, and vomiting. Computed tomography scan revealed a 2.5-cm foreign body in terminal ileum, with an increased intestinal wall diameter and liquid collection in underlying peritoneal fat [Figure 1]. She had MG for 8 years and was classified as Osserman Grade IIB, with ptosis, respiratory dysfunction, and mild generalized weakness. Her past medical

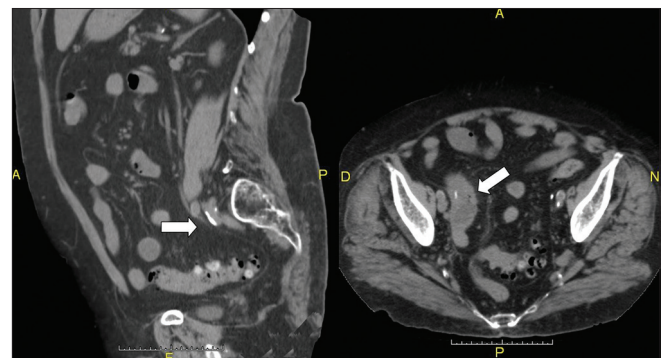


Figure 1: Foreign body in terminal ileum, with an increased intestinal wall diameter and liquid collection in underlying peritoneal fat

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history included allergy to penicillin, gastroesophageal reflux disease, hypothyroidism, hypertension, intestinal dysfunction, and frequent respiratory infections. Her daily medications included pyridostigmine 60 mg every 8 h, levothyroxine 100 µg daily, pantoprazol 20 mg daily, and aziatropin 9 mg daily. She had received anticholinesterase drug therapy 8 h before surgery. Her chest radiograph showed a discrete kyphoscoliosis and electrocardiogram was unremarkable; preoperative hemoglobin was 10.4 mg/dL. Her pulmonary function test performed 6 months ago showed a predicted forced expiratory volume in 1 second (FEV₁) of 70%, a predicted forced vital capacity (FVC) of 54%, and FEV₁/FVC of 0.94. Pulse oximetry showed a stable saturation of 91-93% whilst she was breathing air. We were concerned that general anesthesia would contribute to further respiratory failure requiring prolonged intensive care management and ventilation, and we opted for a low single dose spinal anesthesia. After routine monitoring tests were done, the patient was sedated with 1 mg midazolam iv. Spinal anesthesia was carried out at L₂-L₃ vertebral interspace in the sitting position using a 25-gauge pencil point spinal needle (Braun). After free flow of cerebrospinal fluid was observed, 8 mg 0.5% hyperbaric bupivacaine (Braun) plus 20 µg fentanyl (total volume 2 mL) was injected over 10 sec without barbotage. The patient was then turned in 15° head-down tilt position, receiving oxygen 6 L/min through a facemask. This position was maintained during the entire procedure. Pinprick test done 10 min ago demonstrated a bilateral block to T₃. The procedure lasted 1.5 h, and the patient received 500 mL of 6% hydroxyethyl starch solution and 1500 mL of lactated Ringer's solution. The patient received spinal bupivacaine, i.v. clindamycin, fentanyl, midazolam, and ephedrine during surgery. Reduction in oxygen saturation or any degree of respiratory difficulty was not observed. A 15-cm ileectomy with mechanical ileocecal anastomosis was performed, with the patient remaining comfortable and hemodynamically stable during the procedure. Sensory and motor function completely recovered 2 h after the surgical procedure. Postoperatively, no adverse respiratory events were observed and the patient was discharged home 12 days after surgery.

DISCUSSION

MG patients represent a significant management problem for the anesthesiologist, as the anesthetic considerations in these patients include a marked sensitivity to nondepolarizing skeletal muscle relaxants and an increasing risk of prolonged postoperative mechanical ventilation.^[1-7] A consistently reduced FVC and poor bulbar function are strong indicators of the need of postoperative

mechanical ventilation.^[2] According to these predictors, our patient would most likely have required ventilation if she had received a general anesthetic. Regional anesthesia may reduce or eliminate the need for muscle relaxants in abdominal surgery in MG patients. Furthermore, regional anesthesia may provide an alternative anesthesia method in high-risk surgical patients undergoing abdominal surgery.^[7,8] Epidural analgesia has been used during labor for MG patients with success, but the use of high epidural analgesia has been thought to compromise the patient's respiratory function, thereby increasing the risk of postoperative need for mechanical ventilation, while higher volume of local anesthetics used in epidural anesthesia may decrease the sensitivity of post-junctional membrane to acetylcholine, which causes weakness in MG.^[1] Although the utilization of spinal anesthesia in patients with MG has been described previously for trauma surgery, transurethral ureterolithotriptic procedures, or inguinal hernia repair,^[3-6] there are no reports about the utilization of spinal anesthesia in abdominal surgery in these patients, perhaps due to the high level of the block necessary to perform surgery and the less predictable effect of spinal anesthesia compared with epidural anesthesia. However, spinal anesthesia has advantages of reduced drug dosage, rapid onset, profound sensory and motor block, lack of systemic effects, avoidance of tracheal intubation, and decreased need for opioid administration, and it is being the preferred anesthetic method for subumbilical surgery, particularly in elderly patients and parturients.^[9] A high level of sensitivity block together with acceptable abdominal muscle relaxation were necessary to perform the surgery, but high-spinal anesthesia may lead to deterioration of intercostal muscle movement and decreased FVC and forced expiratory volume in 1 min in MG patients.^[6] Furthermore, the combination of high spinal blockade with the anticholinesterase drug therapy might have potentiated the vagal response. We decided to perform a single-shot spinal anesthesia with low-dose hyperbaric bupivacaine because bupivacaine is more predictable, making it possible to control the level of block by the choice of the dose and position. The utilization of a 15° head-down tilt position increased the cephalad spread of hyperbaric solution and ensured venous return, thereby maintaining cardiac output and blood pressure and reducing the severity and incidence of hypotension during spinal anesthesia.^[10] The utilization of a low-dose spinal anesthesia allowed us to perform the surgery, with no adverse respiratory or cardiovascular events in a patient with advanced MG.

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