Thoracic Epidural Anesthesia Combined with Remifentanil-Propofol without Muscle Relaxants in A Myasthenic Patient for Abdominal Surgery

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Citation

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Abstract

The present case describes the perioperative anesthetic management of a myasthenic patient undergoing thoracic epidural anesthesia using 10 mL of bupivacaine 0.5% combined with the infusions of propofol and remifentanil for abdominal surgery. This anesthetic technique provided good intra-operative relaxation followed by an uneventful recovery and eliminated the need for other postoperative analgesics. We first present a myasthenic patient undergoing the combination of epidural anesthesia and TIVA based remifentanil-propofol without neuromuscular blockade for abdominal surgery.

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INTRODUCTION

Myasthenia gravis (MG) is an autoimmune disorder characterized by easy fatiguability of voluntary muscle. It results from the production of antibodies against the acetylcholine receptors of the neuromuscular synapse. The anticholinesterase drugs are usually used in the treatment of myasthenia gravis.[1] This therapy may pose a challange to anesthesiologists as muscle relaxants and sedatives are best avoided in myasthenics undergoing surgery. With this case we describe the combined used of thoracic epidural anesthesia and propofol-remifentanil infusion without a muscle relaxant in induction and maintanence of anesthesia.

CASE REPORT

A 50-yr-old, 75-kg, 175-cm, male patient with myasthenia gravis (MG) (Osserman 2A) was scheduled for sigmoid colon resection due to villous adenomas. The diagnosis of MG was done by electromyography and by elevated anti-acetylcholine receptor antibodies 5 years ago. Chest computed tomographic scan revealed no timoma. He had a forced vital capacity of 2 L. Pyridostigmine, 200 mg daily was administered for 5 years and the pyridostigmine regimen was maintained until the morning of surgery. Premedication was limited to 1 mg intravenous midazolam in the operating room before anesthesia induction. Under appropriate monitoring and after determining T11-12 epidural space using loss of resistance technique, 10 ml of bupivacaine 0.5% was administred epidurally. An epidural catheter was also inserted. General anesthesia was induced with 2 mg. kg-1 propofol intravenously, to be followed by 3.0 µg. kg-1 remifentanil over 30 s, and tracheal intubation. Anesthesia was maintained by titrated propofol infusion (125-250 µg · kg-1 · min-1) and remifentanil infusion (0.1-0.25 µg · kg-1 min-1) according to the bispectral index score (BIS) between 45-60 with using BIS monitor.

Neuromuscular transmission was monitored by electromyography using a Datex relaxograph (NMT-100-23-01; Datex-Ohmeda Division, Instrumentarium Corp, Helsinki, Finland), using the electromyographic response to ulnar nerve stimulation by the train-of-four. Intraoperatively, blood pressure ranged between 85/35 mmHg and 110/60 mmHg, heart rate ranged between 55 and 90 bpm, and electromyography showed normal T1/control and T4/T1 ratios. The duration of surgery was 2 h. Twenty minutes before the end of surgery, the infusions of propofol and remifentanil were gradually decreased by 20% in every 5 minutes, and on completion of surgery the infusions were discontinued. The total dose of remifentanil and propofol administered throughout surgery amounted to 1,2 mg and 1,0 g, respectively. Ten minutes after discontinuation of the infusions, the patient started to

breathe spontaneously, to respond to painful stimuli, and to buck on the tube. The patient was extubated and transferred, as fully awake and cooperative, to the intensive care unit (ICU) to provide postoperative analgesia via thoracic epidural catheter and monitor closely a further time postoperatively. He did not report pain or awareness during surgery. Spontaneous ventilation and coughing reflex were adequate. Arterial blood gases were within normal limits. The combination of bupivacaine 0.0625% and fentanyl 0.0002% was used through thoracic epidural catheter at the rate of 4 ml hourly. The patient did not complain of muscle weakness and was able to perform respiratory physiotherapy exercises. Pain relief was assessed every 3 hours on a visual analog scale ranging from o (no pain) to 10 (unbearable pain). The collected scores during the first 24 hours were between 0 and 2. In the ICU, his blood pressure and heart rate were normal limits during the first 24 hours. The patient maintained spontaneous breathing easily with a good arterial blood gases. The patient was discharged from the intensive care unit on day 1, and from the hospital on day 5.

DISCUSSION

Several factors such as ester local anesthetics, some antibiotics, pain, and stress may aggrevate the myasthenic symptoms of these patients perioperatively. Although ester local anesthetics may affect neuromuscular transmission in patients receiving anticholinesterase therapy, we used bupivacaine, an amide local anaesthetic without effect on neuromuscular transmission. Anxiety was prevented providing sedation with midazolam before anesthesia induction. And, more importantly, we provided an effective analgesia in both intraoperative and postoperative period with epidural block.

The published anesthetic experience in this disease is quite large, especially the anesthetic management of patients undergoing thymectomy. [4,6,7,8,9,13,14] However, there have not been yet published any reports on epidural anesthesia in combination with remifentanil-propofol anesthesia for abdominal surgery in myasthenia gravis. This currently described anesthetic tecnique avoids muscle relaxants and provides an excellent intubating and operating conditions with effective analgesia into the postoperative period, preserves the function of diaphragm and allows earlier extubation.

Anesthetic management using barbiturates and propofol for myasthenic patients without untoward effects have been described. [8] Propofol has the theoretic advantages of short duration of activation without effect on neuromuscular transmission. Although the use of remifentanil as part of total intravenous anesthesia (TIVA) has been used in a few cases, [8,13]the combination of remifentanil-propofol limited to only two cases for the management of myasthenics underwent thymectomy. [12,13]

Remifentanil is an ultra-short-acting opioid that is rapidly hydrolyzed by circulating and tissue nonspecific esterases. Discontinuation of remifentanil infusion will be followed by a rapid recovery regardless of the duration of infusion. [2] The present report used the remifentanil-based technique of anesthesia, without the use of muscle relaxants, in a myasthenic gravis patient undergoing abdominal surgery. This is the first case report in a myasthenic patient about the use of combination of thoracic epidural anesthesia and remifentanil-propofol based TIVA without any neuromuscular blockers for abdominal surgery.

Non-relaxant techniques are a recognised method of anesthesia in myasthenic patients. [6,7,8,9,10,11,12,13,14] Remifentanil is ideal in this situation because of its potent analgesic effects, the ability to provide apnea with minimal effects on neuromuscular transmision and a rapid offset. Its use in MG has previously been described. [8,9,10,11,12,13,14] The use of a short-acting intravenous anesthetic technique virtually eliminated the risks of respiratory failure or aspiration despite surgery lasting 2 h. In addition, the avoidance of volatile agents reduced the risk of postoperative nausea. Having demonstrated on the first occasion the safety of the technique, we were able to avoid the delays associated with the need for critical care facilities. In this case, we report a new anesthetic management of a myasthenic patient for abdominal surgery using a non-relaxant, propofol and remifentanil with thoracic epidural blockade to provide analgesia in both intraoperative and postoperative period. This afforded excellent control of heart rate and pressor responses during surgery allowed early return of spontaneous ventilation and extubation within ten minutes after discontinuation of anesthesia.

Advantages and disadvantages of this approach versus relaxant and volatile techniques are discussed with particular reference to preservation of neuromuscular function. After surgery these patients have an increased risk of pulmonary complications. In general, especially in abdominal and thoracic surgery patients in whom ventilation difficulty expected postoperatively, we changed the perioperative anesthesiological procedure using TIVA with

propofol/remifentanil and epidural patient-controlled analgesia with opioid and local anesthetic mixture in the first two days after surgery. This management allows a fast extubation and improves lung function postoperatively. Since the myasthenic patients having abdominal surgery tend to respiratory complications, postoperative analgesia in these is more important than in the others.

Although the potentiation of neuromuscular inhibition by local anesthetics has been reported, this situation especially related with ester type of those. In addition, in our case, we performed epidural anesthesia with reduced doses of bupivacaine to avoid high blood levels. Similarly, the safe and successful use of thoracic epidural blockade with bupivacaine for intraoperative anesthesia and postopertaive analgesia for transsternal thymectomy has been reported recently. [6,7]

CONCLUSIONS

In conclusion, the addition of thoracic epidural anesthesia to remifentanil-propofol based TIVA may be a suitable technique for abdominal surgery in myasthenia gravis patients. It can provide a smooth anesthesia course and a rapid recovery, with hemodynamic stability, and also having pain-free postoperatively. In addition, the use of a neuromuscular transmission and BIS monitor allows a better titration of propofol and propably a shorter recovery time.

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