Başkan et al. Int J Anesthetic Anesthesiol 2015, 2:022
DOI: 10.23937/2377-4630/2/1/1022
Volume 2 | Issue 1

International Journal of
Anesthetics and Anesthesiology

ISSN: 2377-4630

Case Report: Open Access

Management of Anesthesia in A Patient with Myasthenia Gravis

Semih Başkan, Dilşen Örnek*, Adem Güney, Fahri Acar, Özlem Saçan and Mustafa Baydar

Ankara Numune Training and Research Hospital, Anesthesiology Department, Turkey

***Corresponding author:** *Dilşen Örnek, Ankara Numune Training and Research Hospital, Anesthesiology Department, Ankara, Turkey, E-mail: dilsenpinar@yahoo.com*

Summary

Purpose: This report describes the management of anesthesia in a patient with myasthenia gravis, undergoing thymectomy.

Clinical features: The patient was a 22-yr-old female. Thoracic computed tomography revealed a thymoma and a right-side paratracheal lymph node 46x44mm in size. A thymectomy operation was required. Low minimum alveolar concentration sevoflurane anesthesia and infusion of remifentanil was combined with thoracal epidural anesthesia. Without the use of muscle relaxant, the patient was administered tracheal intubation with left-sided double-lumen endotracheal tube for one lung ventilation. The operation was uneventful. At the end of surgery, the patient was easily extubated and transferred to the intensive care unit.

Conclusion: This combination was well tolerated for tracheal intubation and allowed a quick transition to spontaneous breathing and a rapid recovery from anesthesia, good postoperative analgesia and an uneventful recovery.

Introduction

Myasthenia gravis (MG) is either an autoimmune or congenital neuromusculer disease that leads to fluctuating muscle weakness and fatigue. In the most common cases, muscle weakness is caused by circulating antibodies that block acetylcholine receptors at the postsynaptic neuromuscular junction [1], inhibiting the excitatory effects of the neurotransmitter acetylcholine on nicotinic receptors at neuromuscular junctions. Alternatively, in a much rarer form, muscle weakness is caused by a genetic defect in some portion of the neuromuscular junction [2]. The disease incidence is 3–30 cases per million per year and rising as a result of increased awareness. Medical treatment of MG includes improving neuromuscular transmission by anticholinesterases, suppressing the immune system with corticosteroids and immunosuppressants, and circulation of antibodies with plasmapheresis and, in selected cases, thymectomy [3]. Patients with generalized MG and patients with ocular symptoms poorly controlled by anticholinesterases often benefit from thymectomy [4].

The myasthenic patient can be a challenge to anesthesiologists, and the post-surgical risk of respiratory failure has always been a matter of concern. During postoperatif period pain, analgesics and residual effects of anaesthetics can adversely affect pulmonary function which is already limited by the MG itself. This makes it important for the anesthesiologist to be aware of possible signs of the disease and to be properly updated on the optimal perioperative anesthesiological management of the myasthenic patient [5].

This report describes the management of anesthesia in a patient with MG undergoing thymectomy.

Case

The patient was a 22-yr-old female. Thoracic computed tomography revealed a thymoma and a right side paratracheal lymph node 46x44mm in size. A thymectomy operation was required. The patient had an Ossermann and Genkins classification score of II a and was taking 300mg prydostigmine and 200mg hydroxychloroquine sulphate daily. Preoperative blood chemistry, respiratory and thyroid function tests were normal. Written informed consent was obtained from the patient. We decided use low minimum alveolar concentration (MAC) sevoflurane anesthesia and infusion of remifentanil was combined with thoracal epidural anesthesia (TEA) method for the patient. Preoperatively, 10mL/kg Ringer lactate infusion was started via an iv cannula. A radial artery catheter was placed under local anaesthesia. Electrocardiogram, invasive arterial pressure, pulse oximetry and capnography were continuously monitored. With the patient in a sitting position, epidural puncture was performed from a median approach with a 18G tuohy needle between the 6th and 7th thoracic vertebrae. The epidural space was identified by loss of resistance to air and 12mL of 0.25% bupivacaine (30mg) with 2mL fentanyl (0.1mg) were injected. 4cm of catheter was threaded into the epidural space. The sensory level was tested with ether. The preoperative upper level of the sensory block was between dermatomes T2and T10. Anaesthesia was induced after preoxygenation with 1µg/kg bolus remifentanil, 1.5mg/kg lidocaine, and 2mg/kg bolus propofol and tracheal intubation was applied with a left-sided double-lumen endotracheal tube for one lung ventilation. After the tracheal intubation remifentanil was infused from 0.1µg/kg/min dosage. The patient was ventilated with a 50 % mixture of oxygen and air to maintain end-tidal CO_2 between 30 and 35mmHg. It was administered as low MAC (0.8-1.0) sevoflurane. Left lung ventilation was applied during surgery via the left side duble-lumen endotracheal tube. The patient was hemodynamically stable during intubation and the surgical procedure. In the second hour of the surgical procedure, the patient received 0.25% 8mL bupivacainne via the epidural catheter. A continuous epidural infusion and 4ml bolus (limited at 20 minute) of the epidural anesthesia solution (fentanyl

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Citation: Başkan S, Örnek D, Güney A, Acar F, Saçan O, et al. (2015) Management of Anesthesia in A Patient with Myasthenia Gravis. Int J Anesthetic Anesthesiol 2:022. doi.org/10.23937/2377-4630/2/1/1022

Received: February 19, 2015: **Accepted:** March 06, 2015: **Published:** March 09, 2015

citrate 0.03mg/ml and bupivacaine 0.5mg/ml) was administered through the epidural catheter for postoperative pain management. At the end of surgery, the patient was easily extubated and was transferred to the intensive care unit (ICU). In the ICU, the patient was hemodynamically stable without any subjective or objective impairment of respiratory function. The patient was discharged from the ICU 24 hrs after surgery.

Discussion

The resultant respiratory and cardiovascular implications are a primary cause of mortality; therefore, a complete and comprehensive understanding of this disorder is vital for the anesthesia provider [6].

The use of muscle relaxants in patients with MG has been a controversial topic. Therefore, the anesthesia of patients with MG requires special attention, particularly in respect of the use of muscle relaxants. Current general anesthesia requires volatile anesthetic agents and sometimes muscle relaxants for tracheal intubation and anesthetic maintenance. Patients with MG are usually sensitive to the effects of non-depolarizing muscle relaxants, and volatile anesthetic agents accelerate their effect. Furthermore, the potential interaction of anticholinesterases (administered as therapeutic agents for MG) with both the depolarizing and non-depolarizing muscle relaxants is also a problem. The respiratory insufficiency introduced by such agents and the complications due to endotracheal tube placement can continue postoperatively and may require reintubation or prolonged intubation [7-9].

It is difficult to determine the optimal amount of muscle relaxants required in a patient with MG. Hence, there is an increasing trend of using non-muscle relaxant techniques in such patients who undergo surgery [7-9].

Various anesthesia procedures have been reported for patients with MG, such as the use of combination propofol and fentanyl, sevoflurane and fentanyl, propofol and sulfentanyl or propofol and remifentanil without muscle relaxants in the literature. Some studies have also reported the use of TEA in combination with techniques of general anaesthesia [9-13].

TEA suppresses hormonal and metabolic stress response to pain, allowing stable hemodynamics during surgery and good postoperative analgesia without compromising pulmonary function [13].

Responses to endotracheal intubation arise essentially due to sympathetic stimulation causing increases in blood pressure, increases in heart rate and tachyarrhythmia [14]. Opioid narcotics were shown to provide hemodynamic stability and suppress most reactions to surgical trauma. Remifentanil has an extremely short context-sensitive half time which allows it to be administered in very high doses during particularly stressful intraoperative phases without prolonging recovery time.

In this case, a combination was used of low MAC sevoflurane anesthesia and an infusion of remifentanil with thoracal epidural anesthesia. Muscle relaxants were not used and hemodynamic responses to intubation were controlled effectively. The elimination of remifentail is fast so that is possible to rapidly reduce its concentration in the plasma by changing the speed of infusion. The infusion of remifentanil and TEA allowed for the adjustment of the depth of analgesia during the operation. Effective analgesia for surgery was achieved in this patient with the use of TEA, but the low MAC sevoflurane anesthesia and infusion of remifentail were needed for the patient to be able to tolerate the tracheal tube allowing adequate one lung mechanical ventilation without the use of muscle relaxants.

Clinicians are well aware of the risk of postoperative respiratory failure that may result from stress-induced exacerbation of MG (myasthenic crisis), an overdose of anticholinesterases (cholinergic crisis), the residual effects of myorelaxants or other adverse drug interactions (with antibiotics or antiarrhythmics). Therefore, routine postoperative ventilatory support and planned extubation in the ICU have been recommended for high-risk patients [15].

In conclusion, this combination avoided the use of muscle relaxants or high MAC volatile agents was well tolerated for tracheal intubation and allowed a quick transition to spontaneous breathing and a rapid recovery from anesthesia, good postoperative analgesia and an uneventful recovery.

References

1. Conti-Fine BM, Milani M, Kaminski HJ (2006) Myasthenia gravis: past, present, and future. J Clin Invest 116: 2843-2854.
2. Kandel E, Schwartz J, Jessel T, Siegelbaum S, Hudspeth A (2012). Principles of Neural Science (5th edn): 318-319.
3. McGrogan A, Sneddon S, de Vries CS (2010) The incidence of myasthenia gravis: a systematic literature review. Neuroepidemiology 34: 171-183.
4. Wilkins KB, Bulkley GB (1999) Thymectomy in the integrated management of myasthenia gravis. Adv Surg 32: 105-133.
5. Blichfeldt-Lauridsen L, Hansen BD (2012) Anesthesia and myasthenia gravis. Acta Anaesthesiol Scand 56: 17-22.
6. Postevka E (2013) Anesthetic implications of myasthenia gravis: a case report. AANA J 81: 386-388.
7. Tripathi M, Srivastava K, Misra SK, Puri GD (2001) Peri-operative management of patients for video assisted thoracoscopic thymectomy in myasthenia gravis. J Postgrad Med 47: 258-261.
8. Mori T, Yoshioka M, Watanabe K, Iwatani K, Kobayashi H, et al. (2003) Changes in respiratory condition after thymectomy for patients with myasthenia gravis. Ann Thorac Cardiovasc Surg 9: 93-97.
9. Della Rocca G, Coccia C, Diana L, Pompei L, Costa MG, et al. (2003) Propofol or sevoflurane anesthesia without muscle relaxants allow the early extubation of myasthenic patients. Can J Anaesth 50: 547-552.
10. Narimatsu E, Munemura Y, Kawamata M, Imaizumi H, Namiki A, et al. (2003) Tracheal intubation without neuromuscular relaxants for thymectomy in myasthenic patients. J Med 34: 47-58.
11. El-Dawlatly AA (2007) Anesthesia for thoracoscopic thymectomy: modified non-muscle relaxant technique--case reports. Middle East J Anaesthesiol 19: 219-224.
12. Ng JM (2006) Total intravenous anesthesia with propofol and remifentanil for video-assisted thoracoscopic thymectomy in patients with myasthenia gravis. Anesth Analg 103: 256-257.
13. Akpolat N, Tilgen H, Gürsoy F, Saydam S, Gürel A (1997) Thoracic epidural anaesthesia and analgesia with bupivacaine for transsternal thymectomy for myasthenia gravis. Eur J Anaesthesiol 14: 220-223.
14. Bergmann I, Szabanowski T, Bräuer A, Crozier TA, Bauer M, et al. (2015) Remifentanil added to sufentanil-sevoflurane anesthesia suppresses hemodynamic and metabolic stress responses to intense surgical stimuli more effectively than high-dose sufentanil-sevoflurane alone. BMC Anesthesiol 15:3.
15. Tripathi M, Srivastava K, Misra SK, Puri GD (2001) Peri-operative management of patients for video assisted thoracoscopic thymectomy in myasthenia gravis. J Postgrad Med 47: 258-261.