

Total Intravenous Anesthesia Management Of A Patient With Myasthenia gravis

S Sahin, A Çolak, M ?nal, C Arar

Citation

S Sahin, A Çolak, M ?nal, C Arar. *Total Intravenous Anesthesia Management Of A Patient With Myasthenia gravis*. The Internet Journal of Anesthesiology. 2007 Volume 16 Number 1.

Abstract

Myasthenia gravis is an autoimmune disease characterized by weakness and fatigability of skeletal muscles, with improvement following rest. It may be localized to specific muscle groups or it may be generalized. The peri-operative management of a patient with myasthenia gravis poses a significant challenge to the anesthesiologist. In this case report, we presented total intravenous anesthesia management of a patient with myasthenia gravis who progressed uneventful intra and postoperative period.

INTRODUCTION

Myasthenia gravis (MG) is an autoimmune disorder with an estimated prevalence of 1 in 20,000. The disorder affects females more than males (1,2). MG is caused by a decrease in the numbers of postsynaptic acetylcholine receptors at the neuromuscular junction (3), which decreases the capacity of the neuromuscular end-plate to transmit the nerve signal. Initially, in response to a stimulus resulting in depolarization, acetylcholine is released presynaptically. In MG, the number of activated postsynaptic receptors may be insufficient to trigger a muscle action potential (4,5). In this study, it is aimed to present Total Intravenous Anesthesia (TIVA) management of a patient with MG.

CASE REPORT

A 41 year-old woman with MG was semielective scheduled for laparotomy general anesthesia. Three years ago, she was diagnosed with MG. In preoperative evaluation, the patient was in good condition. No respiratory, gastrointestinal system and renal system abnormalities were detected. Blood tests were normal: Leukocyte count 8.21 mm³, red cells 4.700 mm³; Hemoglobin 12.7 g/dl, haematocrit 37.5 %, time of activated thromboplastin 99 % and INR 1.01, platelet 272.000 mm³, electrolytes were normal.

On the operation day, following the fast 6 hours later, the patient was accepted to preoperative care unit and a 22 Gauge cannula was inserted into a vein on the dorsum of left hand and crystalloid infusion was started. No premedication was administered. Fifteen minutes later the patient was taken

to the operating room. She was monitored with peripheral oxygen saturation (SpO₂), electrocardiogram (leads II, V1), cutaneous temperature (T), noninvasive blood pressure (NIBP). Heart rate: 87 min⁻¹, blood pressure: 130/50 mmHg, body temperature 37.3 °C. Anesthesia was induced by using 1 µg.kg⁻¹ remifentanyl and 2 mg/kg propofol intravenously. Immediately after TIVA maintenance was achieved by using 8-10 mg/kg propofol and 1 µg.kg⁻¹.min⁻¹ remifentanyl infusion intravenous. During adequate anesthesia, tracheal intubation was performed without any neuromuscular blockers. After tracheal intubation, 50 % oxygen in air inhalation was started. Hemodynamic and other vital parameters were stable during intraoperative period. The duration of the surgery was 125 minutes. After recovery of muscle tone, spontaneous breathing was adequate, trachea was extubated. No respiratory or hemodynamic problems were occurred. The patient was admitted to recovery room with stable vital signs (average blood pressure: 110/55 mmHg, heart rate 81 beats.min⁻¹, peripheral oxygen saturation 99%, body temperature 37.2 °C). Thirty minutes later she was sent to service with stable vital signs .

DISCUSSION

Several anesthetic techniques have been described for myasthenic patients . The use of muscle relaxants in patients with MG has been associated with a higher rate of unsuccessful extubation at the end of surgery and with longer postoperative ventilation and hospital stay (6, 7). We avoided muscle relaxants in myasthenic patients because the neuromuscular effects of nondepolarizing muscle relaxants

are known to be prolonged in patients with MG (8,9). The speed of onset of neuromuscular block is accelerated, the degree of block is potentiated and the rate of recovery is decreased(10). Chevalley and colleagues described the evolution of the perioperative management of myasthenic patients undergoing thymectomy and the possibility to predict the need for postoperative ventilation (6). They observed that postoperative ventilatory support was more frequently required when a balanced technique was used, particularly in patients who received muscle relaxants.

Clinicians are well aware of the risk of postoperative respiratory failure that may result from stress-induced exacerbation of myasthenia gravis (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 intensive care unit have been recommended in high-risk patients.

Anesthetic management using barbiturates and propofol for myasthenic patients without untoward effects have been described (11, 12). Propofol has the theoretic advantages of short duration of action without effect on neuromuscular transmission. Opioid analgesics in therapeutic concentrations do not appear to depress neuromuscular transmission in myasthenic muscle (13, 14). However, central respiratory depression may be a problem with opioids. The introduction of short-acting opioids makes these drugs more titratable in the myasthenic. Remifentanyl's short elimination half-life (9.5 minutes) (15) makes the drug appealing. To date, there are no reports of its use in MG.

Total intravenous anesthesia (TIVA) for the management of myasthenics has been reported (11). In the authors' experience, hemodynamic instability in older patients makes this approach difficult, whereas younger patients usually tolerate it without difficulty. The use of remifentanyl as part of TIVA may alleviate some of the hemodynamic instability. We performed TIVA anaesthesia and tracheal intubation was performed without any neuromuscular blockers. No respiratory or hemodynamic problems were occurred.

In conclusion, MG may cause mortality. Anaesthetic management of this syndrome must be accomplished with the minimal applicable dose of the anaesthetic agent, any traumatic process should be avoided, other drugs must be carefully applied, and the patient must be observed carefully.

References

1. Baraka A. Anaesthesia and myasthenia gravis. *Can J Anaesth* 1992; 39: 476-86.
2. S.R. Dubey, Neha P. Shah, H. J. Patel. Anaesthetic Management Of A Patient With Myasthenia Gravis In A Known Case Of Hyperthyroidism And Bronchial Asthma Posted For Thymectomy - a case report *Indian J. Anaesth* 2004;48:59-61.
3. Fambrough DM, Drachman DB, Satyamurti S. Neuromuscular junction in myasthenia gravis: Decreased acetylcholine receptors. *Science* 1973; 182:293- 295 .
4. Elmquist D, Hoffman W W, Kugelberg J, et al. An electrophysiological investigation of neuromuscular transmission in myasthenia gravis. *J Physiol (Lond)* 1964; 174:417- 438 .
5. Mark A, James B. E. Anesthetic Implications of Myasthenia Gravis *The Mountsinai Journal of Medicine* 2002; 69 :31-37.
6. Chevalley C, Spiliopoulos A, Perrot MD, Tshopp JM, Licker M. Perioperative medical management and outcome following thymectomy for myasthenia gravis. *Can J Anaesth* 2001; 48: 446-51.
7. Eisenkraft JB, Papatostas AE, Kahn CN, Mora CT, Fagerstorm R, Genkins C. Predicting the need for postoperative mechanical ventilation in myasthenia gravis. *Anesthesiology* 1986; 65: 79-82.
8. Baraka A. Anaesthesia and myasthenia gravis. *Can J Anaesth* 1992; 39: 476-86.
9. Rocca GD, Coccia C, Diana L, Pompei L, Costa MG, Tomaselli E, et al. Propofol or sevoflurane anesthesia without muscle relaxants allow the early extubation of myasthenic patients. *Can J Anaesth* 2003; 50: 547-52.
10. Baraka A. Onset of neuromuscular block in myasthenic patients. *Br J Anaesth* 1992; 69: 227-28.
11. O'Flaherty D, Pennant JH, Rao K, et al. Total intravenous anesthesia with propofol for transsternal thymectomy in myasthenia gravis. *J Clin Anesth* 1992; 4:241.
12. Lin CC, Chen MF, Chen HM, et al. Propofol anesthesia in a patient with myasthenia gravis - a case report. *Acta Anaesthesiol Sin* 1996; 34:89- 92 .
13. Kin YI, Howard JF, Sanders DB. Depressant effects of morphine and meperidine on neuromuscular transmission in rat and human myasthenic muscles. *Soc Neurosci Abstr* 1979;5 : 482 - 502 .
14. Sanders DB, Kim YI, Howard JF, et al. Intercostal muscle biopsy studies in myasthenia gravis: Clinical correlations and the direct effects of drugs and myasthenic serum. *Ann NY Acad Sci* 1981; 377:544- 566 .
15. Glass PS, Hardman D, Kamiyama Y, et al. Preliminary pharmacokinetics and pharmacodynamics of an ultra-short-acting opioid: Remifentanyl. *Anesth Analg* 1993; 77:1031- 1040 .

Author Information

Sevtap Hekimoglu Sahin

Department of Anaesthesiology and Reanimation, Trakya University Medical Faculty

Alkin Çolak

Department of Anaesthesiology and Reanimation, Trakya University Medical Faculty

Mehmet ?nal

Department of Anaesthesiology and Reanimation, Trakya University Medical Faculty

Cavidan Arar

Department of Anaesthesiology and Reanimation, Trakya University Medical Faculty