

CASE REPORT

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Thoracic epidural anesthesia for severe myasthenia gravis patient undergoing laparoscopic cholecystectomy**Basak Altiparmak, Leyla Sahan, Semra Demirbilek***Muğla Sıtkı Koçman University Training and Research Hospital, Department of Anesthesiology and Reanimation, Muğla, Turkey*

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Abstract

Myasthenia gravis (MG) is a chronic autoimmune neuromuscular disease characterized by different degrees of weakness and fatigue of skeletal muscles after physical exercise. It has an incidence of 2-10/100000 per year. The optimal anesthetic management of these patients is still controversial. A 69 year-old male patient with MG was scheduled for laparoscopic cholecystectomy due to gallbladder stone. Epidural puncture was performed by a 18G Tuohy needle inserted between 7th and 8th thoracic vertebrae. After the placement of epidural catheter, a combination of 40 mg bupivacaine, 100 mg prilocaine and 100 µg fentanyl were applied slowly. Pneumoperitonium was applied with approximately 12 mmHg CO₂ for laparoscopic view. At the 10th minute of the surgery, a sudden deep bradycardia was observed. Following administration of one mg of atropine, heart rate of the patient turned to normal ranges within 30 seconds. In the postoperative period no respiratory or cardiac complications were detected and the patient was discharged from hospital after three days. Anesthetic management of MG patients should be individualized due to increased risk of intraoperative and postoperative complications. Their increased sensitivity to nondepolarizing muscle relaxants can lead to prolonged postoperative mechanical ventilation need. In adult patients, regional anaesthesia alone can be a good and safe method for myasthenic patients by eliminating the need for muscle relaxants and opioids in abdominal surgeries. In this case we prefer to insert a thoracic epidural catheter to control the level of blockage intraoperatively. Continuous epidural infusion allowed us to maintain postoperative analgesia without intravenous opioid agents.

Keywords: Laparoscopy, myasthenia gravis, thoracic epidural block**Introduction**

Myasthenia gravis (MG) is a chronic autoimmune neuromuscular disease characterized by different degrees of weakness and fatigue of skeletal muscles after physical exercise, ptosis, ophthalmoplegia and bulbar symptoms. It has an incidence of 2-10/100000 per year [1]. The symptoms are seen secondary to autoantibody attack to postsynaptic acetylcholine receptors at motor end plate of striated muscles [2].

In anesthetic management of myasthenic patients, probably the most important issue is consumption of inappropriate doses of muscle relaxants. Nowadays peripheral nerve block is the first chose when possible, but general anesthesia with total intravenous/volatile anesthetics and regional analgesia are also successfully performed for MG patients undergoing abdominal surgery [3]. The optimal anesthetic approach to these patients is still controversial.

In this case report, we represented a myasthenia gravis patient undergoing laparoscopic cholecystectomy surgery with thoracic epidural anesthesia and we discussed possible alternative approaches.

Case Report

A 69 year-old male with MG was scheduled for laparoscopic cholecystectomy due to gallbladder stone. He had been classified as Osserman IIb 8 years ago and treated with pyridostigmine 60 mg every 8 hours and deltacortril 5 mg every 12 hours. He had no history of other systemic diseases, alcohol intake or smoking. In the physical examination, mild generalized muscle weakness was detected but there was no respiratory problem. His chest radiograph and electrocardiogram were unremarkable. At his laboratory tests, direct bilirubin and total bilirubin levels were slightly high as 0.6 mg/dL and 2.1 mg/dL, respectively. All other laboratory results were normal. In the preoperative anesthetic plan, we decided to perform regional anesthesia to avoid endotracheal intubation and possible need for postoperative mechanical ventilation support.

The patient received morning dose of pyridostigmine before surgery but no sedative drug was applied as premedication. In the operating room heart rate, non-invasive blood pressure, oxygen saturation and end-tidal carbon dioxide of the patient were monitored and all of his vital signs were stable. Venous access with an 18G catheter was established and 15 mL/kg/hr 0.9 NaCl solution was administered. Epidural puncture was performed in the sitting position via median approach. Tuohy needle was inserted between 7th and 8th thoracic vertebrae with loss of resistance technique. After the placement of epidural catheter, a combination of 40 mg

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bupivacaine, 100 mg prilocaine and 100 µg fentanyl were applied slowly within ten minutes. Pinprick test was performed 10 minutes after the injection and sensory block was between first and 10th thoracic vertebrae before surgery. The patient was operated in the supine position through entire procedure. At the 10th minute of the surgery, a sudden deep bradycardia (heart rate between 20-35/minute) was observed. Following administration of one mg of atropine, heart rate of the patient turned to normal ranges within 30 seconds. As he continued to be hypotensive, 10 mg of ephedrine was added. The vital signs of the patient turned to normal levels within two minutes. The operation lasted one hour and the patient remained completely stable during rest of the surgery. In the postoperative period no respiratory or cardiac complications were detected and the patient was discharged from hospital three days after the surgery.

Discussion

Anesthetic management of Myasthenia Gravis patients should be individualized due to increased risk of intraoperative and postoperative complications. Increased sensitivity to nondepolarizing muscle relaxants can lead to prolonged postoperative mechanical ventilation need. Beside this, MG is associated with other autoimmune disorders such as Graves' disease, thyrotoxicosis, hypothyroidism, rheumatoid arthritis and diabetes mellitus [4]. As this association may complicate perioperative management for anesthesiologists, other autoimmune disorders should be investigated in the preoperative period carefully.

Osserman classification divides Myasthenia Gravis into five groups. Type I is ocular myasthenia with palpebral ptosis and diplopia and also known as local type. Type IIA is mild generalized form with mild muscle weakness and no respiratory crisis. In type IIB, muscle involvement is more severe but no respiratory crisis either. Type III is acute fulminating group with rapid evolution and respiratory crisis and type IV is late severe form with poor response to drug therapy [5,6]. This classification can help anesthesiologists assess the intraoperative risks and postoperative complications and foreseen possible intensive care requirement [7]. The patient had been classified as type IIB and treated for 8 years, so we decided to perform regional anaesthesia not to use nondepolarizing muscle relaxants.

Until now, different kinds of anaesthetic techniques for different kinds of surgeries have been proposed for myasthenic patients, but the issue is still controversial. In past decades many anaesthesiologists tend to use low dose of nondepolarizing muscle relaxants in abdominal surgeries for endotracheal intubation and abdominal muscle relaxation conventionally under close Train of Four monitorization. In recent years some anaesthesiologists prefer to use inhalational technique in order to avoid muscle relaxants [8, 9]. Although very high concentrations of inhaler anaesthetic agents facilitate endotracheal intubation and allow surgical intervention, it may lead to delay in emergence and hemodynamic instabilities [6]. Total intravenous

anaesthesia with propofol and remifentanyl has also been used in trans-sternal thymectomy patients and suggested to be useful for avoiding muscle relaxation [10].

In 2008, clinical use of sugammadex introduced a new possibility of neuromuscular block reversal to anesthesiologists [11]. Rapid neuromuscular block reversal action with regardless of anesthesia depth makes it possible to use muscle relaxants in myasthenic patients more safely and effectively. On the other hand, Iwasaki et al. recently monitored muscle contractions of ocular myasthenic patients both at the adductor pollicis muscle and the corrugator supercilii muscle. Recovery time of neuromuscular blockade which was reversed by sugammadex, detected to be different in two different muscle groups [12]. This result makes us to remain alert about the neuromuscular blockade of myasthenic patients even if sugammadex is used.

Combination of general anaesthesia with continuous thoracic epidural anaesthesia was performed as an alternative technique especially for the juvenile myasthenic cases. While sevoflurane provided a good condition for endotracheal intubation, thoracic epidural anaesthesia allowed adequate surgical condition without muscle relaxants [13,14].

In adult patients, regional anaesthesia alone can be a good and safe method for myasthenic patients by eliminating the need for muscle relaxants and opioids in abdominal surgeries. Some anesthesiologists prefer to perform single dose of spinal anaesthesia in order to avoid higher volumes of local anesthetics used in epidural technique [3]. Higher volume of local anesthetics is usually blamed to increase muscle weakness in myasthenic patients by decreasing the sensitivity of post-junctional membrane to acetyl choline [1]. However myasthenia gravis has not been proved to increase the sensitivity of neuromuscular junction to local anesthetics yet [15].

Although single dose spinal anesthesia seems to provide a good situation for subumbilical procedures such as transurethral ureterolithotripsy surgery and inguinal hernia repair [16,17], higher levels of block is necessary for not only upper abdominal surgeries, but also laparoscopic procedures. For our patient, we prefer to insert a thoracic epidural catheter to be able to control the level of blockage intraoperatively. Beside this, continuous epidural infusion allowed us to maintain postoperative analgesia without intravenous opioid agents.

The primary medical treatment chose of MG is acetylcholine esterase inhibitors and immunosuppressive drugs. Whereas administration of morning dose of acetylcholine esterase inhibitors is also controversial. Some anesthesiologists prefer to discontinue pyridostigmine preoperatively to minimise muscle relaxant need of patients while most of them administer it for psychological support and optimization of the patient's condition [18]. In this case, we administered morning dose of pyridostigmine. At the 20 minute of the

surgery, a deep bradycardia with hypotension was observed. The reason of bradycardia might be the potentiated vagal response due to acetylcholine esterase therapy as long term acetylcholine esterase inhibitor treatment is well known to cause bradyarrhythmias in myasthenic patients [19,20]. On the other hand, the time point of bradycardia was approximately 20-25 minutes after first epidural injection that correlates with estimated onset time of epidural block. The patient was operated in the supine position and even infused slowly, high volumes of local anesthetics could result in bradycardia. One mg of atropin and 30 seconds later addition of 10 mg of ephedrine allowed to maintain normal hemodynamic parameters easily in our patient.

In conclusion, thoracic epidural anesthesia alone seems to be a good alternative method even for laparoscopic abdominal surgeries in patients with advanced myasthenia gravis.

References

1. Stevens RD. Neuromuscular disorders and anesthesia. Current opinion in anaesthesiology. 2001;14(6):693-8.
2. Conti-Fine BM, Milani M, Kaminski HJ. Myasthenia gravis: past, present, and future. The Journal of clinical investigation. 2006;116(11):2843-54.
3. Rodriguez MA, Mencia TP, Alvarez FV, Baez YL, Perez GM, Garcia AL. Low-dose spinal anesthesia for urgent laparotomy in severe myasthenia gravis. Saudi journal of anaesthesia. 2013;7(1):90-2.
4. Tellez-Zenteno JF, Cardenas G, Estanol B, Garcia-Ramos G, Weder-Cisneros N. Associated conditions in myasthenia gravis: response to thymectomy. European journal of neurology: the official journal of the European Federation of Neurological Societies. 2004;11(11):767-73.
5. Mincewicz G, Aloszko A, Nyka W, Bilinska M, Krzykowski G, Nyka WM. [The comparison of selected spirometric parameters with functional muscles exercise evaluation in patients with myasthenia]. Polski merkuriusz lekarski: organ Polskiego Towarzystwa Lekarskiego. 2007;22(129):177-81.
6. Barbosa FT, Correia MC, Cunha RM, Cavalcanti IL. [Thoracic epidural anesthesia for mammoplasty in myasthenia gravis patient: case report]. Revista brasileira de anesthesiologia. 2005;55(3):354-60.
7. Rudzka-Nowak A, Piechota M. Anaesthetic management of a patient with myasthenia gravis for abdominal surgery using sugammadex. Archives of medical science: AMS. 2011;7(2):361-4.
8. Koda K, Kimura H, Uzawa M, Sambe N, Sugano T, Kitamura T, Tagami M. [Desflurane anesthesia without muscle relaxant for a patient with myasthenia gravis undergoing laparoscopic high anterior resection: a case report]. Masui The Japanese journal of anesthesiology. 2014;63(10):1135-8.
9. Kiran U, Choudhury M, Saxena N, Kapoor P. Sevoflurane as a sole anaesthetic for thymectomy in myasthenia gravis. Acta anaesthesiologica Scandinavica. 2000;44(3):351-3.
10. Della Rocca G, Coccia C, Diana L, Pompei L, Costa MG, Tomaselli E, Di Marco P, Vilardi V, Pietropaoli P. Propofol or sevoflurane anesthesia without muscle relaxants allow the early extubation of myasthenic patients. Can J Anaesth. 2003;50(6):547-52.
11. Schaller SJ, Fink H. Sugammadex as a reversal agent for neuromuscular block: an evidence-based review. Core evidence. 2013;8:57-67.
12. Iwasaki H, Takahoko K, Otomo S, Sasakawa T, Kunisawa T, Iwasaki H. Monitoring of neuromuscular blockade in one muscle group alone may not reflect recovery of total muscle function in patients with ocular myasthenia gravis. Can J Anaesth. 2013;60(12):1222-7.
13. Rangasamy V, Kumar K, Rai A, Baidya DK. Sevoflurane and thoracic epidural anesthesia for trans-sternal thymectomy in a child with juvenile myasthenia gravis. J Anaesth Clin Pharmacol. 2014;30(2):276-8.
14. Stephenson L, Tkachenko I, Shamberger R, Seefelder C. Anesthesia for patients undergoing transsternal thymectomy for juvenile myasthenia gravis. Saudi J Anaesth. 2011;5(1):25-30.
15. Mundada SD, Shah B, Atram S. Emergency cesarian section in a patient of myasthenia gravis: Is neuraxial anesthesia safe? Saudi J Anaesth. 2012;6(4):430-1.
16. Inoue S, Shiomi T, Furuya H. Severe bradycardia in a patient with myasthenia gravis during transurethral ureterolithotripsy procedure under spinal anaesthesia. Anaesth and intensive care. 2002;30(3):387.
17. Kocum A, Sener M, Bozdogan N, Turkoz A, Arslan G. Spinal anesthesia for inguinal hernia repair in 8-year-old child with myasthenia gravis. Paediatr Anaesth. 2007;17(12):1220-1.
18. Datt V, Tempe DK, Singh B, Tomar AS, Banerjee A, Dutta D, Bhandari H. Anesthetic management of patient with myasthenia gravis and uncontrolled hyperthyroidism for thymectomy. Ann Card Anaesth. 2010;13(1):49-52.
19. McGrogan A, Sneddon S, de Vries CS. The incidence of myasthenia gravis: a systematic literature review. Neuroepidemiology. 2010;34(3):171-83.
20. Said S, Cooper CJ, Alkhateeb H, Elhanafi S, Bizet J, Gosavi S, Abedin Z. Pyridostigmine-induced high grade SA-block in a patient with myasthenia gravis. Am J Case Rep. 2013;14:359-61.