

www.jmscr.igmpublication.org

Impact Factor 3.79
ISSN (e)-2347-176x

crossref DOI: <http://dx.doi.org/10.18535/jmscr/v3i9.22>



Journal Of Medical Science And Clinical Research

An Official Publication Of IGM Publication

Myaesthesia Gravis: An Anaesthetic Challenge

Authors

Dr Anuradha Malliwal¹, Dr Rochana Bakhshi², Dr Meenal Agarwal³

¹Associate Professor, ²Professor, ³PG Student 3rd year,

Dept of Anaesthesiology, D Y Patil University School of Medicine, Nerul, Navi Mumbai, India

Corresponding Author

Dr Anuradha Malliwal

Associate Professor, Dept of Anaesthesiology, D Y Patil University School of Medicine, Nerul, Navi Mumbai, India

Abstract

Myaesthesia gravis (MG) is a chronic autoimmune neuromuscular disorder characterized by fluctuating skeletal muscle weakness that worsens with exertion and improves after a period of rest/anti-cholinesterase medication. We report the anaesthetic management of an elderly myaesthetic patient scheduled for cholecystectomy with Common Bile Duct (CBD) exploration under general anaesthesia. Respiratory muscle weakness and interference of anti-cholinesterase medication with anaesthetic drugs are important concerns in such cases.

Keywords: *myasthenia gravis, respiratory muscle weakness, anticholinesterase medication*

Case Report

A 78year old male, weighing 65kgs, known case of myasthenia gravis (Osserman IIa) presented for cholecystectomy with CBD exploration. He was on tablet. Pyridostigmine 60 mg twice daily. He had been treated conservatively for cholangitis and had undergone endoscopic retrograde cholangio pancreaticography (ERCP) with biliary stenting ten days prior. Other complaints included urinary incontinence (for which he was on tab. Urimax-D once daily) and dyspnoea on exertion (NYHA grade II). General and systemic examination were unremarkable except for pallor and decreased breath-holding time (~12-13seconds). Airway examination revealed anticipated difficult intubation due to heavy jaw,

Mallampatti grade III and multiple artificial fixed dentures in both jaws. Routine haematological investigations were within normal limits except haemoglobin 8.0gm%. He had left anterior hemiblock on ECG and moderate obstruction on pulmonary function test (PFT). Chest radiograph revealed increased broncho-vascular markings with few calcific granulomas. Echocardiography showed ejection fraction 55% with diastolic dysfunction and concentric left ventricular hypertrophy.

The patient was taken up for surgery after correcting anaemia and optimizing with nebulisations. High risk consent was taken and ICU bed and ventilator were kept available. Routine premedication administered with

injection (inj.). glycopyrolate, inj. ondansetron and cautious, titrated doses of inj. midazolam and inj. Fentanyl. Inj. metoclopramide was given to reduce the risk of regurgitation and aspiration. Anticipating difficult intubation, a check laryngoscopy was performed in deep plane of anaesthesia, using inj. propofol and sevoflurane (2-6%). Confirming visualization of epiglottis, anaesthesia was deepened and inj. succinylcholine 100mg i.v. was given to facilitate intubation. Intubation with cuffed endotracheal tube #8.0 was achieved using ramp position and #4 MacIntosh laryngoscope blade. Patient recovered from succinylcholine in 17minutes. Further neuromuscular blockade was maintained with careful, titrated doses of inj. atracurium aided by peripheral nerve stimulator (PNS). Anaesthesia was maintained with nitrous oxide-oxygen and sevoflurane. Surgery lasted 90minutes and total 30mg of inj. atracurium was required.

At the end of surgery, patient was extubated after he was conscious, responding to verbal commands and ensuring adequate neuromuscular recovery - Train-of-four (TOF)- 99.0%. Postoperative analgesia was provided with local anaesthetic infiltration along the suture line along with inj. Paracetamol (1gm) and inj. Tramadol (75mg) i.v. infusions. Patient was shifted to ICU for observation. One unit pRBCs was transfused postoperatively. Incentive spirometry and chest physiotherapy was started and duolin/budecort nebulisations continued. Patient was monitored in the ICU for 3 days and discharged on 10th post-operative day.

Discussion

MG is a chronic autoimmune neuromuscular disease characterized by weakness and fatigability of the skeletal muscles, which typically subsides following a period of rest or administration of anti-cholinesterase medication. Auto-antibodies against nicotinic acetylcholine receptors (AChR) destroy the post-synaptic receptors at the motor end-plate of striated muscles⁽¹⁾. This decrease in the number of AChR receptors results in

insufficient transmission of the nerve signal at the neuromuscular junction(NMJ), more so with repeated stimulation causing increased fatigability.

Surgery and anaesthesia in these patients are associated with increased risk of complications, mainly due to higher sensitivity to muscle relaxants. Hence, local or regional anaesthesia is preferred wherever possible. While administering general anaesthesia, techniques using muscle relaxants are avoided. However, for abdominal surgeries, muscle relaxants are necessary to provide better operating conditions. With the advent of newer drugs and equipment, general anaesthesia can be safely administered if the patient is optimally prepared and adequate perioperative neuro-muscular monitoring is done.

The anaesthetic management of a myaesthetic patient should be tailored depending on the severity of the disease and the type of surgery. Osserman classification (1958) helps to grade MG functionally and regionally and to assess the perioperative risk and possible complications⁽²⁾.

Patients should be thoroughly evaluated preoperatively with respect to the involvement of bulbar and respiratory muscles (by pulmonary function tests), and review of anti-cholinesterase and corticosteroid medications should be done. Other associated autoimmune diseases like thyroid hypo-function, rheumatoid arthritis, systemic lupus erythematosus, pernicious anaemia must be looked for. Appropriate optimization of the patient tends to reduce the risk of surgery.

Anti-cholinesterase medications may/may not be continued before surgery⁽¹⁾. If continued, they may potentiate vagal responses and produce copious secretions. Hence, anti-cholinergic premedication is a must. Sedatives should be used with caution, especially in patients having decreased respiratory reserve. Typically, MG patients are known to be sensitive to non-depolarizing muscle relaxants. They show resistance to succinylcholine and require higher doses, probably due to loss of AChRs, the ED₉₅ being 2.6 times that in non-myasthenic patients

(3,4). However, patients in remission have been reported to have normal sensitivity to succinylcholine (5). We used succinylcholine for intubation due to anticipated difficult intubation and the patient recovered from its effect in reasonable time. Marked sensitivity of these patients to non-depolarising muscle relaxants requires that small titrated doses (10-25% of ED₉₅) of intermediate-acting agents be used with neuromuscular monitoring (2). Our patient required 30 mg atracurium for surgical duration of 90mins. Reversal of residual neuromuscular blockade at the end of surgery with anticholinesterases is controversial, as it may be difficult to differentiate from weakness resulting from cholinergic crisis, in the recovery room. However, atracurium has been found to be associated with residual curarization post-operatively (6). Hence, we reversed our patient after adequate recovery of NM function (TOF -99%) and extubated him after confirming full consciousness and hemodynamic stability.

Requirement of postoperative ventilation can be predicted by following risk factors (7):

- 1) MG for >6yrs,
- 2) pyridostigmine dose >750mg/day before surgery,
- 3) preoperative vital capacity < 2.9L,
- 4) history of chronic respiratory disease other than MG.

Our patient did not have any of these risk factors and did not require postoperative ventilation.

Conclusion

Anaesthetic management of a myasthenic patient is particularly challenging as the disease involves the neuromuscular junction (NMJ), the site of action of many commonly used anaesthetic drugs. Respiratory muscle weakness and interference of anti-cholinesterase medication with anaesthetic drugs are important concerns in conduct of such cases.

References

1. Conti-Fine BM, Milani M, Kaminski HJ. Myasthenia gravis: past, present, and future. *J Clin Invest.* 2006; 116: 2843–54.
2. Abel M, Eisenkraft JB. Anesthetic implications of myasthenia gravis. *Mt Sinai J Med* 2005; 69:31-37
3. Eisenkraft JB, Book WJ, Mann SM, et al. Resistance to succinylcholine in myasthenia gravis. A dose response study. *Anaesthesiology* 1988; 69: 760-763 .
4. Wainwright AP, Broderick PM. Suxamethonium in myasthenia gravis. *Anaesthesia* 1987; 42: 950-957.
5. Abel M, Eisenkraft JB, Patel N. Response to suxamethonium in a myasthenic patient during remission. *Anaesthesia* 1991; 46:30-32.
6. McCaul C, Tobin E, Boylan JF, McShane AJ. Atracurium is associated with postoperative residual curarization. *Br J Anaesth.* 2002; 89:766-9
7. Grant RP, Jenkins LC. Prediction of the need for postoperative mechanical ventilation in myasthenia gravis: thymectomy compared to other surgical procedures. *Can Anaesth Soc J* 1982 Mar,29(2):112-6