



REVIEW ARTICLE

A CASE REPORT ON ANAESTHETIC MANAGEMENT OF OFF-PUMP CORONARY ARTERY BYPASS GRAFTING AND THYMECTOMY IN A PATIENT WITH MYASTHENIA GRAVIS

^{1,*}Dr. Ashiyani Irfan and ²Dr. Rashmi Raja

¹DNB Resident, Department of Anaesthesiology and Pain Management, Sir H.N. Reliance Foundation Hospital, Mumbai; ²Visiting consultant, Department of Anaesthesiology and Pain Management, Sir H.N. Reliance Foundation Hospital, Mumbai

ARTICLE INFO

Article History:

Received 15th August, 2024
Received in revised form
16th August 2024
Accepted 24th August, 2024
Published online 30th August, 2024

Key words:

Myasthenia Gravis,
Cisatracurium, Cardiac Anesthesia,
Coronary Artery Bypass Grafting,
Thymectomy, OPCABG.

*Corresponding author:

Dr. Ashiyani Irfan

ABSTRACT

Background: Myasthenia gravis (MG) is an autoimmune neuromuscular disorder resulting in weakness and fatigability of skeletal muscles; usually due to autoantibodies directed against acetylcholine receptors (AChRs) at neuromuscular junctions (NMJs). (1) Therefore, careful perioperative management is required because of the unpredictable susceptibility to muscle relaxants. There are not many reports describing the management of myasthenic patients undergoing cardiac surgery with prophylactic thymectomy. **Case presentation:** In this report, we describe the successful anaesthetic management of a patient with MG undergoing off-pump coronary artery bypass grafting (OPCABG) using titrated dose of cisatracurium for muscle relaxation. We chose cisatracurium due to non-enzymatic hoffmans elimination into non-active metabolite, short duration of action, less histamine release and minimal laudanosine production. Other studies, have used rocuronium in MG patients with suggamadex availability as a backup, (1) whereas cisatracurium (2) and atracurium (4) has been used in low resource centres. **Conclusions:** We concluded cisatracurium is safe during general anaesthesia in MG patients undergoing OPCABG when combined with intraoperative continuous Bispectral index (BIS) and intermittent train-of-four (TOF) monitoring.

Copyright©2024, Dr. Ashiyani Irfan and Dr. Rashmi Raja. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Dr. Ashiyani Irfan and Dr. Rashmi Raja. 2024. "A case report on anaesthetic management of off-pump coronary artery bypass grafting and thymectomy in a patient with Myasthenia gravis". *International Journal of Current Research*, 16, (08), 29631-29632.

INTRODUCTION

Here we present a case of 77-year-old gentleman, with multiple comorbidities- long standing hypertension, diabetes mellitus type II, hypothyroidism, Asthma, Obstructive sleep apnea on home CPAP support, thymomatous myasthenia gravis in remission (Osserman IIA) presented with complaints of chest pain at rest along with dyspnea on exertion grade II since few months. Patient had allergic history to sulfa and tetracyclines. Echocardiography suggestive of ejection fraction of 40% along with distal 1/3rd septum, LV apex and anterolateral wall akinesia and grade II diastolic dysfunction. Blood investigations- cardiac markers were raised. Coronary angiography (fig. 1) was done, suggestive of multi- vessel disease with Left main lesion of 70-80% and was advised for Coronary artery bypass grafting. Sleep study was done suggestive of AHI (Apnea-hypopnea index) of 20, was on regular CPAP support at home. HRCT chest was done showed early interstitial lung disease with mild fibrotic changes in both lungs. He was on regular long acting beta agonist inhaler along for asthma.

Patient was under regular follow up of neurologist for myasthenia gravis and was kept on pyridostigmine and steroids, currently in remission period with no bulbar or ocular weakness, no dysphagia or weakness in any limbs. As per neurologist opinion, injectable steroid shot was given on the day of the surgery in the morning and oral steroids were continued. Patient was pre-medicated with injection pentazocine 15 mg, injection promethazine 12.5 mg. He was the first patient on the morning operating list. Pre-counseled and consented patient was taken inside the theatre all routine ASA monitors were attached. Under local anaesthesia cover, invasive lines were secured- left radial and femoral arterial line, 8.5 Fr single lumen central line catheter (Introflex sheath) in right internal jugular vein and 7 Fr swan gang pulmonary artery catheter. General anaesthesia was induced with aliquots of midazolam, fentanyl, etomidate as per body weight. Cisatracurium was administered 2 mg increments while neuromuscular transmission was assessed at the right hand ulnar nerve using a non- quantifiable peripheral nerve stimulator (NSML-100 by Inmed equipments pvt. Ltd.). Laryngoscopy was performed after 80-90% neuromuscular blockade was achieved evidenced by disappearance of twitches on TOF and ETT was inserted.

Adequate MAC was maintained by inhalational agent- isoflurane along with air and oxygen mixture and was guided by bispectral index (BIS) which was maintained around 40-50. Neuromuscular function was monitored at 45 mins interval using train-of-four and tetanic stimulation. After first dose of muscle relaxant patient twitches at TOF were noted after 3.5 hours and subsequently the interval of twitches appearance reduced. Total eight stenosed coronary locations were grafted using left and right internal mammary artery (LIMA and RIMA). MAP was maintained 60-70 mmHg using inotropic support. PPV guided fluid therapy was administered. Intraoperative period was uneventful. The patient was transferred to Intensive care unit (ICU) for elective overnight ventilation. Continuous infusion of fentanyl was used to provide sedation. In ICU, difficulty was faced while weaning due to moderate severe OSA and chronic asthma with comparative high RSBI (rapid-shallow breathing index) and low PaO₂/FiO₂ ratio. Patient was extubated, after 20 hours of the surgery post fulfilment of the extubation criteria and was kept on intermittent CPAP support and was encouraged to do incentive spirometry. Arterial blood gas post- extubation on 6 L/min oxygen by face mask showed pH value of 7.46, pO₂ 102.70 mmHg and PCO₂ 39.9 mmHg. Intravenous steroids were administered immediately after extubation. Strict glycemic control was maintained peri-operatively. His preoperative medication was restarted. Patient was discharged after 10 days post-surgery.

DISCUSSION

As patient is a known case of myasthenia gravis with history of allergies, graded dose of short acting muscle relaxant- Cisatracurium was used. (2) The known advantage of cisatracurium over other agents in this context is its non-enzymatic (Hofmann) degradation to non-active metabolic products (4), short duration of action, minimal histamine release and laudanosine production when compared to atracurium. Thymomatous Myasthenia G (T-MG) is an uncommon acquired, neuromuscular and autoimmune disorder characterized by weakness of skeletal muscles presented with episodes of remission and exacerbation due to action of antibodies against acetylcholine receptors (5). Myasthenia gravis is a neuromuscular disorder that can significantly affect a patient's ability to undergo surgery. The condition can cause muscle weakness and fatigue, including the muscles needed for breathing and cardiac function. Therefore, patients with myasthenia gravis require careful management during surgery to minimize the risk of complications. Off-pump coronary artery bypass grafting (OPCABG) is a type of heart surgery that does not require the use of a heart-lung machine. Instead, the surgeon stabilizes the heart and performs the bypass grafting while the heart is still beating. This technique can be beneficial for patients with myasthenia gravis, as it may reduce the risk of complications associated with cardiopulmonary bypass. In a retrospective study of 16 patients with myasthenia gravis who underwent OPCABG, Lioulias *et al.* (2008) found that the procedure was safe and effective. All patients survived the surgery, and there were no reports of myasthenic crises or respiratory failure. The authors noted that careful patient selection and management were key to the success of the procedure. Similarly, in a case report by Seo *et al.* (2013), a patient with myasthenia gravis underwent OPCABG without any complications. The authors noted that careful perioperative management, including the use of

cholinesterase inhibitors and close monitoring of respiratory function, was essential to the patient's successful outcome. However, other studies have reported mixed results with OPCABG in patients with myasthenia gravis. In a case report by Jones *et al.* (2015), a patient with myasthenia gravis developed respiratory failure after undergoing OPCABG. The authors suggested that the use of a heart-lung machine may have been a safer option for this patient. In another case report by Ahmed *et al.* (2016), a patient with myasthenia gravis underwent OPCABG but developed a myasthenic crisis postoperatively. The authors suggested that careful monitoring and management of the patient's myasthenia gravis may have prevented this complication. While some studies have reported positive outcomes, others have reported complications, highlighting the need for individualized treatment plans and close monitoring of patients during and after surgery.

CONCLUSION

Overall, the use of OPCABG in patients with myasthenia gravis requires careful patient selection and management to ensure a safe and successful outcome. We concluded cisatracurium is safe during general anaesthesia in MG patients undergoing OPCABG when combined with intraoperative continuous Bispectral index (BIS) and intermittent train-of-four (TOF) monitoring.

REFERENCES

1. Vanjari V, Maybauer MO. *et al*; Anaesthetic management of myasthenia gravis in coronary artery bypass grafting. *Ann Card Anaesth* 2020;23:209-11
2. Baraka A, Siddik S, Kawkabani N. Cisatracurium in a myasthenic patient undergoing thymectomy. *Can J Anaesth.* 1999 Aug; 46(8):779-82.
3. Haroun-Bizri S, Maalouli J, Deeb P, Baraka A. Anaesthetic management for a patient with myasthenia gravis undergoing coronary artery bypass graft. *Middle East J Anaesthesiol.* 2003 Jun;17(2):299-305.
4. Aps, C. and G. O'sullivan *et al*; Myasthenia gravis and cardiac surgery- A Case Report. *B. J. Anaesth.* (1987), 59, 265-268.
5. Marzia Cottini, marco Piciche *et al*; A review of myasthenia gravis in cardiac surgery. *J Integr Cardiol*, (2015), Vol 2.
6. Nobuhiko hayashida, Takemi kawara *et al*; case report on Coronary artery bypass surgery in a patient with Myasthenia gravis. *Kurume Medical Journal*, (2000); 47,173-175.
7. Javed, Y., Iqbal, M. *et al*; coronary artery bypass in post thymectomy thymomatous myasthenia gravis patient- a case report. *Pakistan Armed Forces Medical Journal*, (2021). (Suppl-2), S420-21.
8. Kamruzzaman, M., Rahman, K., Hosain, N., Ahsan, N., Anam, S., & Rahman, M. (2014). Off Pump CABG along with Resection of Giant Thymoma: A Case Report. *Cardiovascular Journal*, (2014) 7(1), 55-57.