Case Report

Indian Journal of Anesthesia and Analgesia
Volume 8 Number 5 September-October 2021
DOI: http://dx.doi.org/10.21088/ijaa.2349.8471.8521.80

Anesthetic Management of Myasthenia Gravis Patient for Shoulder Surgery: A Case Report

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Abstract

Myasthenia gravis patients represent a significant management problem for the anesthesiologist, as the anesthetic considerations in these patients include a marked sensitivity to the non depolarizing skeletal muscle relaxants and an increase in the risk of prolonged postoperative mechanical ventilation. Regional anesthesia, including USG guided nerve blocks are an excellent option, wherever feasible. In situations where regional techniques are contraindicated or fail to provide surgical anesthesia, general anesthesia without muscle relaxants can be a handy option.

Keywords: Femoral block; Interscalene block; Myasthenia gravis; Popliteal block.

Introduction

Myasthenia Gravis (MG) is an autoimmune disorder of neuro muscular junction (NMJ) in which auto antibodies destroy the alpha subunit of muscle-type nicotinic acetylcholine (Ach) receptors of NMJ causing transmission failure resulting in muscle weakness and fatigue.[1] The incidence of MG varies between geographic regions and the reported incidence worldwide is 0.3-2.8 per 1,00,000.[2]

MG can be associated with other autoimmune diseases like SLE, Rheumatoid arthritis, Thyroiditis, Pernicious anemia, etc. Pathologic alterations of the thymus gland are present in 70% of patients. The clinical course of MG is characterized by periods of exacerbation and remission.[1] MG has historically been a challenging disease for the anesthetist to manage because of its involvement in the muscular, pulmonary and cardiovascular systems as well as with drug interactions.

We present, case of a patient with MG undergoing proximal humerus surgery with fibular grafting under peripheral nerve blockade and due to sparing of the posterior aspect of the shoulder, supplemented with General Anesthesia (GA) without muscle relaxants.

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63 Years old female patient, weighing 95 kg

How to Cite this Article:

Thanseena AH, Biju Madhavan/Anesthetic Management of Myasthenia Gravis Patient for Shoulder Surgery: A Case Report/Indian J Anesth Analg. 2021; 8(5): 541-544.

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(BMI 34.8) with an ASA physical status of three, diagnosed with fracture right head of the humerus with dislocation, scheduled for ORIF proximal humerus with fibular grafting. she was diagnosed as a case of Myasthenia Gravis with Osserman and Genkin grade 2 A for 8 years.

At diagnosis, she had ptosis, diplopia, proximal muscle weakness of the upper and lower limbs which was gradually progressive and later developed dysphagia. She was started on tab pyridostigmine 60 mg TDS and later included Tab Neostigmine 15 mg TDS, Tab Azithromycin 50 mg OD and Tab. Wysolone 30mg OD.

She was also a known case of longstanding DM on OHA and insulin, Hypertension on tab Telmisartan-cilacar combination, and hypothyroidism on Thyronorm 125 mcg. On preoperative evaluation patient's vitals were PR of 80bpm, BPof 120/90, RR of 18, and SPO_2 of 98% on room air. Airway examination revealed a short neck and mallampati class of three. CVS examination revealed a systolic murmur at the aortic area and the rest of the system examinations were within normal limit.

All routine blood investigations including TFT and ABG were within normal limits. Her ECHO showed concentric LVH, stage 1 LVDD, and moderate AS due to degenerative aortic valve disease. Preoperative PFT was abandoned due to poor patient efforts. Oral steroids changed to IV steroids.

Written high risk informed consent including consent for post-operative ventilator support was taken. The patient was premedicated with Tab. Ranitidine 150 mg night before and on the day of surgery, and continued the routine schedule of neostigmine, pyridostigmine, and IV steroids.

On the day of the procedure, the patient was reassessed, ensured the NPO status and on shifting to the operation room, standard monitoring including ECG, Pulse oximetry, and NIBP were attached and a peripheral iv line secured on the left forearm. The patient was premedicated with midazolam 1mg IV.

Under aseptic precaution, usg guided right Brachial plexus block via interscalene approach performed with 2% lignocaine with adrenaline 5 ml and 0.5% bupivacaine 5 ml.

Under USG guidance, the right sciatic nerve block (popliteal block) was given with 2% lignocaine with adrenaline 10 ml and 0.5% bupivacaine 10 ml with the patient in the left lateral position. The right femoral block is given under USG guidance with 2% lignocaine with adrenaline 5ml and 0.5% bupivacaine 5ml. Sensory and motor blocks were assessed. The patient was positioned in a beach chair position, scrubbed, and draped for both fibular grafting and shoulder repair. The procedure started with right fibular grafting and once finished, shoulder repair was started.

The patient started complaining of pain and discomfort while extending the incision posteriorly at the shoulder joint and we decided to convert it into GA with LMA with spontaneous ventilation. The patient was placed supine and pre-oxygenated with 100% FiO_2. Inj. glycopyrrolate 0.2 mg, inj. emeset 4mg, inj. fentanyl 75 mcg, inj. propofol 80mg IV were given. Mask ventilation was done and LMA was placed without trauma. Maintenance of anesthesia was accomplished by sevoflurane inhalation with a MAC of 1.5%while the patient maintained spontaneous ventilation.

Intraoperatively judicious fluid administration was given. Throughout the procedure, vitals were stable. Total surgical time was 2.5 hours and no additional analgesic supplements were given. During emergence, the inhalational agent was discontinued. LMA was removed when the patient became conscious, attained airway reflexes with adequate skeletal muscle power, and obeying commands.

The patient was then transported to PACU with O2 administered via a facemask. Postoperative analgesia lasted for more than 10 hours. She was restarted on the oral dose of cholinesterase inhibitors soon after the procedure. The patient was discharged on POD-3.

Discussion

Myasthenia gravis is a disease of great significance to the anesthesiologist, because it affects the neuromuscular junction and its interaction with neuromuscular blockers (NMBs) have significant implications in the postoperative period.

During the postoperative period, residual effects of anesthetics and analgesics can adversely affect pulmonary function which is already limited by the MG itself.[3] Therefore optimal preoperative and postoperative anesthesiological management of the MG patient is crucial.

In patients with myasthenia, the following parameters indicate the need for postoperative mechanical ventilation.[4]

- Disease duration >6years
- Associated pulmonary disease (COPD)
- Pyridostigmine dose requirement >750mg/ day.

- Vital capacity <2.9L[4]

Bulbar or respiratory involvement compromises the patient's ability to protect the upper airway and cough and clear secretions postoperatively.

The patient in our study comes under Osserman and Genkin class IIA and had associated hypothyroidism. Preoperative lung function assessment is most important but our patient could not perform PFT. The morning doses of cholinesterase inhibitors were continued, as the omission of the same makes the patient more susceptible to develop muscle weakness.[5]

MG patients are more sensitive to the effect of non depolarizing NMBDs and monitoring of neuromuscular transmission is vital while carrying out GA. Though standard balanced GA technique including IV or inhalational anesthetic agent without the use of neuromuscular blocking drugs whenever possible is recommended, regional anesthesia (RA) is considered safe and should be incorporated in anesthetic plan wherever and whenever feasible.[2]

For shoulder surgery, Interscalene block should be considered as the regional technique of choice whether combined with GA is influenced by both the type of surgery and patient factors.

The management of severe postoperative pain continues to be a major challenge for many anesthetists. RA technique has the potential to enhance both patient recovery and outcome following both open and arthroscopic surgeries. The minor surgical procedures can usually be performed with RA alone whereas, with major surgery of longer duration, a combination of RA and GA maybe more appropriate. Shoulder surgery is often prolonged and patients may find parts of the procedure uncomfortable, even with sedation, and is associated with significant postoperative pain, therefore excellent postoperative analgesia is essential to ensure a good functional recovery.[6]

Our anesthetic plan for this case was peripheral nerve blockade interscalene brachial plexus block for performing ORIF right proximal humerus, popliteal and femoral block for fibular grafting. While extending incision posteriorly at shoulder joint patient started complaining of pain most commonly due to sparing of C8 and T1 nerve roots, which is unlikely in USG guided technique but common with peripheral nerve stimulation and paresthesia techniques. Winnie's classical interscalene brachial plexus block (ISBPB) is performed at the C6 and the lower trunk of the brachial plexus (C8–T1) is spared. For that reason, patients undergoing conventional ISBPB may complain of pain or discomfort in the posterior aspect of their shoulder. To block the lower trunk of the brachial plexus, a caudal approach to ISBPB guided by nerve stimulation or ultrasound or both can be performed. Although it can produce sufficient anesthesia in the ulnar sides of the elbow, forearm, and hand, which are innervated by the lower trunk, whether the caudal approach to ISBPB provides anesthesia in the posterior shoulder is not evaluated. Even under ultrasound guidance, which directly shows the spread of the local anesthetic around nerves, the lower trunk of the brachial plexus cannot easily be visualized because the C8 and T1 nerve roots are posterior to the subclavian artery, which means they are located more deeply.[7]

MG patients are extremely sensitive to nondepolarizing NMBs and even a very small dose of residual neuromuscular blockade effect may result in respiratory distress or loss of airway protection during emergence from anesthesia. Hence, we avoided neuromuscular blockers and provided GA without muscle relaxants. Postoperatively the patient was comfortable and analgesia lasted for more than ten hours, which helped in maintaining hemodynamic stability and avoiding myasthenic exacerbations.

Conclusion

The myasthenic patient can be a challenge to the anesthesiologist and the post-surgical risk of respiratory failure has always been a matter of concern. 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.

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