Case Report

Anesthetic management of late onset myasthenia gravis with fracture humerus, with undiagnosed thymoma

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Background: Myasthenia gravis (MG) is an autoimmune disorder characterized by fatigable weakness of skeletal muscles resulting from an antibody-mediated immunologic attack directed at acetylcholine receptors (or receptor-associated proteins) in the postsynaptic membrane of the neuromuscular junction. **Case Presentation:** 62 years old, 86/kg male patient had road traffic accident and had blunt injury chest and fracture humerus. He was known case of MG, on treatment (Pyridostigmine and Prednisolone). He was scheduled for open reduction internal fixation proximal humerus (left side). Tailor made plan was made to minimize any adverse incident (myasthenia crisis). Further investigations revealed associated thymoma and immunosuppressants were started. **Conclusion:** Patients with MG should be thoroughly investigated for associated thymoma. Regional anesthesia with close monitoring is the key to successful outcome and avoidance of myasthenia crisis.

KEY WORDS: Autoimmune disorder, myasthenia gravis, thymoma

INTRODUCTION

Myasthenia gravis (MG) is an autoimmune disorder characterized by fatigable weakness of skeletal muscles resulting from an antibody-mediated immune attack directed at acetylcholine receptors (or receptor-associated proteins) at the postsynaptic membrane of the neuromuscular junction. This further leads to failure of propagation of action potential across the neurons, causing neuromuscular weakness without stiffness.[1] In most of the cases, the anticholinergic autoantibodies mainly target the extraocular muscles, leading to fluctuating muscular fatigability, predominantly causing bilateral diplopia and ptosis and it characteristically worsens as the day progresses. The diagnosis is suggested by clinical history and is confirmed by electromyography, anticholinesterase test or serological assay for acetylcholine receptor antibody.[2] MG imposes a greater challenge for anesthesiologists due to the diversity of disease manifestations and associated possibility of post-operative respiratory complications.

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CASE PRESENTATION

A 62-year-old patient male presented with a history of road traffic accident 2 days back with fracture left proximal humerus with left hemothorax [Figures 1 and 2]. Patient was known hypertensive and well controlled on tablet Amlodipine 10 mg once a day (OD). Patient was diagnosed case of MG (history of unilateral bulbar weakness right side) and was on tablet Pyridostigmine 60 mg BD, tablet methyl prednisolone 10 mg OD since 4 years. Patient was obese, weight 86 kg and BMI 35,and blood pressure was 140/76 mm Hg. Patient had cushingoid faces owing to chronic steroid therapy. Neck was short, neck circumference

44 cm and Mallampati grade was 2 [Figure 3]. Bedside PFT was done. Breath holding time was 36 seconds and single breath count was 40. Pre-operative routine investigations were within with in normal range. Chest X-ray revealed blunting of left cardiothoracic angle with lower zone haziness suggestive of left hemothorax. Confirmation was done by ultrasonography (USG) guided tapping. Nebulization with Duolin ipratropium bromide and levosalbutamol and incentive spirometry was started. Pulmonary function test revealed restrictive lung disease; FEV1/FVC −69%. Muscle power was assessed and was Grade 5.

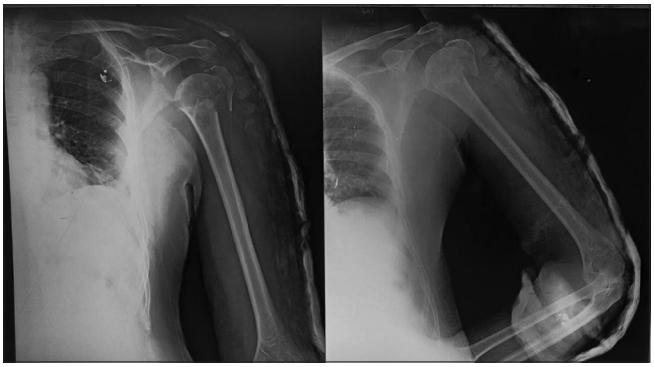

Figure 1: Fracture proximal humerus

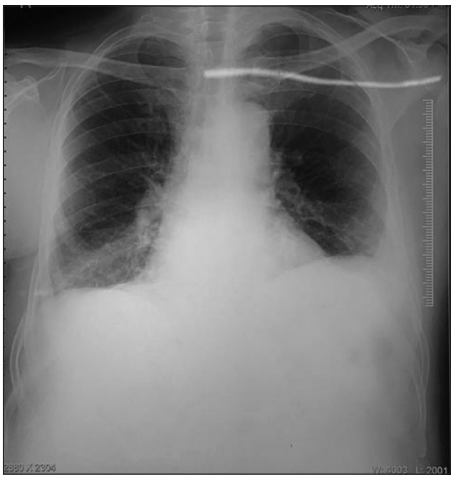

Figure 2: Left hemothorax (mild)

Figure 3: Airway assessment

All medications were continued till day of surgery. Case was scheduled as a first case. Informed consent was obtained. Counseling was done and procedure was explained to patient to allay anxiety as we wanted to avoid sedation.

In Pre-operative Room

Patient was nebulized with Duolin. Evaluation of any signs of muscle weakness was done and was shifted to operation theater with secured IV line (20 G cannula).

Mode of Anesthesia

On arrival to operating room, standard monitors were connected. Under all aseptic precaution, under ultrasound guidance, left interscalene block was given using 30 mL of 0.5% Bupivacaine with 25 µg of Fentanyl. Utmost care was taken during procedure to avoid phrenic nerve. Inj. hydrocortisone 200 mg was given as premedication. Mild sedation was given using injection Midazolam (0.5 mg alliquotes were given twice). Supplemental analgesia (injection ketamine (0.5 mg/kg) was required during the reduction of fracture segment.

Oxygen was supplemented throughout the procedure through Hudson mask with O_2 @ 4 l/min. Surgery lasted for 2 h.

Patient was hemodynamically stable and shifted to post-operative room and continuous monitoring was done. Two hours after surgery, patient complained of difficulty in breathing. Breathing was shallow with respiratory rate of 12. Impending myasthenia crisis was suspected. Visual analogue score was 5. Pain was managed with Intravenous Paracetamol (1 g) infusion and ABG was done (pH 7.4, $PaCO_2$ 48 mmHg, PaO_2 110 mm Hg) suggestive of low ionised calcium levels (4.1 mg/dL). Inj. calcium gluconate 10 mL was given slow i.v. over 10 min under continuous heart rate monitoring and tab. Pyridostigmine 60 mg was given orally. After 15 min, patient had symptomatic improvement. Nebulization was continued postoperatively. Neurologist was consulted, computed tomography thorax revealed thymoma (4.9 cm). Immunosuppresants were started and patient was referred to neurophysician for follow-up.

DISCUSSION

Regional anesthesia remains the safest technique in patients with MG but requires vigilant continuous monitoring and prompt management. Classically, MG presents with fluctuating and fatigable skeletal muscle weakness, affecting the extraocular muscles mainly and the muscles of mastication to a lesser extent. Apart from prototypical muscular involvement, nevertheless, any set of muscles can be affected and may include the proximal limb and neck musculature.[3] It has been found to be associated with an increased falls risk and glucocorticoid-induced osteoporosis, recognized determinants of increased fracture risk.[4]

Muscle power is maximum in the morning and goes on reducing as the day progresses thus; we planned the case as a first case in the morning. Local anesthetics (with amide group) like

Bupivacaine, Ropivacaine are considered safe as compared to ester group, in patients who are on anticholinesterase therapy as Anticholinesterases, may theoretically impair the hydrolysis of ester local anesthetics resulting in prolonged block. Patients with MG, maintained on anticholinesterases can be quite sensitive to discontinuation of the medication, with development of respiratory and bulbar weakness if medication is withheld, so all drugs were continued till day of surgery.

Premedication withheld to avoid any respiratory complication and pre procedural counseling and assurance was done. Patients who were on 5 mg or more dose of Prednisone (or its equivalent) for more than 3 weeks, 6 months before surgery or those who appear Cushingoid should either receive stress dose of glucocorticoids as premedication before induction of anesthesia, or should get their hypothalamic pituitary axis tested preoperatively, hence we gave inj. hydrocortisone 200 mg as premedication. In our case, USG-guided interscalene block was performed to avoid accidental block of phrenic nerve, which can cause unilateral diaphragmatic palsy and aggravate respiratory distress. Certain antibiotics such as fluoroquinolones, aminoglycosides, and macrolides impair neuromuscular transmission, pre and postsynaptic levels were avoided.[5]

The need for intensive post-operative monitoring and/or intensive care unit admission for patients with MG should be individualized based on the clinical features, duration of MG, the risk factors for myasthenic crisis, type of surgical procedure, the type of anaesthetic implementation, the intraoperative, and immediate post-operative course.[6]

This patient had late onset MG (at age 58 years), was on low dose of Pyridostigmine, corticosteroid for 4 years and was not on immunomodulating therapy. Patient did not give any history of myasthenia crisis in the past. Due to unavailability of previous neurological records, staging of the disease could not be done. Neurologist reference was seeked and HRCT thorax suggested thymoma. Thymoma is associated with MG in 40% cases.[7]

Various factors such as stress and medications can precipitate myasthenia crisis. Prompt management of symptoms is prudent to avoid any untoward incident in post-operative period even after regional anesthesia. There are reports of precipitation of myasthenia crisis even after regional anesthesia.[8]

CONCLUSION

Patients with MG should be thoroughly investigated for associated thymoma. Regional anesthesia with close monitoring is the key to successful outcome.

CONSENT FOR PUBLICATION

Written informed consent was obtained from patient for the publication of this case report and any accompanying images. We have tried to hide the identity of the patient.

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