

Thoracic epidural and Total IntraVenous Anaesthesia for transsternal thymectomy in a patient with myasthenia gravis

A Kulkarni, S Joshi, A Bhargava

Citation

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Abstract

Myasthenia gravis is a challenging condition due to its neuromuscular involvement; the main concerns are respiratory muscle weakness and side effects of anticholinesterase drugs. The use of neuromuscular blocking drugs (NMBD) is related to an increased incidence of postoperative mechanical ventilation and pulmonary complications in patients with myasthenia gravis, hence techniques avoiding use of NMBD are recommended. We performed transsternal thymectomy under thoracic epidural and total intravenous anaesthesia with propofol and sufentanil.

CASE REPORT

A 34-year-old 66kg male was posted for transsternal thymectomy. He had history of diplopia, nasal twang of speech and difficulty in swallowing for 15 days, within next few days patient developed weakness in both upper limbs which increased on exercise.

On general examination vitals were normal, IX and X cranial nerve palsy was present. (Osserman classification II)

On investigation, Edrophonium test was positive, and Acetylcholine receptor antibodies were detected. Nerve conduction studies revealed positive decremental response of more than 10% in proximal and distal group of muscles tested at rest, immediately after exercise, at 1 and 2 minutes after exercise suggestive of generalized myasthenia gravis.

Computerised Tomography (C T) Scan of the Chest revealed large anterior mediastinal mass measuring 7.5x7.8x8.2 cms, invading the superior vena cava. C T guided Fine needle aspiration cytology was suggestive of malignant thymoma.

Treatment commenced with Tablet pyridostigmine 60 mg 8 hourly, Tablet prednisolone 10 mg 12hrly, patient showed positive response, but within 7 days he developed acute exacerbation with increased muscle weakness and difficulty in breathing requiring assisted ventilation with pressure support of 10 cms of H₂O, treatment included inj neostigmine 0.5 mg in titrated doses and IV Immunoglobulin

25 mg/day. Artificial ventilation was required for 48 hours.

External beam radiotherapy (EBRT) was given as thymoma was involving SVC, Patient was in remission when posted for thymectomy.

On preoperative evaluation routine hematological and biochemical investigations were normal. Thyroid function test was normal, Pulmonary function test showed FVC-4.30L FEV₁ - 3.79L. Mallampati grade was I.

Premedication included Tab diazepam 5mg HS, Tablet Pyridostigmine 60mg, Tablet Ondansetron 16 mg and Tablet Ranitidine 150 mg on the morning of surgery.

In the operation theatre the patient had baseline heart rate of 92 beats /min, BP 128/78mmHg. Intravenous access was gained with 16G cannula, monitoring included 5 lead electrocardiography, ETCO₂, IBP, CVP, Pulse oximetry, Expiratory gas analysis, Nasopharyngeal temperature (Datex Ohmeda Aestiva /5), Peripheral nerve stimulation of Left ulnar nerve (Fischer and Paykel innervator 252).

Under local anesthesia a 16G Portex epidural catheter was placed in the T4-5 interspace using loss of resistance technique, test dose was given with 2ml 0.5% bupivacaine.

Anaesthesia was induced with morphine 0.1mg.kg⁻¹, sufentanil 0.5 g.kg⁻¹ and propofol 1.5-2.5mg.kg⁻¹. The trachea was intubated with a cuffed portex ETT (ID 7.5mm) after achieving topical anesthesia of the airway with 4ml

2% lignocaine. Post induction epidural morphine 3mg diluted in 10 ml normal saline and 12 ml 0.5% bupivacaine was given slowly over 15 minutes.

Anaesthesia was maintained with Nitrous oxide /Oxygen (33:67), propofol infusion 6-8mg . kg⁻¹ .h⁻¹ initial 10 minutes, then reduced to 4-6mg.kg⁻¹ .hr⁻¹, infusion was further reduced to 2mg.kg⁻¹ .hr⁻¹ 30 minutes prior to closure and stopped 10 minutes before closure. During the surgery intermittent sufentanil boluses 0.2 g.kg⁻¹ were given.

Ventilation was controlled artificially to maintain the ETCO₂ between 30-36mmHg with a tidal volume of 8ml/kg, Respiratory rate of 12/min . Paw remained between 19-22mmHg.

During the surgery heart rate was maintained between 68-92 beats/minute, Blood Pressure decreased to 92/60 mm Hg for about 20 minutes after the initial dose of 0.5% epidural sensoricane was given ,further during the procedure BP remained between 104-130/58-72 mm Hg .

T4/T1 Ratio at the end of the procedure was >90%, spontaneous breathing was adequate, Tracheal tube was removed on table 12 minutes after completion of the procedure.

Postoperative pain was managed with epidural infusion of 0.1% bupivacaine 4-6ml.hr⁻¹ and PCA IV Morphine 1mg bolus with lockout interval of 10 minutes.

At the end of the procedure pyridostigmine was not required.

DISCUSSION

Myasthenia Gravis (MG) is an autoimmune disease characterized by reduction of postsynaptic nicotinic acetylcholine receptors (nAChRs) at the neuromuscular junction caused by their destruction or inactivation by circulating antibodies. Skeletal muscle weakness and fatigability are hallmark of MG, the condition is associated with relapses and remission. Surgery and stress may exacerbate the symptoms of MG.¹

The disease is frequently associated with morphological abnormalities of the thymus.

10-15% of patients with MG present with a thymoma and 60-80% with thymus hyperplasia. Transsternal thymectomy is now the treatment of choice in most adult patients with generalized myasthenia gravis. Thymectomy benefits nearly 96% of patients, 46% develop complete remission and 50%

improve on therapy.¹

Preoperative assessment should focus on the recent course of the disease, current drug therapy including anticholinesterase drugs, steroids and any coexisting thyroid disease.

Patient should be in remission when subjected for surgery. Pulmonary function test should be performed for evaluation of the lung functions.

Anesthesia concerns are increased sensitivity of patients with MG to neuromuscular blocking drugs (NMBD), leading to prolonged effect of NMBD.

Catherine Chevalley and etal collected retrospective data from 36 MG patients who underwent thymectomy, it was observed that the need for postoperative ventilatory support was more frequent when muscle relaxants were given intraoperatively, higher incidence of early extubation was noted when the combination of thoracic epidural and general anesthesia with IV propofol technique was used.²

Use of techniques for thymectomy avoiding use of NMBD is recommended. Propofol or sevoflurane anesthesia without muscle relaxants has been shown to allow early extubation of myasthenic patients.³

We performed the surgical procedure without the use of NMBD under thoracic epidural anesthesia (TEA) supplemented with Total Intravenous Anesthesia (TIVA)

TEA with 0.5% bupivacaine provided optimal operating conditions with necessary muscle relaxation and prolonged duration of sensory analgesia .⁴ Epidural morphine was given for postoperative analgesia thus facilitating spontaneous breathing at the end of surgery. TIVA with propofol and fentanyl technique has been used successfully for transsternal thymectomy. Propofol has been shown to obtund airway reflexes ,thus allows smooth intubation , we choose propofol - narcotic for induction and propofol infusion with sufentanil boluses for maintenance of anesthesia. Continuous IV propofol infusion allows rapid control of depth of anesthesia, haemodynamic stability and rapid recovery which is beneficial in patients with MG.⁵

In this case the combined use of TEA and TIVA avoided use of NMBD, provided good control of heart rate and pressor response during surgery, early return to spontaneous ventilation and extubation within 12 minutes of completion of surgery. Postoperative analgesia was achieved with combination of TEA with 0.1% bupivacaine infusion and

intravenous PCA morphine. Patient had uneventful postoperative course.

CONCLUSION

Thoracic epidural anesthesia with bupivacaine supplemented with propofol infusion and sufentanil excluded the need for neuromuscular blocking drugs, the technique provided optimal operating conditions with no changes in the neuromuscular function. Rapid recovery and effective postoperative analgesia lead to early restoration of spontaneous ventilation and extubation within few minutes of completing the surgical procedure. TEA and TIVA technique can be used successfully for myasthenic patient undergoing transsternal thymectomy.

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Author Information

Anita Kulkarni, M.D.

Consultant Anesthesiology, Department of Anesthesiology, Rajiv Gandhi Cancer Institute and Research Centre

Saurabh Joshi, M.B.B.S.

Junior Resident, Department of Anesthesiology, Rajiv Gandhi Cancer Institute and Research Centre

Ajay Bhargava, M.D.

Senior Consultant Anesthesiology, Department of Anesthesiology, Rajiv Gandhi Cancer Institute and Research Centre