

# Anesthesia For Thoracoscopic Thymectomy: Modified Non-Muscle Relaxant Technique

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## Abstract

Anesthesia for thymectomy in myasthenia gravis is challenging. The anesthetic experience of that technique is quite large. It involves either muscle relaxant or non-muscle relaxant techniques. However, the literature is deficient of standard anesthetic technique for thoracoscopic thymectomy. Therefore we present in this report a modified non-muscle relaxant technique for thoracoscopic thymectomy (TT). We report two cases with TT under general anesthesia using sufentanil and propofol for induction and local anesthesia spray to the vocal cords to facilitate endobronchial intubation using non-muscle relaxant technique. The intubating, operating and postoperative conditions were excellent. To the best of our knowledge, this is the first report on modified non-muscle relaxant technique for TT in myasthenia gravis. Further cases have to be done to verify our technique.

## INTRODUCTION

Myasthenia gravis (MG) is an autoimmune disease characterized by release of antibodies against acetylcholine receptor at the neuromuscular junction (NMJ). Anesthesia for myasthenia gravis is challenging for anesthesiologists because of drug interaction with various anesthetic agents namely muscle relaxants. Several reports have been written on anesthesia and critical care management of myasthenic patients undergoing trans-sternal thymectomy (1,2,3). However, very few on thoracoscopic thymectomy (4). The techniques of anesthesia for thymectomy in myasthenia gravis could be either with or without muscle relaxants. In 1994, we have adopted non-muscle relaxant technique for trans-sternal thymectomy (5). Since that time more cases were done using the same technique with very encouraging results. Thoracoscopic thymectomy (TT) has been recently introduced and slowly is getting popularity. That warrants revisiting and modifies our anesthetic technique. This report will focus on the modified non-muscle relaxant anesthetic technique for thoracoscopic thymectomy in myasthenia gravis patients.

## CASE 1

A 23-year-old female weighing 60 kg known to have myasthenia gravis. The disease started since 1 yr with ocular symptoms and then she had generalized muscle weakness. At one stage she developed respiratory failure and bulbar

involvement where the trachea was intubated and she was admitted to critical care area for ventilatory support. The diagnosis of myasthenia gravis was made based on the severity of her symptoms. She started medical treatment in the form of pyridostigmine (60 mg, 6 hourly) and prednisolone (20 mg once a day) with marked improvement of her symptoms. The patient was posted for TT under GA. Her preoperative laboratory investigations and ECG were within normal limits. Chest CT scan showed thymus enlargement (Figure 1).

**Figure 1**

Figure 1: Chest CT scan shows enlarged thymus gland. Arrow points at the thymus shadow.



Pyridostigmine was continued as usual and three sessions of plasmapheresis were performed preoperatively. Premedication was achieved with oral lorazepam 1mg 1hr preoperatively. In the operating room, peripheral and arterial cannulae were inserted. Right internal central venous catheter was inserted after induction of general anesthesia. Monitoring included, non-invasive monitoring of blood pressure, ECG, pulse oximeter, intra-arterial and central venous pressure monitoring. Induction of anesthesia was achieved with sufentanil (10mcg) followed by propofol (200mg), while she was breathing 50% O<sub>2</sub>/air/sevoflurane at 1 MAC. Laryngoscopy was performed and the larynx was sprayed with xylocaine 10%. Due to non-availability of LTA (laryngo tracheal analgesia cannula) which we use usually for local anesthesia of the tracheo-bronchial tree, the trachea was intubated with single lumen tube and 15cc of xylocaine 2% was instilled through the tube followed by controlled ventilation to ensure equal distribution of local anesthetic (Figure 2).

**Figure 2**

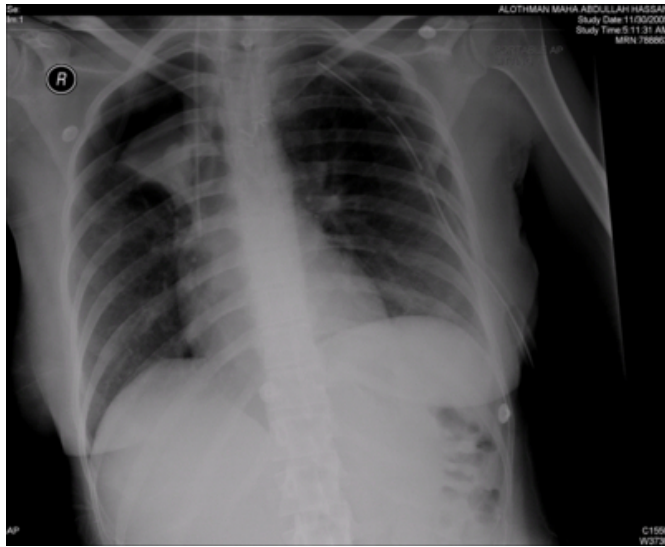
Figure 2: Shows trachea intubated with single lumen tube and xylocaine instilled through it.



Two min later, single lumen tube was removed and left sided DLT was inserted and checked by auscultation and fiberoptic bronchoscope (FOB). Anesthesia was maintained with sufentanil infusion running at 5mcg/hr and propofol infusion at 100mg/hr. The patient underwent uneventful thymectomy for 3hr. The trachea was extubated. She was then transferred to the surgical intensive care unit (SICU). Postoperative analgesia was achieved with ketoprofen 100mg/i.m/12hr. In the first postoperative day her chest-x-ray showed right upper lobe collapse, due to secretions, where the trachea was intubated and fiberoptic bronchoscope suctioning was performed followed by tracheal extubation (Figure 3). Her postoperative period was smooth and the chest tube was removed on the second postoperative day.

**Figure 3**

Figure 3: Postoperative chest-x ray shows right upper lobe collapse.



**CASE 2**

A 21-year-old female (weighing 58kg) known myasthenia gravis disease for the last 2yr. She was on medical treatment included pyridostigmine and prednisolone. She was scheduled to undergo TT. Preoperative hematological profile and ECG were normal. Pulmonary function tests revealed restrictive airway pattern. Premedication achieved with oral lorazepam 1mg, 1hr prior to surgery. In the operating room, her body temperature was maintained with water heated mattress. After placement of the ECG and automated blood pressure cuff, intravenous and arterial cannulae were inserted under local anesthesia. Anesthesia was induced with sufentanil 0.1mcg/kg followed by propofol 3mg/kg body weight while she was breathing 50% O<sub>2</sub>/air through a Magill anesthetic circuit. Direct laryngoscopy was then performed and the larynx was sprayed with 4% lignocaine 2-4ml using a laryngo-tracheal analgesia cannula (LTA, 24 laser pores, Abbott, USA). Two minutes later, the trachea was intubated with a left sided DLT (Fr 35) which was checked by auscultation and FOB. Anesthesia was maintained with propofol infusion 6-12mg/kg/hr. Incremental dose of 10mcg sufentanil was given if required. Surgery lasted uneventfully for 2hr and at the end the trachea was extubated and the patient was transferred to the SICU. Postoperative analgesia was achieved with i.m ketoprofen. The patient made uneventful recovery.

**DISCUSSION**

Trans-cervical, trans-sternal maximal thymectomy is an established surgery for generalized myasthenia gravis. More

recently thoracoscopic thymectomy has been introduced as a less invasive technique for the management of myasthenia gravis and also as an alternative to conventional trans-sternal approach. Thoracoscopic thymectomy offers several advantages compared to open technique, namely, less postoperative morbidity, minimal discomfort, rapid functional recovery, shorter postoperative hospital stays and reduction of hospitalization cost. Also TT offers excellent cosmetic healing compared to sternotomy (6, 7). In the literature there are many publications on the anesthetic management of trans-sternal thymectomy. However, very few on thoracoscopic thymectomy. Classically, anesthetic technique for thymectomy could be either, muscle relaxant or non-muscle relaxant technique. The myasthenic patient is sensitive to non-depolarizing neuromuscular blockers and sensitive to depolarizing ones (8,9). We have first coined and adopted non-muscle relaxant technique combined with thoracic epidural analgesia (TEA) and light general anesthesia in 1994 (3). During earlier phases of TT, we have used the same non-muscle relaxant technique combined with TEA, on the assumption that it could be converted to open surgical technique at any time during the procedure (10). However, later we have modified our technique which we present in this report to be non-muscle relaxant without TEA. Our current anesthetic technique includes, non-muscle relaxant approach, intubating the trachea with DLT after LTA spray, and continuous infusion of propofol and sufentanil. In the first case described above and due to lack of LTA kit, we have intubated the trachea with single lumen tube and through it we instilled xylocaine 2% 15cc for local anesthesia of the tracheo-bronchial tree to facilitate endobronchial intubation with minimal stress response. We advocate this method in case of non-available LTA kit. In both cases, lung deflation was complete and did not require capnothorax insufflation. In case incomplete lung deflation exist, we do recommend use of capnothorax at pressure <10mmHg (11,12).

In conclusion, anesthesia for thymectomy in myasthenia gravis is challenging. Use of modified non-muscle relaxant technique for thoracoscopic thymectomy provided excellent intubating operating and postoperative conditions.

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