

## MULTISCIPLINARY APPROACH OF NON-THYMOMATOUS MYASTHENIA GRAVIS

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*[Approccio multidisciplinare della miastenia grave non timomatosa]*

### ABSTRACT

**Objectives:** Thymectomy has been accepted as a potential therapy for myasthenia gravis in patients with failure of medical treatment. The extent of resection of surrounding mediastinal fat remains contentious, and several approaches have been proposed. Transcervical thymectomy has been criticized as potentially giving a “lesser” thymectomy. We report our multidisciplinary approach to the myasthenia gravis in non thymomatous patients treated with transcervical approach with telescope enhancement.

**Methods:** The technique was used in 7 patients with failure of medical treatment. Preoperative stage according to MGFA classification was 1 and 2. Thymic hyperplasia and Hassal’s corpuscles were found in all patients. All patients show a reduction of symptoms at a mean follow up of 31 months.

**Conclusions:** Patients with myasthenia gravis need a multidisciplinary approach and close follow-up care in cooperation with the primary care physician. Minimally invasive transcervical thymectomy permits to perform a safer thymectomy with an extended removal of all anterior mediastinal fat and good results at midterm follow up.

**Key words:** Myasthenia gravis, medical treatment, prednisolone, thymectomy, multidisciplinary approach.

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### Introduction

Myasthenia gravis (MG) is one of the most treatable neurologic disorders. Myasthenia gravis is a relatively rare autoimmune disorder of peripheral nerves in which antibodies form against acetylcholine nicotinic postsynaptic receptors at the neuromuscular junction. The basic pathology is a reduction in the number of ACh receptors at the postsynaptic muscle membrane brought about by an acquired autoimmune reaction producing anti-AChR antibodies.

Pharmacologic therapy includes anticholinesterase medication and immunosuppressive agents, such as corticosteroids, azathioprine, cyclosporine, plasmapheresis, and intravenous immune globulin<sup>(1)</sup>. Plasmapheresis and thymectomy are also employed to treat MG.

Removal of the thymus, an organ located in the chest that plays a role in the immune system, has been used for many years as a treatment for MG, an autoimmune disease.

However, conclusive data on its effectiveness are lacking.

Despite one century following the first proved beneficial surgical effect of thymectomy, the optimal surgical approach remains controversial. Thymectomy was described for the first time in an adult patient in 1912<sup>(2)</sup>, and was divulged by Blalock et al<sup>(3)</sup> and Kayne<sup>(4)</sup>.

In 1988 Cooper published an improved technique to facilitate TT for MG<sup>(5)</sup>. In recent years, the emphasis on minimally invasive surgery has increased extensively<sup>(6,7,8)</sup>, and several VATS techniques for thymectomy have been reported<sup>(9,10,11)</sup>.

After multidisciplinary meetings on those patients in whom medical treatments have failed, we have recently used telescopic imaging to facilitate exposure of the anterior mediastinum during thymectomy with excellent results (VATT).

This has allowed complete clearance of the mediastinum without the need of additional thoracic port access.

## Clinical experience

This technique was used electively in 7 patients (5 females and 2 males, mean age 37) with non thymomatous generalized myasthenia gravis in whom medical treatment had failed. Preoperative stage according to MGFA classification was 1 and 2. The length of the operation was always less than 90 minutes with minimal blood loss. There were no complications. The length of hospitalization was 2 days. Thymic hyperplasia and Hassal's corpuscles were shown in all patients. All patients present a reduction of symptoms at a mean follow up of 31 months (12-48 months).

## Discussion

It is well known that to minimise operative morbidity, a multidisciplinary (neurology, surgery, anaesthesia) approach to peri-operative care is the gold standard to achieve clinical excellence in myasthenia gravis.

In a patient with clinical signs suggesting myasthenia gravis, the diagnosis is confirmed by a combination of anticholinesterase testing, electrophysiological testing, and antiacetylcholine receptor antibody assay. Once a diagnosis of myasthenia gravis is made, patients should undergo a screening with chest computed tomography scan for possible thymoma.

Medical therapies for myasthenia gravis can be classified into three groups: anticholinesterase drugs, immunosuppressive drugs, and short-term immunotherapies (plasmapheresis and immunoglobulin).

Anticholinesterase drugs are the first line of treatment for myasthenia gravis. They enhance neuromuscular transmission by inhibiting cholinesterase activity at the neuromuscular junction. Because they have no impact on the underlying autoimmune process, anticholinesterases do not alter the natural history of myasthenia gravis. Most patients notice improvement in muscle weakness with anticholinesterases, but relief of symptoms is often incomplete. Therefore, the addition of second-line agents (immunosuppressive drugs), or surgical treatment (thymectomy), is eventually required in most patients. Second-line medical therapies and surgical thymectomy should not be viewed as competitive treatment modalities. Immunosuppressive therapy and thymectomy are often used together, in a complementary fashion.

During the last decade advances in endoscopic techniques have facilitated a less invasive approach to thymectomy. Numerous modifications of VATS techniques have been published<sup>(10,11,12,13)</sup>.

Left, Right or Bilateral Video Assisted surgical techniques have been described as the optimal modern techniques for thymectomy for MG, acknowledging the cosmetic advantages of this technique over mid-line sternotomy and its possible improvement over TT.

However, potential disadvantages over the TT technique are:

- VATS approach needs the use of a double lumen tube;
- difficulties may be encountered in patient with pleural adhesions,
- lung exclusion cannot easily be performed in patients with respiratory insufficiency (Table 1).

*Full or partial median sternotomy* has the advantage of excellent visualization of the entire anterior mediastinum. Although this incision entails normally the possible risk of wound infections, dehiscence and reduced mobility for 6 weeks. Evidence to support significantly better substantial results compared to the other methods is lacking. Moreover, this incision does give an optimal cosmetic appearance.

*Transcervical Thymectomy* is a truly minimally invasive technique but has been criticized as potentially giving a "lesser" thymectomy compared to an open surgery. However, we have found that this disadvantage can be avoided using the telescope. The use of a camera and telescope system allows excellent visualization with magnification of the inside of the anterior/superior mediastinal space<sup>(7)</sup> including the aorto-pulmonary window.

In addition, viewing the images on a television screen allows everyone in the operating theatre to follow the advances of the operation and engaging them throughout the procedure. As TT is a difficult technique to teach because the surgical field is very small, with television imaging techniques several surgeons can follow the procedure, which can also be recorded, thus improving the teaching of the surgical method.

Although it is difficult to compare the therapeutic efficacy of the various thymectomy surgical procedures, in recent years some authors compared the results of several traditional operations with the TT approach and have shown that clinical results are remarkably similar<sup>(14,15,16,17,18)</sup>.

versus TT
Operation can be performed under direct vision even if the scope is inserted
Visual enhancement allows extended removal of anterior mediastinal fat
Better teaching method
versus VATS
Single lumen tube
Faster operation
Less hospital costs
Operation can be performed in patient with previous chest surgery
Operation can be performed in patients with respiratory insufficiency
versus Sternotomy
Cosmesis
Faster surgical time
Shorter hospital stay
Fewer complications

**Table 1:** Advantages of VATS over other surgical methods. TT trans-cervical thymectomy; VATS video-assisted thoracic surgery.

The Myasthenia Gravis Foundation of America is funding a phase-3 trial to remove the thymus gland to demonstrate conclusive data on the effectiveness of thoroscopic thymectomy. In the mean time, when thymectomy is indicated we prefer the less invasive approach.

*In conclusion*, patients with myasthenia gravis need a multidisciplinary approach and close follow-up care in cooperation with the primary care physician. Minimally invasive transcervical thymectomy permits to perform a safer thymectomy with an extended removal of all anterior mediastinal fat.

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