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Thymectomy by Partial Sternotomy for the Treatment of Non-Thymomatous Myasthenia Gravis

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ABSTRACT

Background: Myasthenia gravis is an autoimmune disease characterized by weakness and fatigue of voluntary muscles. Thymectomy is considered an effective therapeutic option for patients with myasthenia gravis. The purpose of this study is to evaluate the efficacy of thymectomy by partial sternotomy for the treatment of non-thymomatous myasthenia gravis.

Materials and Methods: From 2002 to 2006, patients with non-thymomatous myasthenia gravis who underwent thymectomy through a partial median sternotomy were studied prospectively and analyzed to evaluate the results of thymectomy performed by this technique.

Results: There were 10 patients (8 women and 2 men) and the mean age at the time of thymectomy was 25.9 years. Eight patients (80%) were in class IIA of Osseman's classification while 2 patients (20%) were in class IIB. Mean duration of symptoms before operation was 2 years. Mean follow-up was 9 ± 3 months. Mean postoperative hospital stay was 6.1 days (5 to 10 days). Pathology examination revealed thymus hyperplasia in all patients. There was no mortality. Complications occurred in two (20%) patients. One (10%) patient needed mechanical ventilation for 24 hours postoperatively. After 6 months of follow-up, 2 patients (20%) had complete remission of symptoms, 5 (50%) had a significant improvement, 2 (20%) had a mild improvement, whereas one patient (10%) had no improvement in his clinical symptoms.

Conclusion: Partial median sternotomy may be a useful surgical approach to the thymus, as demonstrated by the good functional and aesthetic results, associated with low morbidity and no mortality. (*Tanaffos* 2006; 5(4): 43-46)

Key words: Partial sternotomy, Thymectomy, Myasthenia gravis

INTRODUCTION

Myasthenia gravis (MG) is a disorder of neuromuscular transmission that is characterized by weakness and fatigue of voluntary muscles. It has

now been reasonably established to be due to an autoimmune attack directed against the postsynaptic nicotinic acetylcholine receptors of voluntary muscles. (1)

A relationship between MG and the thymus gland has been appreciated since at least 1901. The earliest trans-sternal procedures were performed for removal of thymic tumors. The beneficial results in non-thymoma patients, including the silent abnormal

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histologic changes and possible contributing factors to the pathogenesis of MG, were appreciated afterwards (2). The role of the surgical approach and the influence of the technique of thymectomy on late results in the treatment of MG remain controversial. Thymectomy can be done through a partial or complete sternotomy, transcervical or video-assisted approach (3, 4, 5, 6).

This study reviews our experience and our treatment outcomes of thymectomy via a partial median sternotomy.

MATERIALS AND METHODS

A prospective study was performed on 10 patients who underwent thymectomy for non-thymomatous MG through partial median sternotomy during 2002 to 2006.

All patients had undergone preoperative plasmapheresis. Our standard operative technique includes a 6 to 7 cm u-shape incision about two finger breadths below the sternal notch and the skin flaps were mobilized superiorly to the sternal notch and inferiorly to the fourth intercostal space. The manubrium must be completely divided and the sternum should be divided to the level of the third or fourth intercostal space. After completion of the standard thymectomy which included the entire intrathoracic portion of the thymus and its cervical extensions without any attempt to resect mediastinal fat a suction drain was placed in the anterior mediastinum (Figures 1 and 2). The sternum was then approximated with wire and the soft tissue and skin were closed. After the operation, the patients were evaluated closely by the anesthesiologist and if the respiratory effort and blood gases were satisfactory, extubation was preformed. Anticholinesterase agents were restarted only if weakness occurred. The neurologists were actively involved throughout the entire perioperative period. Mean duration of follow-up was 9 months (range 6 to 12 months).



Figure 1. U-Shape incision below the sternal notch



Figure 2. Surgical approach.

RESULTS

There were 10 patients (8 females and 2 males) with a mean age of 25.9 years (range 20 to 36 yrs). All patients were symptomatic with a 2-year mean duration of symptoms (range 1- 4 years).

MG was graded according to the modified Osserman's classification. Eight patients (80%) were in class IIA, while 2 patients (20%) were in class IIB.

There was no perioperative mortality. Complications occurred in two patients (20%). One patient had wound infection and the other had late pneumothorax. Nine patients were extubated immediately in the recovery room and one patient needed 24 hours of mechanical ventilation.

The mean duration of hospital stay was 6.1 days (range 5 to 10 days). Pathological examination revealed thymic hyperplasia in all 10 patients.

Clinical symptoms improved in 70% of patients. Twenty percent had complete remission (without medication and asymptomatic), and 50% had significant improvement (reduction of medications and/or clinical improvement). Twenty percent had mild improvement (stable disease with no clinical modifications), and 10% had no improvement (deterioration of their clinical status with worsening of their symptoms, requiring more medication, or both) (Table 1).

Table 1. Characteristics of the patients

Sex	Age (years)	Myasthenia grading	Interval between the diagnosis and surgery (year)	Surgical complications	Hospital stay (days)	Response to surgery
F	30	Class IIA	2	None	6	SI
F	20	Class IIB	3	Late pneumothorax	8	MI
F	27	Class IIA	1	None	5	SI
F	36	Class IIA	1	None	5	CR
M	34	Class IIA	2	None	6	SI
F	27	Class IIB	4	Wound infection	10	NI
F	20	Class IIA	3	None	5	MI
M	20	Class IIA	1	None	5	CR
F	25	Class IIA	1	None	6	SI
F	20	Class IIA	2	None	5	SI

CR=complete response MI=mild improvement
SI=significant improvement NI=no improvement

DISCUSSION

Thymectomy is considered an effective therapeutic option for patients with myasthenia gravis; (1, 2) and also has a preventive role in rate and severity of myasthenic crisis in non-thymomatous myasthenic patients in comparison with medical therapy alone (2).

However, thymectomy indications and surgical approach are still controversial (3, 4, 5, 6).

Most studies showed that thymectomy should be considered in all patients with generalized myasthenia gravis and selecting patients based on thymic enlargement alone or anticholinesterase antibody positivity may be inadequate (7).

It is also recommended that thymectomy should be advocated for these patients early in the course of disease because the duration of symptoms determines the outcomes (8, 9, 10).

Thymectomy can be done through either a partial or complete sternotomy, transcervical or video-assisted thoracoscopic approach (11, 12).

The role of surgical approach and the influence of the technique of thymectomy on late results in the treatment of MG remain controversial; but, most studies showed that transsternal thymectomy had better late results because of the removal of ectopic foci of thymic tissue (13).

Thymectomy is effective in the management of patients with MG at all stages with low morbidity, less than 1% mortality, and more than 75% improvement in the clinical status of myasthenic patients (8). Partial median sternotomy has shown to be an acceptable surgical approach to the thymus allowing the removal of thymic tissue through a less invasive approach with a significantly smoother postoperative course, less pulmonary complications and also better aesthetics than a total median sternotomy (14, 15).

The improvement ratio of patients who had undergone thymectomy through a partial sternotomy

is also comparable with those undergone thymectomy with total sternotomy and the clinical status improved in 74% of patients (complete remission or significant improvement) (3). Our patients had the same results as the clinical status improved in 70% of them. Twenty percent had complete remission and 50% had a significant improvement; whereas, 20% had a mild improvement and 10% had no improvement. We also had no perioperative mortality. The younger patients with less duration of symptoms had better outcomes.

CONCLUSION

Although the number of patients is too small to reach a valid conclusion, early thymectomy in the course of disease had better outcomes in our patients and partial median sternotomy may be a useful surgical approach to the thymus allowing for complete removal of all thymic tissue with a good functional and aesthetic results.

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