Original article

Clinical Profile And Outcomes Of Total Thymectomy In Patients With Myasthenia Gravis: A Retrospective Descriptive Cohort Study From A Tertiary Care Centre Of Nepal

Lokesh Shekher Jaiswal,[1] Deependra Prasad Sarraf,[2] Anshu Jaiswal,[1] Durga Neupane[1]

Abstract

Introduction: Myasthenia gravis is an autoimmune disorder of neuromuscular junction causing various degrees of voluntary muscle weakness and disability. Medical treatment consists of acetylcholinesterase inhibitors, immunosuppressants, immunoglobulins and plasmapheresis. Total thymectomy has been shown to provide significant clinical benefit. Here, we present our experience of total thymectomy in patients presenting with myasthenia gravis.

Methods: A retrospective analysis of all patients undergoing total thymectomy via median sternotomy for myasthenia gravis with or without thymoma from January 2015 to December 2024 were done. The data were entered and analysed in MS- EXCEL 2007.

Results: A total of 11 patients underwent total thymectomy. The male to female ratio was 1.2:1. The age ranged from 13 to 56 years with mean age of 33.5±12.7 years. All patients had positive tests for Acetylcholine receptor antibody. All patients were on pyridostigmine therapy and four (36.4%) patients were on steroid treatment for control of symptoms. Seven (63.6%) patients had thymoma preoperatively. All patients underwent surgery via median sternotomy. The median duration of follow up was 40 months (IQR 26-58). Complete remission was seen in four (36.4%) patients and significant clinical improvement with minimal pyridostigmine requirement in six (54.5%) patients. No patients required steroid treatment postoperatively. Histopathological examination of non-thymomatous MG patients showed thymus hyperplasia. Postoperative histopathological examination of patients having thymoma showed Masoka stage I in five (71.4%) and one (14.3%) each of stage IIB and IVA.

Conclusions: Total thymectomy via median sternotomy is a safe procedure and provides significant clinical benefit in patients of myasthenia gravis with or without thymoma.

Keywords: Myasthenia Gravis; Outcomes; Sternotomy; Thymectomy; Thymoma.

Author affiliations:

[1] Department of Cardiothoracic and Vascular Surgery, B.P. Koirala Institute of Health Sciences, Dharan, Nepal.

[2] Department of Clinical Pharmacology and Therapeutics, B.P. Koirala Institute of Health Sciences, Dharan, Nepal.

Correspondence:

Dr. Lokesh Shekher Jaiswal
Department of Cardiothoracic and Vascular Surgery, B.P. Koirala Institute of Health Sciences, Dharan, Nepal.

Email: lokesh_shekher@yahoo.com

Disclosures:

Ethical Clearance: Taken

Conflict of interest: None

Financial aid: None

How to cite this article:

Jaiswal LS, Sarraf DP, Jaiswal A, Neupane D. Clinical Profile And Outcomes Of Total Thymectomy In Patients With Myasthenia Gravis: A Retrospective Descriptive Cohort Study From A Tertiary Care Centre Of Nepal. J Soc Surg Nep. 2025;28(2):39-42.

DOI:

https://doi.org/10.3126/jssn.v28i2.91603

Introduction

Myasthenia gravis (MG) is an autoimmune neuromuscular disease caused by autoantibodies directed against acetylcholine receptors on postsynaptic membrane, resulting in defective transmission at the neuromuscular junction level, leading to muscle weakness.[1] Its prevalence is estimated to be around 12.4/100,000 population.[2] Clinically it can present from only ocular involvement to generalised muscle weakness including respiratory muscles. The therapeutic approach of MG consists of drug treatment (acetylcholinesterase inhibitors, immunosuppressives), plasmapheresis or surgical management (Total thymectomy).[3,4] Thymectomy in patients with MG has been shown to have increased likelihood of overall improvement and medication-free remission, compared to those treated medically.[5,6]

Clinical profile and outcomes of thymectomy in MG are not reported from Nepal. The objective of this study was to find the clinical profile and outcomes of total thymectomy in patients of MG from our community based tertiary care centre of eastern Nepal.

Methods

A retrospective cross-sectional study was conducted among the patients who underwent total thymectomy for MG. All consecutive patients with MG admitted and requiring total thymectomy from January 2015 to December 2024 were included. Ethical clearance for the study was obtained from our institute review committee (IRC). The medical records of the patients were reviewed for the demographic and clinical characteristics, surgical approach, and histopathological results and were recorded using a pre-designed proforma.

Surgical procedure: All patients underwent surgery via median sternotomy. Thymus was removed along with tumor if present in toto from innominate vein superiorly to diaphragm inferiorly and from left phrenic to right phrenic laterally.

All data were entered into Microsoft Excel version 2007. The data were presented as mean (±SD), median (IQR), frequency and percentage as appropriate. The clinical outcomes were determined and grouped according to the following: complete remission, significant clinical improvement, no clinical change, worsening of symptoms and mortality. Microsoft Excel version 2007 was used for analysis.

Results

A total of 11 patients presented to us and accepted for surgical intervention, six (54.5%) were male and five (46.5%) were female The age ranged from 13 to 56 years with mean and median age of 33.5±12.7 and 34 (IQR 15.5-40.5) years respectively. The clinical characteristics of patients are presented in **Table 1**.

Table 1. Clinical characteristics of patients undergoing total thymectomy (n=11)

Clinical Characteristics		Number	%
Gender	Male	6	54.55
	Female	5	45.45
Age groups	<20	2	18.18
	21 – 40	5	45.45
	41 – 60	4	36.36
Type of MG	Generalized	7	63.64
	Ocular	4	36.36
Osserman classes at Presentation	Class I	4	36.36
	Class IIa	4	36.36
	Class IIb	2	18.18
	Class III	1	9.09
Preoperative Medicines	Pyridostigmine	11	100.00
	Steroid	4	36.36
Presence of Thymoma	Yes	7	63.64
	No	4	36.36
Presence of Comorbidities	Yes	4	36.36
	No	8	72.73
Comorbidities (n=4)	Hypothyroidism	1	25.0
	Hypertension	1	25.0
	Diabetes mellitus	1	25.0
	COPD	1	25.0
Surgical Outcome (n=11)	Complete remission	4	36.36
	Significant clinical improvement	6	54.55
	Died due to covid-19	1	9.09
Masoka stage (n=9)	Stage I	5	71.43
	Stage IIb	1	14.29
	Stage IVA	1	14.29

All patients had positive tests for Acetylcholine receptor antibody. None of them had antibody against muscle specific tyrosine kinase (MUSK) receptor. Before surgery, all patients were on acetylcholine esterase inhibitor (Pyridostigmine) and four (36.4%) patients were on steroid (prednisone) treatment for control of symptoms. At presentation four (36.4%) patients were in Osserman's class I and IIa and two (18.2%) were in class IIb. One patient presented with severe symptoms of class III. Seven (63.6%) patients had thymoma. All patients underwent surgery via median sternotomy. There was one (9%) 30-day mortality due to covid-19 infection following discharge from hospital. The median duration of follow up was 40 months (IQR 26-58). Complete remission was seen in four (36.4%) patients and significant clinical improvement with minimal requirement of pyridostigmine in six (54.5%) patients. No patients required steroid treatment

postoperatively. Histopathological examination of non-thymomatous MG patients showed thymus hyperplasia. Postoperative histopathological examination of patients having thymoma showed Masoka stage I in five (71.4%) and one (14.3%) each of stage IIB and IVA. Both patients of stage IIB and IVA received postoperative radiotherapy and are alive with significant clinical improvement and no recurrence till last follow up.

Discussion

Myasthenia gravis commonly occurs in female of 40-60 years age group.[6] In our study the male to female ratio was 1.2:1 (almost equally distributed) and the mean age was 33.5±12.7 years. This might be due to referral bias and bias in less patients opting for surgical intervention. MG can be divided broadly into ocular and generalised types, and almost half of ocular type progresses to generalised MG within two years. It can be clinically divided into four Osserman's classes: class I (ocular myasthenia), class IIa (generalized muscle involvement without pulmonary involvement), class IIb (bulbar manifestation), class III (rapid progression of generalised bulbar disease and weakness in respiratory muscle), and class IV (class I or II patients presenting progressive symptoms within two years).[7] In a study by AL-Bulshi et al clinical presentation in class I, IIa, IIb and III were in 5%, 39%, 34% and 22% respectively.[8] In our study four (36.4 %) patients had ocular and 74.6% were having generalised type at presentation, with majority of patients presenting in class IIA and IIB (class I- 36.4%), class IIa- 36.4%,Class IIb- 18.2% and Class III- 9.1%).

In one meta-analysis, approximately 21% of myasthenia gravis patients are found to have thymoma especially in age >40 years age of onset and male patients.[9] In our study thymoma was present in 63.6%, this can be due to selective referral of patients with thymoma from medical counterpart and patient preference for medical treatment against surgical therapy. Four patients of generalised myasthenia gravis without thymoma referred to our outpatient clinic for thymectomy refused for surgical intervention.

In a clinical trial comparing thymectomy versus medical management for non-thymomatous MG, thymectomy was found to have significant clinical improvement with lower average requirement of steroid.[5] In our study as well all four (36.4%) patients had significant clinical improvement and none of them required steroid during follow up.

Thymectomy can be performed via various techniques like median sternotomy, minimal invasive techniques (video or robotic assisted). There is no evidence of one approach to be superior to others with respect to long term remission or clinical improvement.[10] Median sternotomy was chosen in our centre as it provides a wide area of exploration in mediastinum from neck to diaphragm allowing complete resection of thymus and associated adipose tissues. Similarly, most of the patients referred for surgical intervention had thymoma for which median sternotomy provides better oncological clearance. Patients with thymoma also showed significant clinical improvement with two patients showing complete remission. The findings are similar to existing literature.[11] None of the patients with thymoma had recurrence and had 100 % survival with mean follow up duration of 43.8 months.

Conclusions

Myasthenia gravis is relatively uncommon and total thymectomy via median sternotomy is safe procedure in these patients. There is significant clinical improvement after total thymectomy, from complete remission to minimal medication requirement, in patients of myasthenia gravis with or without thymoma.

References

1. Lindstrom JM, Seybold ME, Lennon VA, Whittingham S, Duane DD. Antibody to acetylcholine receptor in myasthenia gravis. Prevalence, clinical correlates, and diagnostic value. Neurology. 1976 Nov;26(11):1054-9.
2. Salari N, Fatahi B, Bartina Y, Kazeminia M, Fatahian R, Mohammadi P, Shohaimi S, Mohammadi M. Global prevalence of myasthenia gravis and the effectiveness of common drugs in its treatment: a systematic review and meta-analysis. J Transl Med. 2021 Dec 20;19(1):516.
3. García-Carrasco M, Escárcega RO, Fuentes-Alexandro S, Riebeling C, Cervera R. Therapeutic options in autoimmune myasthenia gravis. Autoimmun Rev. 2007 Jun;6(6):373-8.
4. Salahoru P, Grigorescu C, Hinganu MV, Lunguleac T, Halip AI, Hinganu D. Thymus Surgery Prospectives and Perspectives in Myasthenia Gravis. J Pers Med. 2024 Feb 23;14(3):241.
5. Wolfe GI, Kaminski HJ, Aban IB, et al. Randomized Trial of Thymectomy in Myasthenia Gravis [published correction appears in N Engl J Med. 2017 May 25;376(21):2097. [Dosage error in article text]]. N Engl J Med. 2016;375(6):511-522.
6. Aljaafari D, Ishaque N. Thymectomy in Myasthenia Gravis: A Narrative Review. Saudi J Med Med Sci. 2022 May-Aug;10(2):97-104.
7. Perlo VP, Poskanzer DC, Schwab RS, Viets HR, Osserman KE, Genkins G. Myasthenia gravis: evaluation of treatment in 1,355 patients. Neurology. 1966;16(5):431-439.
8. Al-Bulushi A, Al Salmi I, Al Rahbi F, Farsi AA, Hannawi S. The role of thymectomy in myasthenia gravis: A programmatic approach to thymectomy and perioperative management of myasthenia gravis.

Asian J Surg. 2021;44(6):819-828.
9. Mao ZF, Mo XA, Qin C, Lai YR, Hackett ML. Incidence of thymoma in myasthenia gravis: a systematic review. J Clin Neurol. 2012 Sep;8(3):161-9.
10. Kadota Y, Horio H, Mori T, et al. Perioperative management in myasthenia gravis: republication of a systematic review and a proposal by the guideline committee of the Japanese Association for Chest Surgery 2014. Gen Thorac Cardiovasc Surg. 2015;63(4):201-215.
11. Kondo K, Monden Y. Thymoma and myasthenia gravis: a clinical study of 1,089 patients from Japan. Ann Thorac Surg. 2005;79(1):219-224.