*Acta Med. Nagasaki* 32 : 104－109

# Effect of Thymectomy on Myasthenia Gravis

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Received for publication, June 23, 1987

The effects of thymectomy on myasthenia gravis were clinically evaluated for twenty-one patients.

(1) Thymectomy is effective for myasthenia gravis without thymoma.

(2) A high remission rate after thymectomy is predicted in the case of shorter duration of disease, avoiding steroid administration prior to surgery.

(3) It is warned that meticulous postoperative respiratory care is required for the patients with %VC of 60% or less preoperatively because postoperative respiratory failure would be expected.

## INTRODUCTION

Since BLADOCK's report on thymectomy for myasthenica gravis (MG) with thymoma in 1939, many examples concerning the effect of thymectomy on MG have been reported. From the experience with thymectomy on 21 MG cases, clinical evaluation was made concerning the relationship between their recuperation and personal backgrounds such as age, sex, duration of disease, and the existence of steroid dosage before operation, and an example of MG with thymoma accompanying aninteresting clinical process.

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## MATERIALS AND METHODS

Among 21 MG cases, consisting of nine men and 12 women, 20 cases had no thymoma and only one had thymoma. Their average age was 34.5, average age of onset was 30.7, and the duration of disease between onset and surgery was from three months to 20 years with an average of 4.1 years. According to the type of disease, Type I was seen in three, Type IIa in five, and Type IIb, in 13.

Thymectomies were made via the cervical approach on early three cases, and, the others by midsternotomy. On 20 cases without thymoma, authors investigated the postoperative recovery at one year and five years following thymectomy and classified them into six groups; A: remission, B: marked improvement, C: moderate improvement D: no change, E: aggravation and death.

The results are indicated as the rate (%) of improvement (remission). Improved groups included A, B and C, but remission group was only A. The pathological diagnosis was carried out in accordance with the Guideline for Shearing Thymus and Thymoma set forth by the Japanese Ministry of Health and Welfare, and authors classified the degree of forming germinal center (GC) into five classes 0 to 4.

## RESULT

Relationship between recuperation and sex and onset age.

The recuperation (five years) of male and female cases after thymectomy was respectively 67% (0%) and 67% (25%), showing no significant difference between sexes.

The recuperation (five years) of the two groups classified by onset age was 50% (0%) in the case of the age of less than 30 years and, 75% (50%) in the age of 30 or more.

As mentioned above, the improvement was remarkable in the older groups. As to the type of disease, the recuperation in Type IIa was satisfactory with a 100% recovery which meant the higher effect of treatment for this type as compared with the other groups.

Relationship among recuperation, duration of disease, and histologic degree of germinal center (GC) formation.

In the two groups classified by the duration of disease, a 100% (38%) recovery was found in the cases of duration of less than three years, and 63% (36%), in those of three years or more. The recuperation rate (five years) were 100% (33%) and 43% (28%) respectively, indicating that the shorter the duration of the disease, the greater the improvement of clinical symptoms. In the cases with the Grade 0 and 1 of histologic GC formation, the recovery rate was 33% (0%), and it was 83% (50%) in Grade 2, 3 and 4, showing better recuperation in the cases with increasing histologic GC formation.

**Table 1.** Prognosis after thymectomy

| | | 1Y-Prognosis | 5Y-Prognosis |
|---|---|---|---|
| sex | ♂ | 86% (14%) | 67% ( 0 %) |
| | ♀ | 75% (50%) | 67% (25%) |
| onset age (y) | <30 | 81% (36%) | 50% (16%) |
| | ≧30 | 75% (37%) | 75% (50%) |
| Osserman's | I | 50% ( 0 %) | —— |
| classification | I a | 100% (60%) | 100% (100%) |
| | II b | 75% (42%) | 50% (13%) |
| duration until | <3y | 100% (38%) | 100% (33%) |
| thymectomy (y) | ≧3y | 63% (36%) | 43% (28%) |
| histnlogy of | GC (0−1) | 66% ( 0 %) | 33% ( 0 %) |
| thymus | GC (2−4) | 100% (53%) | 83% (50%) |

**Table 2.** Effect of preoperative steroid theraphy on prognosis

| | steroid (+) | (−) | |
|---|---|---|---|
| case | 7 | 13 | |
| onset age (y) | 33.4±9.9 | 33.5±12.6 | NS |
| duration until thymectomy (M) | 76.2±78.5 | 38.6±33.5 | NS |
| prognosis (1y) | 57% (28%) | 91% (75%) | |
| 〃 (5y) | 67% (33%) | 80% (80%) | |
| histology of thymus | | | |
| GC (0−1) | 4 | 0 | |
| GC (2−4) | 0 | 12 | $<0.01^{x^2}$ |

**Table 3.** respiratory function & postoperative course

| post-ope-course | good (14) | trable (7) | |
|---|---|---|---|
| age (y) | 34.2±10.8 | 36.6±13.1 | NS |
| % VC | 98.6±12.5 | 64.5±26.2 | <0.01 |
| $FEV_{1.0\%}$ | 86.0±7.6 | 89.7±9.6 | NS |

Relationship between recuperation and steroid dosage prior to thymectomy.

The recuperation rates (one year) were compared in the two groups one of which receiving steroid hormons before operation. The recovery rates were 57% (28%) in the steroid hormon group, in contrast to 91% (75%) in the other group in which steroid was not administered, showing better recuperation in the group without steroid administration.

As compared with the grade of histologic GC formation of above-mentioned groups, four out of sex with steroid showed the Grades of 0 and 1, whereas all the cases without steroid demonstrated the grades of 2 to 4. These findings indicate that steroid administration significantlly influences on the suppression of histologic GC formation ($p<0.01$).

Relationship between pulmonary function before operation and respiratory distress after operation.

In seven cases (one in Type I, one in Type IIa and five in Type IIb) out of 21, it was necessary to control their respiration for two days or more after surgery. In three cases (all from IIb) out of the seven, episodes of respiratory crisis occured on the third or fourth day after surgery. The remaining 14 cases showed good respiratory function. Weaning from respiratory care was allowed on the first or the next day after surgery.

As compared with the preoperative respiratory function between the two groups that presented either fair or poor postoperative respiratory function, there was found no difference in $FEV_{1.0\%}$, but, a significant difference in %VC. An average %VC value of good respiration group was 98.6% and that of poor respiration was 64.6%. The latter showed apparently lower percentage than the former ($p<0.01$).

A 29-years-old male, with thymoma of 3-month duration is presented. Plasma

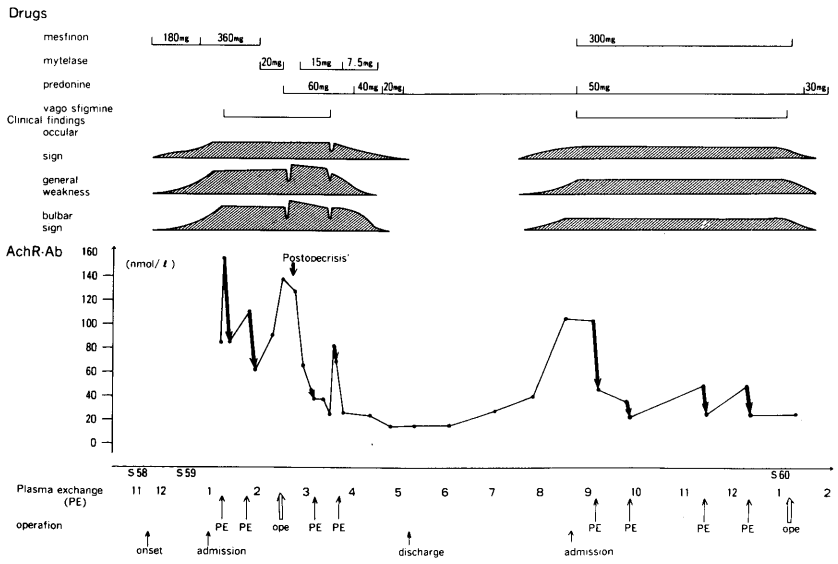


Figure 1 clinical course of a case with thymoma

**Fig. 1.** clinical course of a case with thymoma

phoresis was first applied for absorption of antibody by using the antibody-absorbing columns prior to and following thymectomy. Fig. 1 indicates his clinical course.

Soon after adimission, he failed to continue to eat and walk. A repeated plasma replacement therapy enabled him to become stable prior to surgery.

The high acetylcholine receptor antibody (Ach·R antibody) titers dropped down after plasma replacement. However, after two weeks the Ach·R antibody levels rose again. After an operative procedure of thymectiomy, Ach·R antibody was reduced with an improved clinical condition.

After five months, his condition was aggravated and Ach·R antibody level remained high. Final diagnosis was made as a recurrenece of thymoma apparently demostrating the presence of thymoma by pneumomediastinography.

Remediastinotomy was carried out to remove the recurrent thymoma, which was 2.0 cm×2.0cm in size at right upper mediastinum. Histologic diagnosis was "mixed type thymoma". Since then, he has been well and stable with low value of the Ach·R antibody titer.

## DISCUSSION

Thymectomy has become popular as a surgical treatment for MG and the remission is satisfactorily expected after surgery.[1] Our experience of 60 to 80% of remission rate is consistent with the other reports.[2)~4)]

It is well known that the effects of thymectomy are not influenced by age and sex of the patients. However, the patient's age at onset is referable to surgical outcome. The onset age of 30 or older is the most favorite age for predicting the efficacy of thymectomy.

The results in this study indicate that the shorter the duration of the disease, the better the surgical improvement offers. In cases with 3 or more year duration of the disease, the remission rate is 40 to 60%. To our clinical experience, a complete remission had occurred in a case with 9-year duration of the disease. It is of interest to indicate that thymectomy seems to be effective and applicable even for the cases with a considerable long duration of the disease. The steroid administration before surgery, though reported to be effective by some, has been avoided, because of poor remission rate following thymectomy in our experience. It is certain that the steroid suppresses the histologic GC formation.

Contrary to this fact, it is recommended that steroid hormone should be introduced positively in order to overcome the unstable condition after surgery and to shorten the period needed to stabilize the condition.[5] Crisis is one of the serious complications after surgery, and the case whose preoperative %VC was 60% or less is very liable to fall into respiratory failure and vulnerable to cirsis.

For the condition in such a case, careful management is required. Recently many researchs have made the immunological capacity indicated as the parameters such as T-cell subset in blood[6] and Ach·R antibody,[7] equivalent to the severity of MG. Especially many reports point out that the Ach·R antibody levels correlate with the clinical condition of MG and the effectiveness of thymectomy. However, since some of the recent study has negated this fact, further study should be accumulated.

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