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Original Article

Retrospective study of myasthenia gravis in a sample of patients at the University Hospital of Rabat, Morocco

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ABSTRACT

The purpose of this study is to highlight a chronic neuromuscular disease characterized by a rapid weakening and exhaustion of voluntary muscles: 'Myasthenia gravis' (MG). It is an autoimmune disease that belongs to a broad class of disorders characterized by the irregular response of immune cells that create auto-reactive antibodies that target its own cells and tissues. This disease presents in different forms in different individuals. Myasthenia is almost three times more common among women than men. This report concerns 117 clinically confirmed myasthenic and electromyographic patients who had been hospitalized in the neurology department of a specialized hospital in Rabat, Morocco. Patient records were archived by the doctors of the Department of Neurology. Several parameters have been studied clinically in this sampling. This research included 31 men and 86 women, 26% and 74% of the total sample respectively. This study also describes the associated diseases for both sexes, as well as the diagnostic methods and the used treatments. Myasthenia gravis is a condition that occurs at any age, with two peaks of frequency; the first between the second and fourth decades of life, with a strong female predominance. The second peak is observed from age 50 with a clear male tendency. The responsible factors are still poorly understood.

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KEYWORDS: neuromuscular diseases, myasthenia gravis, treatment.

1. INTRODUCTION

Ultimately, the concept of immune tolerance was defined as an ability of the immune system to prevent itself from targeting self-molecules, cells or tissues [1].

The immune system is a complex network of cells and molecules that work together to protect the body against various diseases [2].

However, in certain circumstances, the immune system may also attack and damage the body's own tissues, organs and cells, resulting in autoimmune diseases (ADs) [3]. Almost all forms of (ADs) disproportionately affect middle-aged women and are among the leading causes of death for this group of patients. The older the patient is, the lower the ratio of men to women [4].

Although the etiology of autoimmune diseases is unknown, these diseases are known to be influenced by genetic and environmental factors [5, 6].

Our study deals only with myasthenia gravis (MG), which is an acquired disease of rare autoimmune origin that affects the neuromuscular junction system following post-synaptic membrane modification by anti-acetylcholine receptor auto-antibodies (anti-ACh) [7]. Other studies have defined MG as an autoimmune disease characterized by impaired neuromuscular transmission due to circulating anti-acetylcholine receptor auto-antibodies (AchRAb) [8]. The antibodies induce weakness of

skeletal muscles, which is the sole disease manifestation [9-11]. The weakness can be generalized or localized, is more proximal than distal, and nearly always affects eye muscles, with diplopia and ptosis [10].

Myasthenia gravis (MG) is a long-lasting neuromuscular disease that causes various degrees of skeletal muscle weaknesses. The most affected muscles are often those of the eyes, face and those that control swallowing. This can lead to double vision, droopy eyelids, difficulty in speaking and walking. The onset can be sudden. Myasthenic-affected individuals often have a large thymus or develop a thymoma [12].

This investigation will be based on a thorough retrospective study of myasthenic patient records followed by a discussion of the results obtained.

2. PATIENTS AND METHODS

The study was conducted using the archives of data of 117 clinically confirmed myasthenic patients, who were hospitalized in the Neurology Department of the Rabat Specialty Hospital.

Patient files were archived by the doctors of the Department of Neurology. The retrospective review of these files allowed us to record several key parameters in this sample by targeting three main objectives:

- Analysis of the socioeconomic and demographic characteristics of patients.
- The clinical analysis of myasthenia
- Evaluation of the type of diagnosis and treatment method performed.

2.1. Statistical analysis

The one-sample Kolmogorov-Smirnov test was used to test the normality of the distribution of quantitative variables. Characteristics were compared by means of a chi-square test with Yates correction. All statistical comparisons were made with a defined significance threshold ($p < 0.05$).

3. RESULTS

3.1. Distribution by gender

The group of myasthenic patients treated comprised of 31 men and 86 women, with a respective percentage of 26% and 74%, which corresponds to approximately 1 man per 2.7 women, as shown in Figure 1.

3.2. Distribution by educational level

With regard to the level of education of patients, 91% of myasthenic women were found to be illiterate compared to 87% in men. The highest educational level (superior) did not exceed 1% for women and 10% for men; these results are illustrated in Figure 2.

3.3. The appearance of the first symptom

With regard to the appearance of the first symptom in men, 51.6% of cases had ocular signs as the first symptom, 25.8% complained of oropharyngeal involvement and 22.6% had axial muscle involvement. In women, 50% had ocular signs as their first symptom; 25.6% had axial muscle involvement and 24.4% had oropharyngeal involvement. The respective results are presented in Figures 3 and 4.

3.4. The prevalence of type of myasthenia based on sex

With regard to the prevalence of myasthenia type based on sex, Figure 5 shows a distribution with an approximately equal rate of 64.5% and 64.0% among men and women, respectively, for Myasthenia-Localized-Ocular Muscle (M-Localized-OM). On the other hand, the rate differs for the pharyngo-laryngeal (M-Localized-LPM)

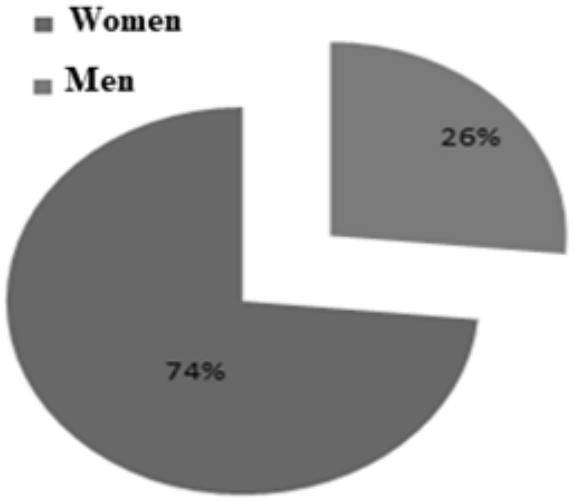

Figure 1. Distribution by gender.

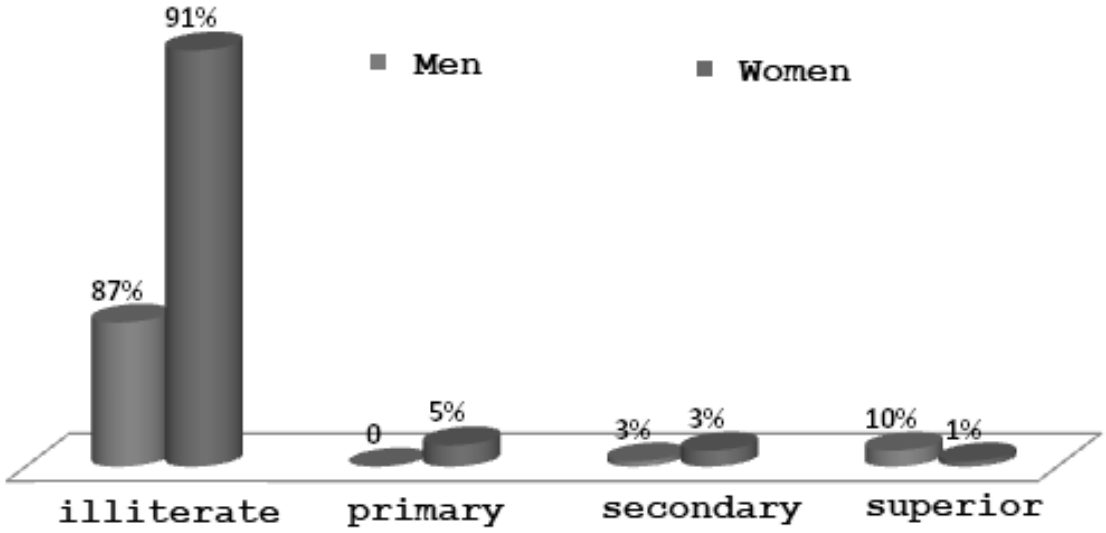

Figure 2. Distribution by educational level.

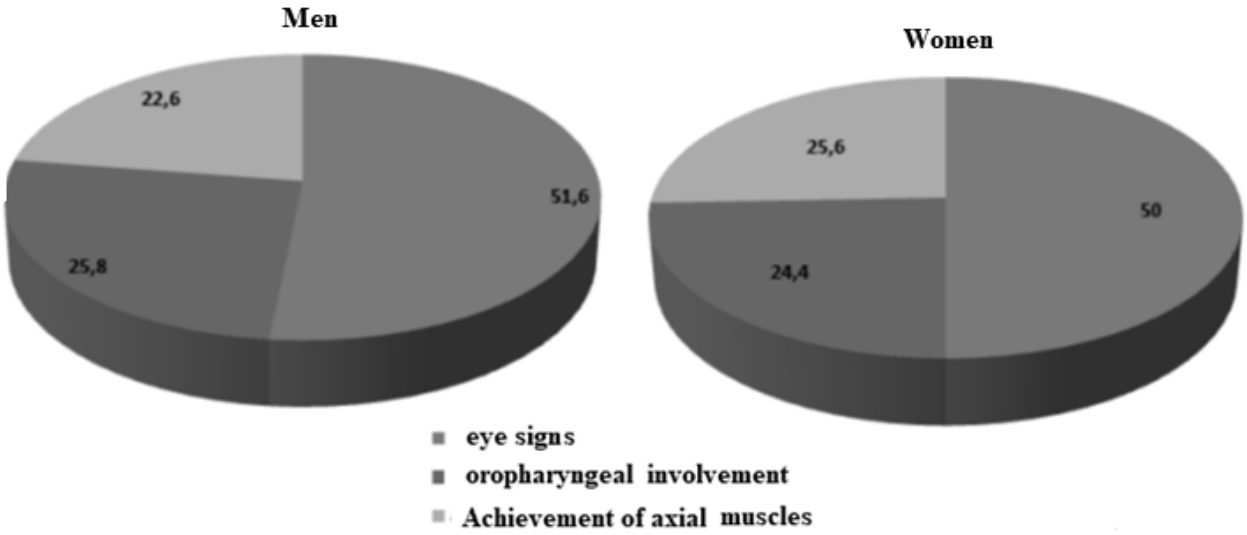

Figure 3. The first symptom in men.

Figure 4. The first symptom in women.

type: 16.1% for men and 7.0% for women. With regard to the prevalence rate of Generalized Myasthenia Gravis, we recorded 22.6% for men and 32.6% for women.

3.5. Distribution of patients by age

As shown in Figure 6, the myasthenia has two peaks of incidence; the first one is between the second and the third decades of life with a strong female predominance and the second peak is in the sixth decade of life with a clear male tendency.

3.6. Distribution of myasthenia gravis according to the Osserman classification

Using Osserman's classification method we can see that class 1 is more common in both sexes with a percentage of 77.4% men against 66.3% women (Figure 7).

3.7. Distribution of method of diagnosis of myasthenia gravis according to sex

Diagnostic methods for myasthenia gravis differ considerably from one patient to another, as shown

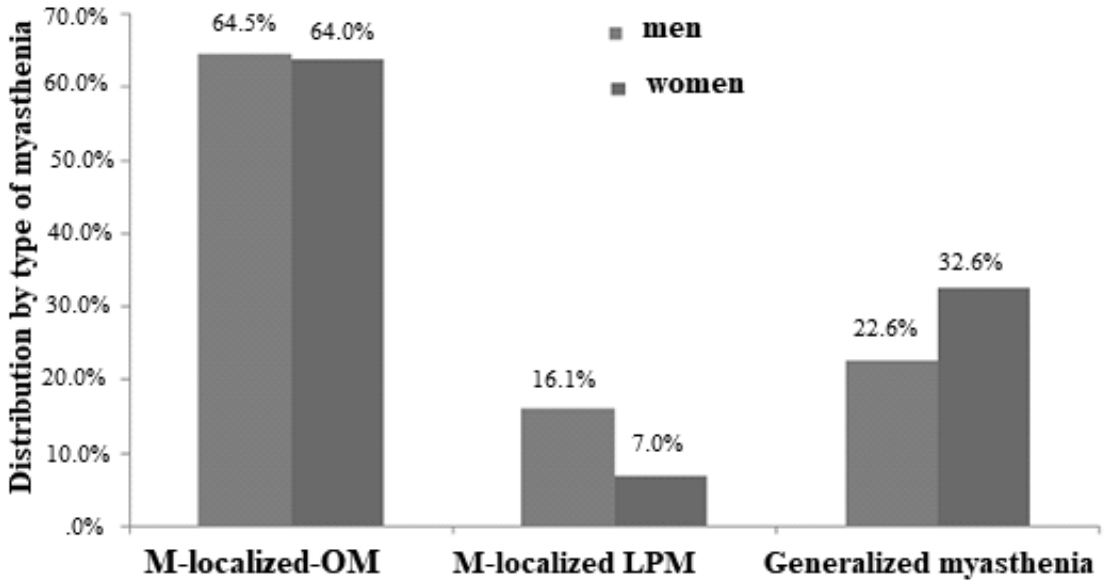

Figure 5. The prevalence of type of myasthenia based on the sex. M-Localized-OM**:** Myasthenia-localized-ocular muscle; M-Localized-LPM**:** Myasthenia gravis-laryngeal pharyngeal muscle.

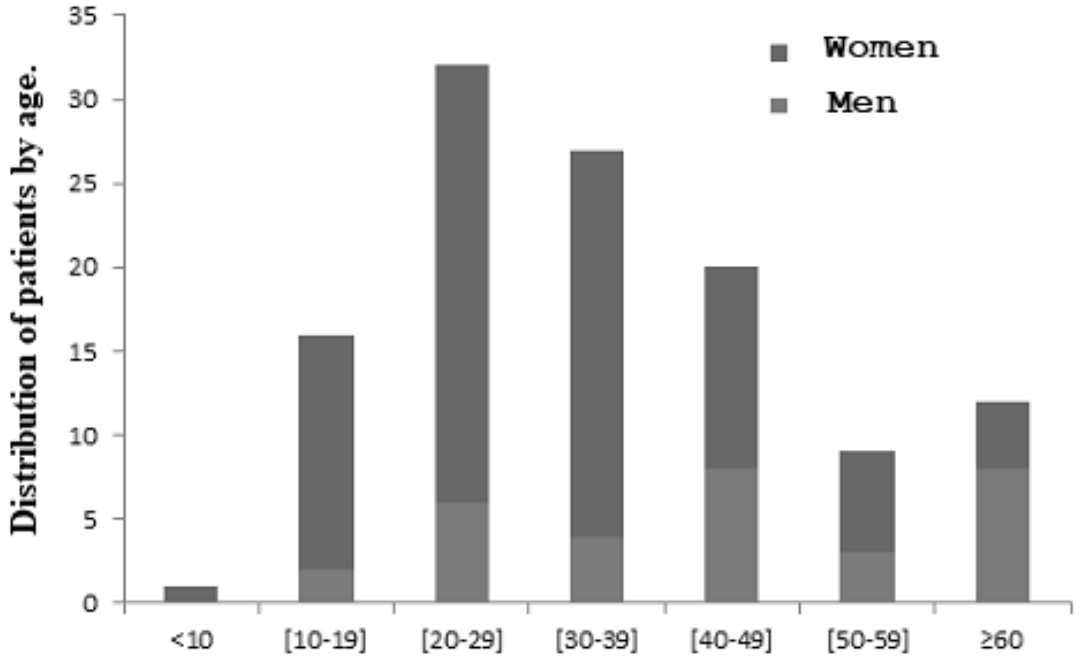

Figure 6. Distribution of patients by age.

in Figure 8. The electromyogram (EMG) diagnostic method was the most widely used (94% men versus 86% women), followed by computed tomography (61% men versus 43% women). The third was the magnetic resonance imaging (MRI) method with a rate of 45% for men compared to 48% for women. The biological analysis method was less used by the patients in our cohort (only 13% men against 17% women; as we can see, the biopsy diagnosis method was almost unused.

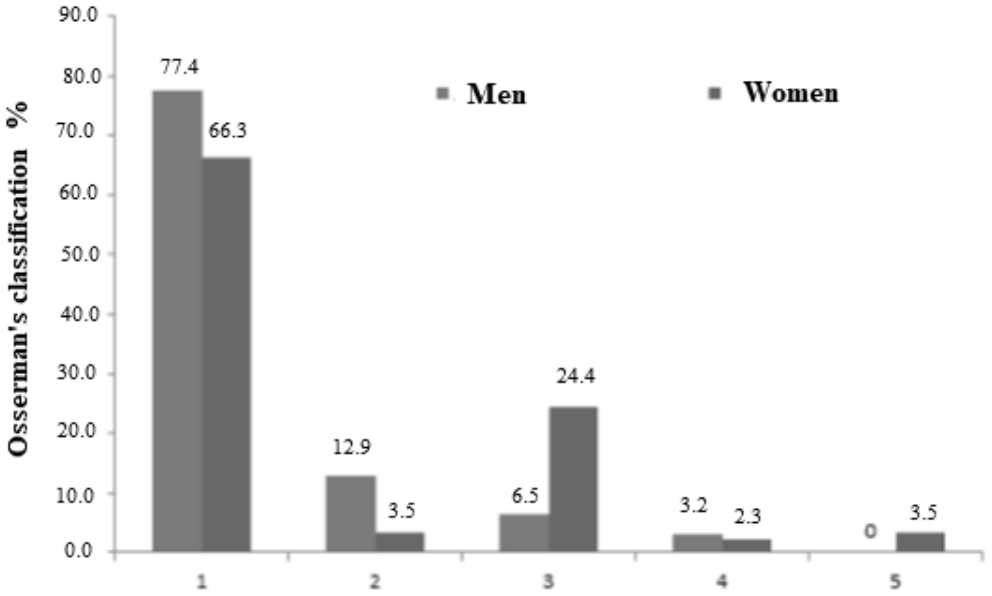

Figure 7. Distribution according to Osserman's classification.

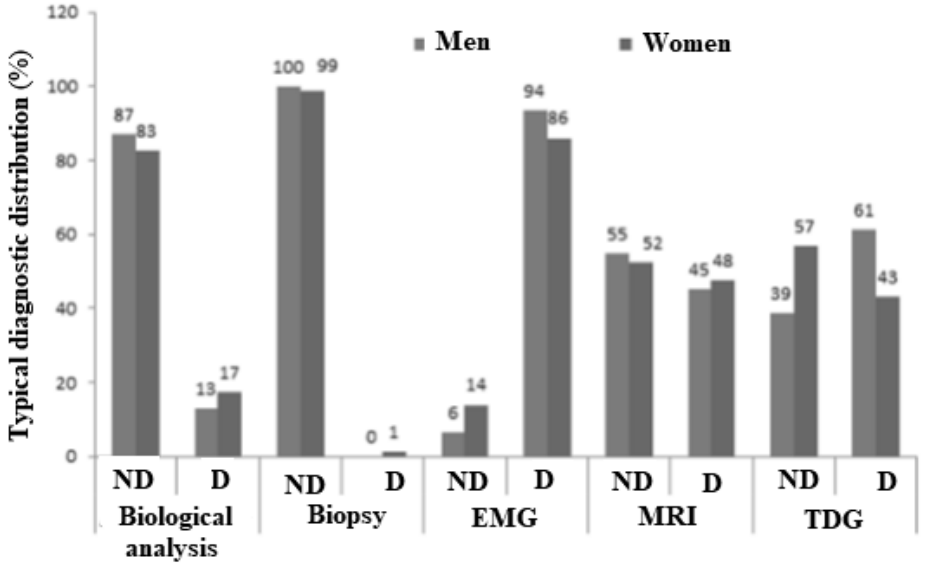

Figure 8. Distribution based on the diagnostic method for myasthenia gravis. ND: Not Done; D: Done; EMG: Electromyogram; MRI: magnetic resonance imaging; TDG: Computed Tomography.

3.8. Associated pathologies

In men, the two major diseases associated with myasthenia gravis were dysthyroidism and hypertension, both with 6.5% cases affected (Figure 9). In women (Figure 10) we found that dysthyroidism remains the most predominant associated pathology with 9.3% cases affected.

3.9. Anticholinesterase treatments

With regard to anticholinesterase treatments, as shown in Figure 11, the majority of patients received basic treatment with anticholinesterase inhibitors. In our cohort, Mestinon treatment predominated with 67.7% men and 87.2% women being treated using this method.

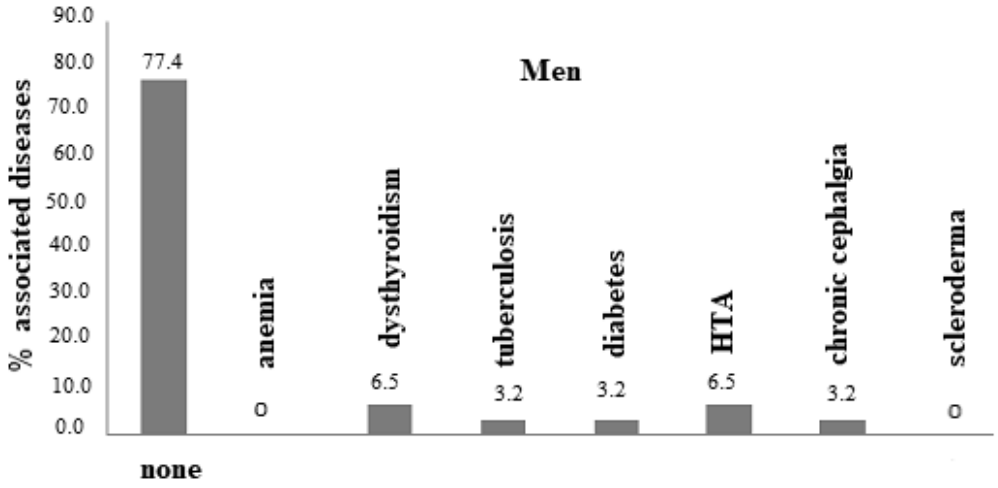

Figure 9. Associated pathologies in men.

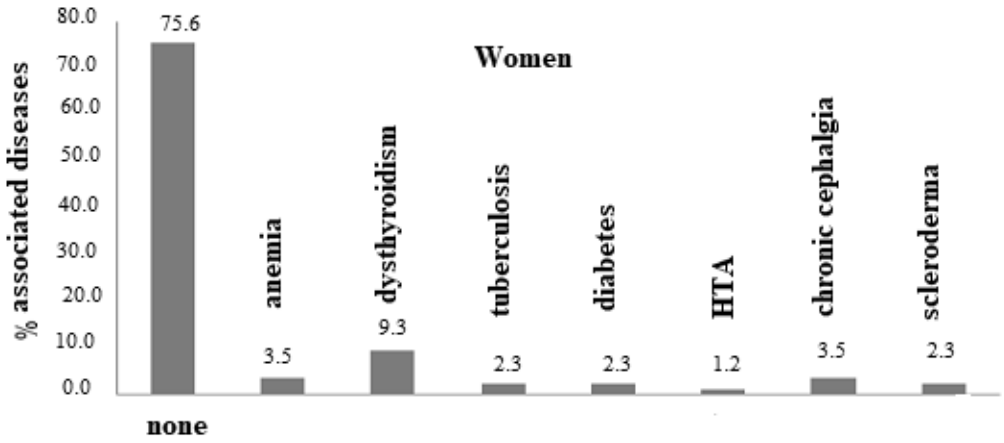

Figure 10. Associated pathologies in women.

3.10. Corticosteroid therapy treatment

Corticosteroid treatment was administered to 29% of men and 40.7% of women. Figure 12 shows these percentages.

3.11. Thymectomy treatment

The percentage of men and women who had surgical removal of the thymus is shown in Figure 13, which corresponds to 45.2% and 39.5%, respectively.

3.12. Treatment of myasthenia gravis by immunosuppressants

Figure 14 shows that immunosuppressive therapy was very poorly used by patients (only 9.7% men versus 9.3% women.

3.13. Treatment of myasthenia gravis by plasma exchange

The plasma exchange treatment method was also very poorly used by patients; only 6.5% of men and 7.0% of women did so, Figure 15.

4. DISCUSSION

In this retrospective type of epidemiological survey on patients' files, we set the goal of assessing various socio-economic and demographic aspects, methods of treatment and comorbidity in Moroccan patients diagnosed myasthenic.

Myasthenia gravis is a neuromuscular disease mainly characterized by muscular weakness and fatigue.

Although the disorder usually becomes apparent in adulthood, the onset of symptoms can occur at any age.

This study showed that 74% of myasthenic subjects are women compared to 26% of men with a sex ratio of men/women = 0.38. These data

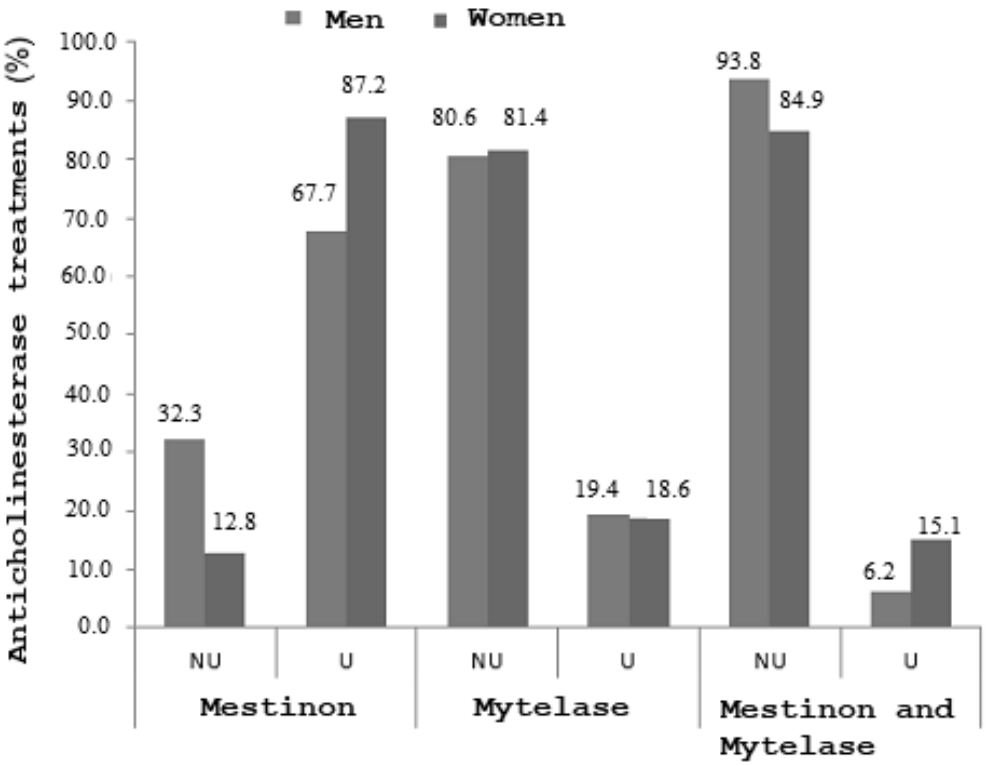

Figure 11. Anticholinesterase treatments. NU: Not used; U: Used.

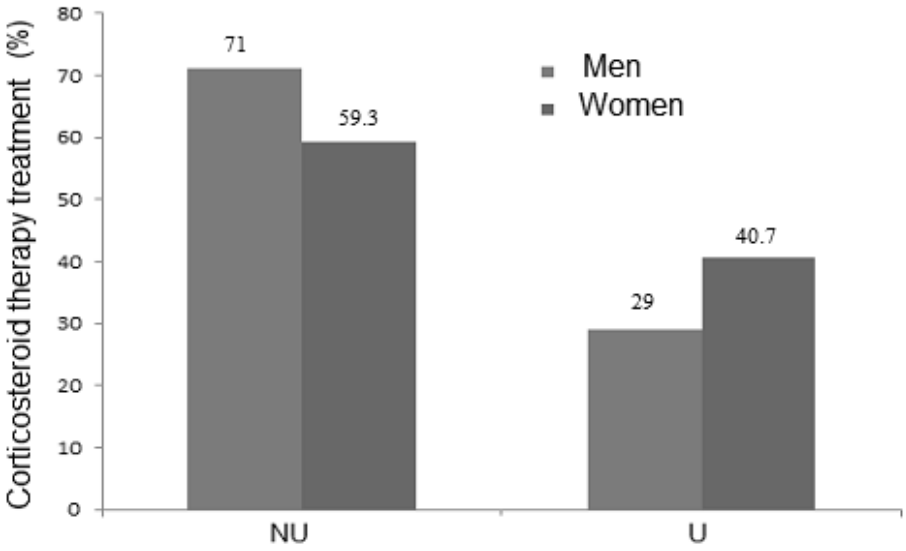

Figure 12. Corticosteroid therapy treatment.

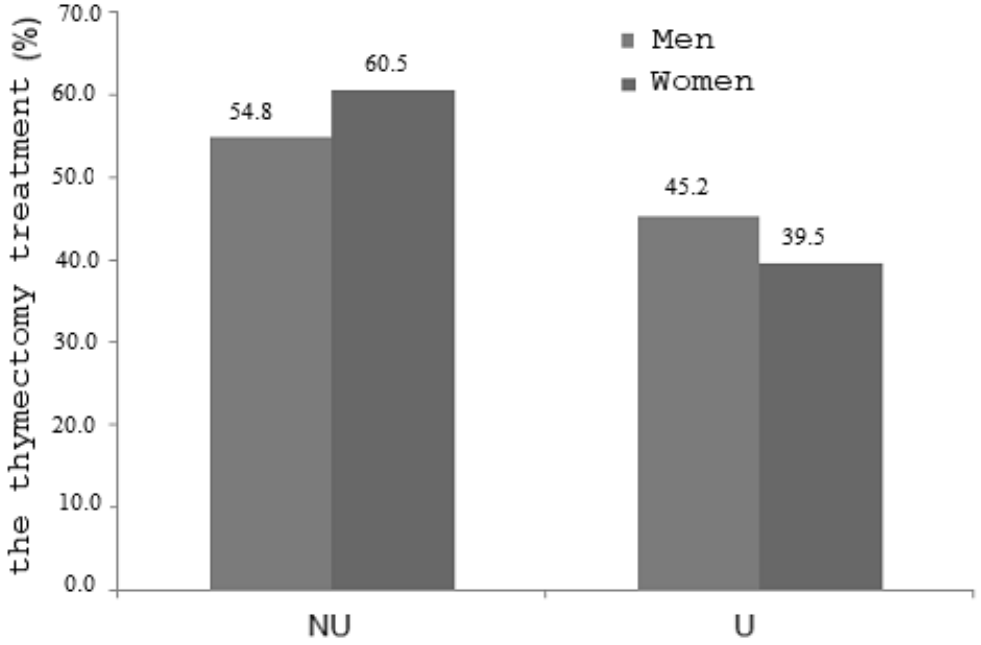

Figure 13. Distribution based on the thymectomy treatment method. NU: Not Used; U: Used.

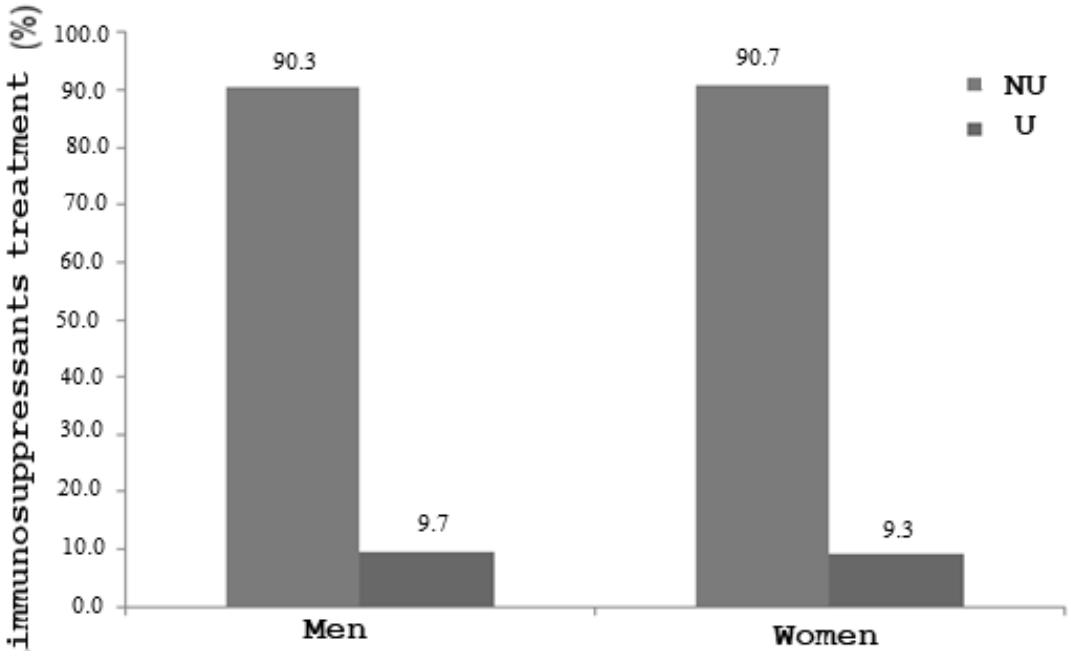

Figure 14. Distribution based on the immunosuppressive treatment method. NU: Not Used; U: Used.

are in full agreement with the data of those who have shown that the incidence of myasthenia gravis is observed in both sexes, but that women are more affected than men [13].

The initial clinical presentation of the patients included in our study shows that the first symptoms of myasthenia gravis are ocular signs. Indeed, several studies have shown that the first

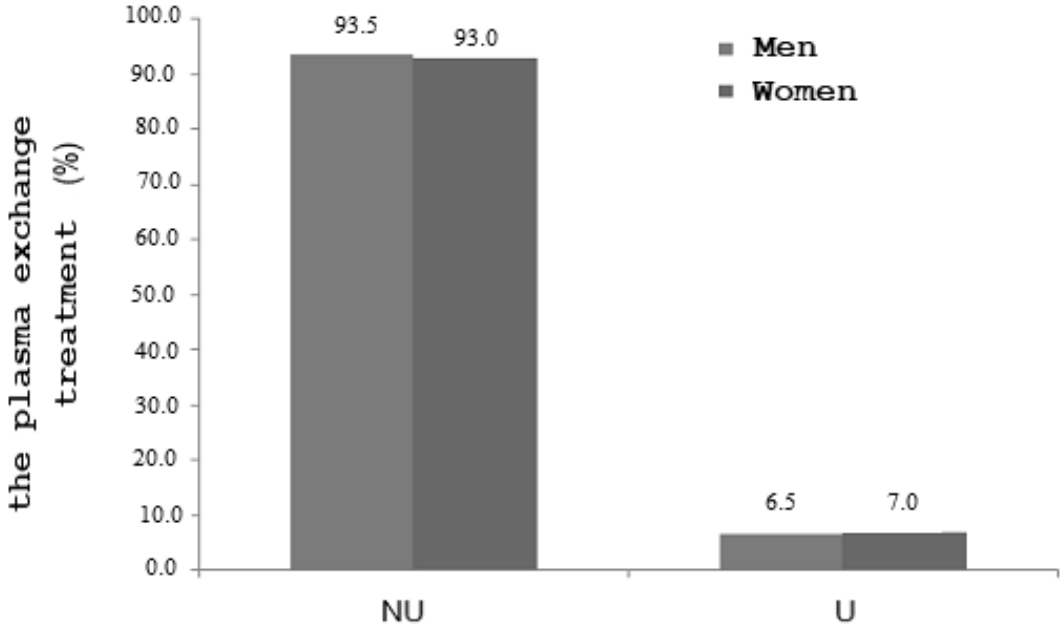

Figure 15. Distribution based on the plasma exchange treatment method. NU: Not used; U: Used.

signs are ocular with diplopia or ptosis [13-16]. These data are consistent with our results.

However, our results confirm that the first signs and symptoms of myasthenia gravis involve eye muscles problems with a percentage of 64% in both sexes. This result is in contradiction with that of previous studies [15] which had shown that the majority of patients had generalized myasthenia gravis.

The symptoms of myasthenia gravis vary according to the degree of the muscles affected, i.e. some muscles or a large amount of them. Most authors and clinicians classify the muscles affected by the anatomical regions, typically ocular, bulbar and limbs/axial muscles [17-19].

The diagnosis methods for myasthenia gravis differ significantly with the myasthenic patients. These methods are based on EMG, MRI, CT and biopsy. Decisions about specific treatments are based on the specifics of each patient's case. Myasthenic crisis that signifies rapid deterioration of the state of patients with myasthenia gravis, often characterized by respiratory failure, is a potentially life-threatening complication that occurs in approximately 15 to 20% of patients [20]. The main risk of myasthenia gravis is the occurrence of episodes of respiratory difficulties, most often requiring emergency management and implementation of respiratory assistance. The underlying causes of autoimmunity are unknown, and therefore, treating these conditions poses a significant challenge as currently there is no therapeutic strategy to cure these conditions. Some studies confirm that the causative factors could be divided into two major groups: genetic and environmental. The environmental factors have impact on a large range of health outcomes [21].

The majority of people in our study with myasthenia gravis (MG) have no family history of MG and the disorder appears to occur spontaneously for unknown reasons which confirm that MG is not hereditary.

5. CONCLUSION

Our retrospective study coupled with the analysis of the latest data from the literature has allowed us to reaffirm the fundamental characteristics of myasthenia gravis. The main findings can be summarized as follows:

- Autoimmune myasthenia gravis can be observed at any age, with 2 frequency peaks, the first one between 20 and 40 years with a female predominance and the other at over 50 years with a clear male tendency.

- The most common associated disorders are dysthyroidism and high blood pressure, which were high in both sexes.
- The first sign of MG is eye damage in both sexes.
- In general, the most affected populations have a low level of education and come from disadvantaged socio-economic and demographic backgrounds.
- For the majority of patients, the diagnosis is based on electromyography.
- Care is provided on a case-by-case basis.
- Medical treatments improve patients' quality of life and slow the progression to the next forms of MG.

In this study, it was also found that associated symptoms can occur at any age and that the factors responsible for this disease are still poorly understood.

CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

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