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Assessment of fatigue and autonomic dysfunction in myasthenia gravis – case report

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Abstract

Introduction: Myasthenia gravis (MG) is an autoimmune disease in which neuromuscular conduction disorders occur. The reason is the loss of acetylcholine receptors and the presence of antibodies directed against these receptors. The most characteristic symptoms of myasthenia gravis are: tenderness and weakness of striated muscles, which intensify particularly during exercise and in the evening. Non-motor symptoms such as: fatigue,

disorders of the autonomic nervous system can be asymptomatic, and in a significant proportion of cases significantly affect the quality of life. A full understanding of non-motors symptoms is needed to treat patients with MG. The aim of the study was to present the characteristics of non-motor symptoms on the example of a patient with myasthenia gravis.

Material and methods: A 50-year-old woman who had been suffering from myasthenia gravis for 23 years was examined. Chalder Fatigue Scale, Epworth Sleepiness Scale, Orthostatic Grading Scale were used to evaluate non-motor symptoms. The orthostatic reaction was tested using the tilt test.

Results: The most frequently reported non-motors symptoms in the patient were: chronic fatigue, sleep disturbances and cardiovascular symptoms (orthostatic intolerance, weakness).

Conclusions: Myasthenia gravis is characterized by a large variability of symptoms. An important part of the clinical picture are non-motor symptoms that can affect the functioning of patients in everyday life.

Key words: myasthenia gravis, non-motor symptoms, fatigue

Introduction

Myasthenia gravis (MG) is one of the autoimmune diseases in which neuromuscular transmission disorders occur. The disease is in many cases late diagnosed by a heterogeneous clinical picture. The most characteristic symptoms for MG are excessive fatigue and muscle weakness, however, many patients may have additional non-motor symptoms such as fatigue or disorders of the autonomic nervous system [1, 2].

Fatigue is a subjective symptom accompanied by a feeling of general weakness. Occurs as an additional symptom of neurological (Parkinson's disease, Multiple Sclerosis), cardiovascular or neuromuscular diseases. Fatigue in patients with myasthenia gravis has not been as well understood as in other diseases. The reason may be that it is often confused with muscular fatigue, which is very characteristic for MG [3, 4].

Similar to fatigue, autonomic dysfunction has been well known in many other disease entities - including in multiple sclerosis, Parkinson's disease, Guillain-Barry syndrome, in cerebrovascular disease. In the available publications, the authors notice that symptoms such as heat intolerance, sweating disorders, orthostatic hypotension, urinary and sexual disorders, excessive dryness or diarrhea and constipation are also present in many patients with myasthenia gravis. However, these are not symptoms characteristic of MG, they are often asymptomatic. They are difficult to diagnose [2, 5, 6].

Case report

A woman aged 50, suffering from myasthenia gravis for 23 years. Currently unemployed, currently on a pension. In the interview, the patient reported arthralgia, progressive muscular weakness of the lower limbs and excessive fatigue, which is intensified under the influence of physical activity. A patient walking alone, without orthopedic assistance. Additional overweight (BMI - 27.7; height - 159 cm; weight - 70 kg).

In the assessment of autonomic disorders, the patient reported such symptoms as: orthostatic disorders, arrhythmia, dizziness, thermoregulation disorders, dry eyes and mouth, sleep disorders and secretory disorders (Table 1).

Table 1. Autonomic dysfunction in a patient.

Orthostatic disorders	+
Arrhythmia episodes	+
Vertigo	+
Constipation	-
Dry eyes and mouth	+
Secretory disorders	+
Stomach ache	-
Sleep disorders	+
Post-meal symptoms	-
Anxiety disorders	+
Diarrhoea	-
Urinary bladder dysfunctions	-
Sexual dysfunctions	-
Thermoregulatory disorders	+

Assessment of fatigue and autonomic nervous system functions

Chalder Fatigue Scale (CFS) was used to assess fatigue. It is a questionnaire consisting of 11 questions, of which the first seven are related to physical fatigue, the last seven are about mental fatigue [7]. The Epworth Sleepiness Scale (ESS) was used to assess sleepiness. This scale assesses the possibility of falling asleep in 8 everyday situations on a scale of 0 (impossible to sleep) to 3 (high probability of falling asleep). The higher the result achieved, the greater the tendency to fall asleep in everyday life [8].

The orthostatic reaction was tested by tilt test using Task Force Monitor® (TFM). It is a non-invasive method by which the autonomic and cardiovascular systems can be assessed. TFM consists of the following elements [9, 10]:

- impedance cardiography (IKG),
- pulse oximeter
- a device for continuous measurement of blood pressure,
- electrocardiograph,
- device for oscillometric blood pressure measurement.

The verticalization to 70 degrees took 5.20 minutes. The following parameters were analyzed: heart rate (HR), systolic blood pressure (sBP), diastolic blood pressure (dBP) and

mean blood pressure (mBP). The patient was informed about the methodology of the study, which she agreed to.

Additionally, the 5-point OGS (Orthostatic Grading Scale) questionnaire was used to assess the symptoms of orthostatic intolerance. The result obtained by the respondent is proportional to orthostatic intolerance [11].

Results

The body's physiological response to passive standing is to increase the heart rate (by up to 30%). Mean blood pressure does not change much [5]. The patient had an increase in the parameters studied, however, the increase in heart rate was very small, which may be manifested in the patient by dizziness or orthostatic intolerance (Fig. 1).

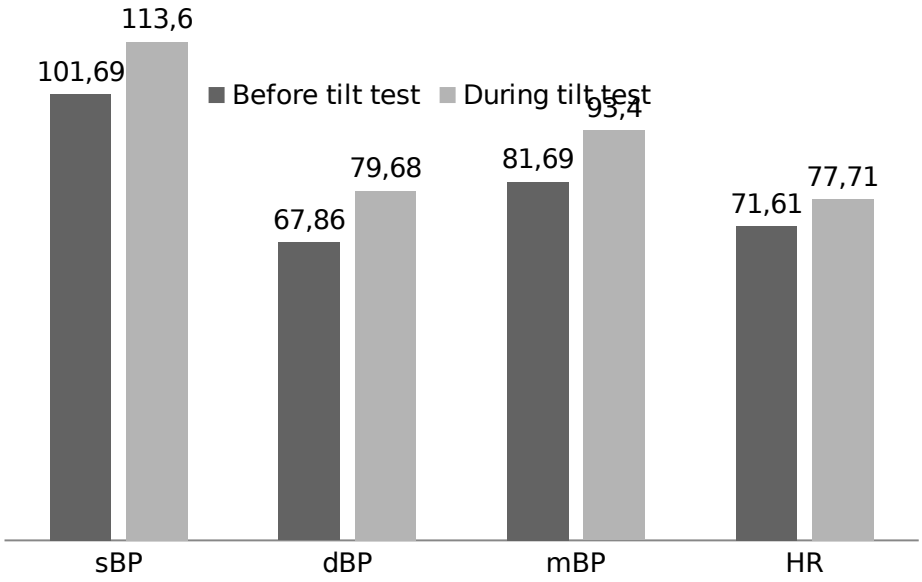

Figure 1. Hemodynamic values before and during the tilt test.

The results obtained in the tilt test are confirmed by the interview with the subject, who reported symptoms from the autonomic system - including orthostatic disorders, dizziness and arrhythmia (table 1).

The results of the questionnaires along with the interpretation are presented in Table 2. In CFS, the patient scored 16 points, which indicates excessive fatigue and weakness. ESS analysis does not indicate excessive sleepiness (4 points obtained). In addition, in the

Orthostatic Grading Scale, assessing the symptoms of orthostatic intolerance, the subject obtained 12 points out of 20 possible.

Table 2. Assessment of non-motor symptoms using OGS, CFS, ESS.

Scale	Score	Interpretation
Orthostatic Grading Scale (OGS)	12	• the higher the score, the greater the orthostatic intolerance; • maximum number of points: 20.
Chalder Fatigue Scale (CFS)	16	A score above 9 points is a fatigue.
Epworth Sleepiness Scale (ESS)	4	A score of 0-5 is no excessive sleepiness.

Discussion

The test organism's response to the tilt test, the results obtained in individual questionnaires and the interview signalize a reduced of the orthostatic reaction and may signal disorders of the autonomic nervous system (orthostatic disorders, arrhythmia, dizziness, dry eyes and mouth, secretory disorders, sleep disorders , anxiety disorders and thermoregulation disorders) and excessive fatigue. Currently, there are more and more scientific studies in which the authors raise the issue of fatigue and other non-motor symptoms in myasthenia gravis. Clinicians note that these are significant problems in this group of patients, negatively affecting the patient's quality of life [12-16].

In a prospective study, Nikolić et al. [12] compared the incidence of autonomic disorders due to the presence of antibodies and thymus disorders. In the group of patients with anti-acetylcholine receptor (anti-AChR) antibodies and thymoma, symptoms of autonomic dysfunction were in 86% of patients, with the most common occurrence: heat intolerance (76%), urinary bladder dysfunctions (81%) and sexual disorders (67%). Autonomic disorders in patients with anti-AChR positive antibodies, but without thymoma - were in 57% of

patients. In turn, in patients with anti-MuSK (anti-tyrosine kinase antibodies) the most common disorders were dizziness (39%), heat intolerance (30%) as well as dry mouth and sexual dysfunction - present in 26% of respondents. In the study by Elsais et al. [13], the most frequently reported symptoms of autonomic dysfunction in myasthenia gravis were excessive dryness (50%) and sleep disturbance (46%) and orthostatic disorder (44%). 32% reported vascular disorders, while food disorders - 22%.

Hoffmann et al. [14] used Chalder Fatigue Scale to assess fatigue. For 110 people with myasthenia gravis participating in the study, excessive fatigue was found in 56.1% of respondents. Elsais et al. [13] based on the same questionnaire noted the occurrence of fatigue in 44% of respondents. Alekseeva et al. [15] examined 73 people with myasthenia gravis using the FSS (Fatigue Severity Scale) questionnaire. Fatigue was found in up to 70% of respondents. In another study, Paul et al. [16] observed fatigue in 82% of patients with MG.

Non-motor symptoms, including disorders of the autonomic nervous system, are a big problem for patients with myasthenia gravis. These are not characteristic symptoms of myasthenia gravis, they are often asymptomatic and therefore their diagnosis may be a problem.

Conclusions

Myasthenia gravis is a disease characterized by a large variability and variety of symptoms. An important part of the clinical picture are non-motor symptoms such as chronic fatigue, sleep disturbances, orthostatic intolerance, weakness or thermoregulation disorders. They can affect the functioning of patients in everyday life.

All symptoms should be considered when diagnosing myasthenia gravis and when planning comprehensive therapeutic management.

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