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Available online at www.sciencedirect.com

ScienceDirect

Neuromuscular Disorders 31 (2021) 1287–1295

www.elsevier.com/locate/nmd

Patients' Forum

Myasthenia gravis: do not forget the patient perspective

Nils Erik Gilhus[a,b,*], Jan J.G.M. Verschuuren[c], Sandra Iren Barkås Hovland[d], Huw Simmonds[e], Floor Groot[f], Jacqueline Palace[g]

[a] *Department of Clinical Medicine, University of Bergen, Norway*
[b] *Department of Neurology, Haukeland University Hospital, Bergen, Norway*
[c] *Department of Neurology, Leiden University Medical Centre, Leiden, The Netherlands*
[d] *Norwegian Association for Muscle and Nerve Disorders, Oslo, Norway*
[e] *Myaware, College Business Centre, Derby, England*
[f] *Dutch Neuromuscular disease Association, Baarn, The Netherlands*
[g] *Nuffield Department of Clinical Neurosciences, University of Oxford, Hospitals Trust, Oxford, England*

Received 17 June 2021; received in revised form 9 July 2021; accepted 20 July 2021

1. Introduction

Patients with a chronic disease often have worries about the future and experience impairment in daily functions and quality of life. Symptoms such as fatigue, pain, insomnia, and depression are common, often secondary to the primary disease manifestation. Doctors tend to focus on the specific disease-related symptoms and signs, ongoing disease activity and improvement or deterioration of relevant biomarkers. Myasthenia gravis (MG) is a chronic disease with weakness in some but not all skeletal muscles as the single primary symptom [1]. Antibodies to acetylcholine receptors (AChR), muscle-specific kinase (MuSK), or lipoprotein-related peptide (LRP4) in the postsynaptic muscle membrane are specific for MG and induce the muscle weakness [2]. In 10-20% of MG patients, no such serum antibodies are detected by standard assays. AChR, MuSK and LRP4 antibodies bind selectively to skeletal muscle and have the sole action of impairing neuromuscular transmission, thus reducing skeletal muscle function. However, patients often describe fatigue as more important than weakness for daily function. MG treatment aims at restoring the function of neuromuscular transmission [3]. This can be done symptomatically by increasing acetylcholine availability through inhibition of acetylcholine esterase, or by suppression of the immune response against the postsynaptic muscle membrane. Supportive and additional therapies aiming at the total patient incapacities are often neglected.

Most MG patients do well. In a long-term study, 75% had remission or only mild symptoms, and only 3% had lasting severe disease [4]. There is hardly any increased mortality due to MG [5-7]. However, only around 20 % obtain a complete stable remission [8], and 15-25% do not respond satisfactorily to first and second-line treatments [8]. In a retrospective, Chinese study of 2154 patients, 9% had at least one MG crisis with the use of respiratory support [9]. MG implies considerable costs for the individual as well as for the society [10].

Patient reports, either as a score in formal outcome measures or as complaints during ordinary consultations, illustrate how other aspects than actual muscle strength is important in their self-evaluation of current health status. Fatigue is prominent in some patients, and does not necessarily correlate to muscle strength [11]. This fatigue can peripheral (due to muscle microdamage and activity) and central (with a brain component) [11]. Daily functions, working capacity and quality of life are not determined by arm strength or ptosis alone. Patient-reported tools for MG include MG-ADL, MG Impairment Index and MG-QOL15 [2,12,13] The scores reflect patient satisfaction, adaptability and health status, but does not necessarily correlate to severity or deterioration of MG muscle weakness [14].

The aim of this review is to focus on MG aspects that in our experience are very important for the patient, but less so for the treating neurologists. The authors of this opinion paper, consisting of expert neurologists and patients suggested as representatives by their MG organizations from three European countries, have through a consensus process

* Corresponding author at: Department of Neurology, Haukeland University Hospital, 5021 Bergen, Norway.
E-mail address: nils.gilhus@uib.no (N.E. Gilhus).

https://doi.org/10.1016/j.nmd.2021.07.396
0960-8966

selected such aspects. Consensus was reached through several digital meetings where high priority aspects from all authors were accepted, without any further formal process. The first author searched Web of Science for the key words myasthenia gravis and each aspect combined, and selected the most relevant papers. The co-authors supplemented with relevant papers.

The patient's perspective combines their present health situation with prognosis, treatment effects and side-effects, benefits versus risks of procedures and treatments, therapies in addition to pharmacological drugs, comorbidity, and availability of best treatment and expertise. Controlled studies are sparse, exact knowledge is limited, and the authors' personal experience has been included. Discussing all relevant aspects should make it easier to adapt to living with MG. This is especially important for newly diagnosed patients who usually have a lot of questions and concerns. When evidence-based information is available, it should be presented for the patients.

2. Daily function

Patient-reported data and registry data both illustrate that MG patients often experience impaired daily functions even when their muscle weakness is only mild to moderate. This can be due to specific limitations, such as diplopia impairing driving. More often it is explained by the numerous demanding tasks for modern people at work and in leisure time. An additional health factor such as mild MG may lead to severe consequences for daily functions. This can reflect a competitive labour market, expectations in family life, or comorbidity.

In a North American registry study of 1140 MG patients, a large proportion had a significant disease burden measured by activities of daily living and quality of life [15]. This burden was not clearly related to muscle strength or ongoing treatment. Younger patients and women reported more limitations and a poorer disease-specific quality of life. The authors suggested that more active immunosuppressive drug treatment might have improved daily functions in this cohort. In a population study from two European countries (Norway and The Netherlands) health-related quality of life was reduced in MG patients with generalized symptoms, whereas those with ocular symptoms only or in remission scored similar to healthy controls [16]. Female gender, but not age, was a determinant for lower quality of life. Physical activity, job, socio-economic factors, psychological well-being , and comorbidity were determinants for quality of life and daily functions. Quality of life in MG had not improved compared to studies from previous decades despite more effective immunosuppressive treatment.

A Chinese cross-sectional study of 1815 MG patients found a distinct reduction in activities of daily living [17]. This reduction correlated with quality of life, but less so with muscle strength. Main factors associated with daily living impairment were comorbidities, female sex, and unemployment. Younger patients with MG reported more symptoms and lower health-related quality of life. An active lifestyle counteracted reduced functions, whereas social support did not influence the results. Side-effects of MG drug treatment may have an impact on daily functions [18]. MG patients often need to ration their daily activities. This means that they may be unable to combine full-time jobs and perform tasks at home.

Frost et al found that MG patients had almost six times higher odds of no labour market participation and long-term sick leave compared with the general Danish population [19]. Females were more affected. Immunosuppressive drug treatment, a proxy for MG severity, was negatively associated with labour-market participation. MG patients with refractory disease worked fewer hours than those with a well-controlled MG [20]. However, disease severity did not influence short-term absence from work in this study. Among 165 Australian MG patients, 40% had stopped work due to MG, and 20% had changed their occupation [21]. MG can therefore lead to lower income, lower pensions, and to challenges regarding various types of insurance.

MG patients often experience a reduced social network. Muscle weakness and fatigue may cause them to abstain from social gatherings. Some MG patients feel inadequate regarding family responsibilities, and even experience break-ups or divorces because of the disease. Many patients feel a loss from no longer being able to live the life they were used to. Social support is important for most MG patients [16,17].

The variability of symptoms during the day can represent an additional challenge for MG patients. When they are seen by their doctor or their employer, they may appear healthy and symptom-free, with no obvious functional limitations and no need for treatment and extra support. Later in the day this could change considerably.

3. Daily symptoms

Muscle weakness is used to assess disease severity, and the effect of treatments. However, for some patients, other symptoms are more important. Even with moderate or minimal muscle weakness and no obvious comorbidity, some MG patients feel weak and tired. Nearly one third of consecutive MG patients responded "no" when asked whether they were satisfied overall with their current MG status [14]. Patients dissatisfied with their MG state had worse disease severity score, more fatigue, and were more likely to be women and unemployed [22]. Fatigue has in some patients a greater impact on daily living than muscle weakness [23]. This includes lack of energy, tiredness, and exhaustion, reported in 40-80% of MG patients, a much higher figure than in controls [11,24-26]. Fatigue is more frequent in female MG [11], and correlates with daily activities, quality of life, but less so with muscle weakness [25]. Presence of MuSK antibodies correlated strongly with fatigue [25]. When using a neuromuscular fatigue scale with eight patient-reported items in 257 MG patients from a single Canadian centre, the authors found a correlation between fatigue and MG severity, and with fatigue reduction after effective immunomodulatory

Table 1
Key points for clinical assessment of MG patients in addition to muscle strength evaluation, drug compliance and treatment side effects.

- Daily functions that are limited, with best and worst to capture variability
- Precipitating worsening (infection, long days, menstruation), and how they can be better managed
- Non-myasthenic causes of symptoms, comorbidity
- Mood and anxiety
- Family planning and written advise on planning pregnancy and effects of drugs, from puberty
- Function at work or educational establishment and adaptations t reduce fatigue; rest times, shorter days, mid-weekday off, working from home.
- Job limitations and whether entitled to financial help or extra support
- Social function and limitations
- Exercise and fitness
- Smoking
- Weight management and diet
- Burden on support network (family, partner, children)

treatment [24]. Seemingly conflicting results probably reflect that fatigue covers a range of meanings and symptoms that have various pathogenesis and is measured by different methods. Chronic fatigue may complicate and interfere with outcome parameters in formal treatment trials and perhaps explain negative results.

Personalities do not differ in MG patients and controls, and frequency of long-term psychiatric disturbances corresponds to the general population [27], although affective comorbidities can appear [28]. Depression occurs in 10-30% of MG patients [29-31]. This represents a double risk compared with matched non-MG controls [32]. Depression in MG correlated strongly with fatigue, and with corticosteroid treatment. MG patients are more frequently than controls treated with drugs for psychiatric disorders [33].Depression in MG can be seen as a response to a chronic disease with physical disabilities and fatigue, and is not a primary symptom associated with the disease.

Pain is not regarded as a symptom associated with MG. However, in a few small studies, body pain was reported more frequently in MG than in controls [34,35]. This is similar for most chronic disorders. Tension-type headache in MG is associated with diplopia and ptosis [36]. Some of the immunosuppressive drugs used in MG can have headache as a side-effect [35]. Opiates for severe pain can lead to a respiratory depression unwanted in MG. However, pain can also cause worsening of MG symptoms due to lack of rest and relaxation.

Hearing loss might be a comorbidity of MG. Antibody-induced subacute hearing loss has been reported in a few patients with thymoma and MG [37,38]. It has been suggested that AChR antibodies in some MG patients decrease the function of hair cells in the cochlea leading to impaired hearing [38,39].

Potential and experienced side-effects of MG drugs can lead to symptoms and influence daily life. Most patients and neurologists are concerned about short-term and especially long-term side-effects of immunosuppressive drugs [40]. Those on corticosteroids are especially worried. Weight gain, mood change, gastric reflux, skin changes, fluid retention and osteoporosis represent relevant symptoms induced by corticosteroids [18]. At the same time, patients often fear a relapse with immunosuppressant dose reduction [40]. Optimal dose of acetylcholine inhibitors such as pyridostigmine is often a balance between effect and side-effects from the autonomic nervous system, such as diarrhea, gastric cramps, salivation, muscle cramps and flushing. Patients should be encouraged, to find the lowest possible dose that is clinically relevant, and to avoid overtreatment with possible negative effects. A critical review of other medications is important, as some MG patients have prescriptions that could potentially worsen symptoms [41].

Key points for the clinical assessment of MG patients in addition to muscle strength are listed in Table 1.

4. Cognitive function

The immunological reaction at the neuromuscular junction and in thymus should not interfere with cognitive function. AChR IgG antibodies cross the blood-brain barrier, but they do not bind to the AChR in the brain [42]. Even though MG is a truly non-brain disorder, patients sometimes report reduced memory, lapses of concentration and cognitive difficulties. Four separate studies compared altogether 184 MG patients with controls [43-46]. They found no evidence of neuropsychological impairment for verbal learning, attention, and memory. However, after completing the tests, the MG patients reported more mental and physical fatigue than the controls. Impaired performance in some tests was interpreted as secondary to muscle weakness. A meta-analysis of 300 tested MG patients and 179 controls concluded that the patients performed worse in several cognitive domains [47]. Some MG patients report physical and cognitive fatigue with reduced cognitive ability and impaired social and physical functions. Such reports illustrate the patient perspective but do not necessarily imply a true cognitive impairment due to brain dysfunction [35]. Preliminary patient reports and experimental data may indicate cerebral involvement in MuSK MG [48].MG should be regarded as a disease not affecting the brain, but it should be acknowledged that some

MG patients have a reduced capacity for demanding cognitive tasks.

5. Family planning

Consequences of MG for family planning in young women were examined in 801 German MG patients [49]. Among the 307 patients who had not already completed their family planning before MG onset, more than half had abstained or intended to abstain from having children due to MG. However, at the same time 73% agreed to a statement that MG patients should not abstain from having children when the neurologist had no concerns. A low level of MG knowledge as well as previous intensive care treatment were associated with abstaining from giving birth. The most common concern was the possible influence of MG medication on the unborn child. This probably explains the infrequent use of MG medication in pregnancy [50], despite the fact that the most commonly used drugs such as pyridostigmine, prednisolone and azathioprine are regarded as safe for the developing child [51,52]. Intravenous immunoglobulin (IVIg) is safe during pregnancy and should be used for exacerbations of muscle weakness [53]. Such treatment will also counteract antibody-mediated neonatal myasthenia in the child. One-third of MG patients experience worsening of their symptoms when pregnant while most remain stable [53]. Some MG patients experience arm weakness, which makes taking care of a baby challenging. Harnesses, nursery pillows and other physical measures can help, as well as assistance from family or caregivers.

Two-thirds of MG women reported an exacerbation in the days just before their menstrual period and during the first days of the period itself [54], and one fifth increased the dose of their symptomatic drugs.

6. Comorbidity

MG patients frequently have comorbidities. With an increasing age of the MG population [55], comorbidities become even more frequent. Patients worry how this will influence their MG, and if their MG will increase risk or severity for other disorders. Comorbidities may be less well treated because they remain unrecognized, the symptoms are wrongly attributed to MG, or fear of MG interference may prevent effective treatment. Changes of immunosuppressive drug doses during chronic treatment are usually based on reports from the patients. Most patients can distinguish between MG and non-MG symptoms, but sometimes this is a problem for both patient and doctor. MG exacerbations can be due to comorbidity, even a common cold often increases MG symptoms.

MG patients have an increased risk of all other autoimmune disorders; thyroid disease, systemic lupus erythematosus and rheumatoid arthritis in particular [21,56]. Autoimmune comorbidity is most common in early onset MG with thymic hyperplasia. Thymomas are in addition to MG associated with myositis, myocarditis and hematological cytopenias [57]. Limbic encephalitis with CASPR2-antibodies is a rare paraneoplastic disease in thymoma MG [58].

Immunosuppressive drugs and thymectomy decrease protection against infections. Best estimates from population studies and large patient cohorts indicate that corticosteroids and most other immunosuppressive drugs increase the risk for infections with 20-50% [59]. No reliable data are available for thymectomy in MG. Thymoma patients tend to have more severe and frequent respiratory tract infections, and MG patients have a 20-30% increase in their use of anti-infectious drugs [33,59]. Combined drug therapy and higher doses of immunosuppression increase the risk for more severe infections. Antibiotic treatment should be initiated early and for only mild bacterial infections in MG. Progressive multifocal leukoencephalopathy (PML) is the most feared infection when on rituximab, has been reported in MG, and appears in 1:30,000 rituximab-treated patients with rheumatoid arthritis [59,60]. Vaccinations against common infections and severe infections are recommended for MG patients. Whereas the risk for covid-19 infection may increase in immunosuppressed patients, high-dose corticosteroids in the acute phase protect against severe lung disease [61-63].

Population studies show that MG patients do not have an increased risk of cardiac disease and cardiac death [5]. AChR-, MuSK- and LRP4-antibodies do not cross-react with the heart muscle. Still rare MG cases with severe cardiomyositis have been reported, most frequently in patients with thymoma and antibodies against intracellular muscle antigens [57]. When thymoma patients are excluded, the risk for cancer is similar with and without MG, the odds ratio reported to be 1.1 (Denmark) and 1.4 (Taiwan) in population studies [64,65].The thymoma subgroup has an increased cancer risk, and to the same degree in thymomas with and without MG [66].

Patients tend to worry about treatment-induced disease. Corticosteroids have well-known dose- and time-dependent negative effects. Common and relatively mild side-effects as well as rare but severe complications should be acknowledged and discussed with the patient before any drug treatment. Drug treatment to young women in fertile age needs particular consideration. Mycophenolate mofetil, methotrexate and rituximab should be avoided in pregnancy [51,52], and therefore in young women in general.

7. Total treatment

Patients usually accept recommendations from the neurologist regarding pharmacological treatment and thymectomy. However, they frequently ask for more attention paid to, information about and optimal precautions regarding diet, exercise, infection risk, and lifestyle. No environmental factors that induce or worsen MG long-term is known, and no diet factor has been associated with MG or MG severity. Thus, diet recommendations should be the same with and without MG. Swedish MG patients ate less fish

than a matched control population, with an odds ratio of 4 [67], and Korean MG patients had reduced serum vitamin D levels [68]. However, no cause-effect relationship has been established. Low vitamin D levels may increase the risk for autoimmune disease in general [69]. Vitamin D has also a protective role against osteoporosis, particularly important for MG patients on corticosteroids and with reduced mobility.

Smoking is associated with reduced health, health risks, disease complications and disease severity. This is true for autoimmune disorders as well, including MG. MG patients tend to smoke more [67], and smoking may increase the risk for ocular MG to generalize [70]. Smoking increases the risk for complications in MG, and especially from the respiratory system. Smoking cessation may reduce inflammatory disease activity [71] and reduces complication risks.

Being overweight with muscle weakness increases functional disability. MG patients are more often obese than controls [67]. This could be due both to inactivity and corticosteroid treatment.

Physical training and exercise are safe in MG. Ten intervention studies including 159 patients with generalized MG have shown that muscle strength and daily functions improve with systematic and individualized training programs [72-74]. A minimum of 150 minutes of exercise per week is recommended for patients with mild and moderate disease [75]. Resistance training, aerobic exercise as well as comprehensive programs have proved effective in small patient series. Respiratory physiotherapy may be helpful in selected patients. In patients with severe weakness and pending MG crisis, exercise can further aggravate the situation and training should be avoided.

Mild dysarthria is common in MG, and speech therapy may improve function [76]. Local muscle weakness can influence oral health. Dental treatment should be undertaken by brief sessions, usually in the morning when muscle strength is optimal, and regurgitation of saliva should be counteracted by several practical measures [77]. In some countries, MG patients can obtain a refund of dentist expenses.

When reading information about the disease, patients sometimes see MG portrayed as an easily treatable disease, and they may expect to live their usual lives. For some, this is true, for others, managing the disease may prove much more challenging. The group who does not go into remission, and especially the 15-25% who are resistant to first- and second-line treatments will be disappointed. They might even meet a negative attitude from their caregivers for failing to respond satisfactory to the treatment. Lack of response may have social implications if the patient's network expects MG to be easily treated and that is not the case.

MG patients should receive information about relevant local, national, and international patient organizations, charities, and websites. This is especially important at the time of MG diagnosis. Most patients will have hundreds of questions and much worry spinning around their head. Information and support are crucial. Patient organizations should also be watchdogs for total treatment quality, equal access for everyone, and updated guidelines and information material available.

8. Diagnostic precision

Patients with MG need a definite diagnosis. The specificity of AChR and MuSK antibody tests is near to one hundred per cent [2]. The sensitivity for the commercial tests is lower, around 80%. Tests for LRP4 antibodies are not yet available, and precise specificity and sensitivity less well defined. We recommend that antibody tests are repeated after 6 months if negative initially. Single-fiber EMG is not absolutely MG-specific, and repetitive nerve stimulation can give false-positive or inconclusive results [78]. A positive response to acetylcholine esterase inhibitors supports the MG diagnosis. Genetic myasthenic syndromes should be considered in patients without antibodies, atypical clinical symptoms and signs, and with symptom debut at a young age [79]. Patients with ocular symptoms only and no muscle antibodies may profit from a diagnostic evaluation of an ophthalmologist.

Patients with fatigue as the dominating symptom, no objective muscle weakness and no muscle antibodies usually do not have MG. As MG has become better known and with easy access to medical information, some non-MG fatigue patients have wrongly diagnosed themselves with MG, and they may confirm symptoms regarded as rather MG specific. Reexamining patient cohorts with a previous diagnosis of possible or probable MG, no antibodies, atypical symptoms, and very little long-term response to acetylcholine esterase inhibitor and immunosuppressive treatment will often reveal a non-MG diagnosis.

Diagnostic reevaluation should be done with care. Seronegative patients may experience added stress by repeatedly having their diagnosis questioned by healthcare personnel. Seronegative MG patients have a similar non-responder rate to first- and second-line treatments as the seropositive group. MG patients with no detectable antibodies have probably the greatest risk for insufficient MG treatment.

The delay from first MG symptom to a correct diagnosis can vary from less than a day to several years. This means that patients can have typical MG weakness without a diagnosis. With increased MG awareness, better access to specialist care, and more widespread use of specific tests for AChR and MuSK antibodies, MG prevalence has increased in the last decades [80]. Epidemiological surveys indicate that in some very old people with MG, their muscle weakness remains undiagnosed and untreated [55]. In young people, a much increased number of AChR antibody tests, resulted in only a marginally increased MG incidence [81], indicating detection of nearly all cases.

Correct MG subgroup classification depends on thymus pathology. Thymoma, thymus hyperplasia or a normal, atrophic thymus have therapeutic consequences [2]. MR imaging is superior to CT regarding sensitivity and specificity

[82]. Thymoma has a high MR imaging sensitivity (90%) and specificity (95%), whereas the sensitivity for hyperplasia was only 18%, with a very high specificity [83]. Imaging markers that predict response to thymectomy have not been established. Another diagnostic challenge in MG often occurs in patients with thymic hyperplasia and unsatisfactory response to thymectomy. Lack of response may be due to subtotal resection of thymus tissue embedded in mediastinal fat outside the proper gland. Imaging protocols that better differentiate between thymus, fat and postoperative tissue are much needed [84]. Antibodies against titin and ryanodine receptor in muscle occur frequently with thymoma, sometimes in late onset MG, but rarely in early onset disease [2,85]. Combining antibody testing with imaging increases both sensitivity and specificity for thymus pathology detection.

Patients with a feeling of muscle weakness may sometimes be wrongly diagnosed with MG, or MG is put forward as a possible diagnosis. Such patients have no effect of MG-specific treatment, may be overtreated, and risk developing long-term disabilities. A correct and definite diagnosis of no MG from an authoritative institution is necessary and should not be delayed. Patients with chronic fatigue and no MG need a rehabilitation program with participation from multiple sources, and not hampered by a wrong MG diagnosis.

9. Treatment availability

MG treatment is complex, specialized and often expensive. MG is a rare disease with a prevalence of 20-40 per 100 000 [55,80]. In low-income countries, there is limited access to expensive drugs, intensive care treatment, specialized antibody tests and neurophysiological examinations. In some countries, even pyridostigmine is a too expensive drug for some patients. Standard tests for AChR antibodies are not available for a large proportion of all MG patients. Lack of resources is crucial for a disease like MG, where correct diagnosis and treatment means a difference between life and death. Density of neurologists varies immensely globally. Even within and between countries in Europe, North America, and the Far East the availability of expert MG treatment varies considerably.

MG should be a disease for specialist care [86,87]. Both a precise diagnosis and optimal short-term and long-term treatment require regular follow-up by a specialist. A satisfactory MG outcome was more common when care was provided by neuromuscular specialists [88]. That study found that two-thirds of the unsatisfactory outcomes could have been prevented by appropriate therapy and improved compliance. Patients prefer a neurologist with experience and specific interest for MG. They also prefer the same doctor being responsible over time. Hospitals and specialist centres should aim for continuity in treatment. MG care needs to integrate treatment of comorbidities. Ocular symptoms such as diplopia and ptosis may profit from the combined efforts of the neurologist, ophthalmologist, orthoptist, and plastic surgeon. General practitioners usually have total treatment responsibility, but with a rare disease and need of specialized treatment, the neurologist needs to assess the comorbidities as well. Identifying the broad range of MG disease manifestations influencing daily life and daily functions should improve the treatment. This includes to optimize standard MG care, but also to focus on fatigue and fatigue treatment, mood changes, comorbidities, drug side-effects, and other real or perceived limitations for optimal function.

Local, national, and international guidelines and consensus documents exist for MG treatment. They correspond for all major aspects. In contrast, the actual treatment given to MG patients shows great variation and is not always in accordance with best practice. Mechanisms for better adherence to updated treatment recommendations in MG, and with regular audits, should be developed at neurology units.

Best MG treatment is not globally available and can be restricted also in well-developed countries. The complement inhibitor eculizumab is approved for MG treatment and has shown very good treatment results [89]. However, annual treatment costs up to 500 000 Euros for a single patient makes long-term treatment prohibitive [90]. Cost-benefit considerations will probably be more important in future MG treatment considerations with new and expensive drugs becoming available. Health authorities, patients and neurologists should all take part in cost-benefit decisions. International cooperation is necessary to curb costs of pharmacotherapy.

Health commissioners and insurance companies rightly demand good evidence before they refund treatment expenses. Drugs such as mycophenolate mofetil and rituximab are widely recommended and used in MG[1, 2]. Open studies and clinical practice demonstrate a good effect, despite the failure of these drugs in small placebo-controlled, prospective studies [91,92]. The drugs are not very expensive as patent rights have expired, however, in some countries, patients are not refunded for their expenses because of the lack of data from well-controlled studies [93].

10. Conclusions

Patients with MG often have unmet treatment needs, and they always need information and follow-up. Neurologists take care of the pharmacotherapy and thymectomy. However, the patients seek information also about other treatment aspects, not least about daily life modifications. They are satisfied with information about pathogenesis, but would in addition like to know why they have got MG. Today this is unknown. MG treatment should stick to updated and widely approved guidelines, but still be individually adapted. Comorbidities and treatment side-effects should be actively considered and evaluated at every clinical control. Neurologists should be the patients' advocate in their meetings with health commissioners and society. There is a need for further good-quality studies into patient-centered needs, including therapy effects on a range of symptoms. Improved MG treatment is much

wanted, and both patients and neurologists should be motivated to take part in new controlled trials and in research.

Declaration of Competing Interest

N.E. Gilhus has received consultant or speaker's honoraria from Argenx, UCB, Ra Pharma, Roche, Immunovant, Merck, Alexion. J. Palace has received travel support or honoraria from MerckSerono, Biogen Idec, Novartis, Teva, Chugai Pharma, Bayer Schering, Alexion, Roche, Genzyme, Medimmune, Eurimmune, MedDay, Abide, Argenx, and grants from MerckSerono, Novartis, Biogen Idec, Teva, Abide, Bayer Schering. J.J.G.M. Verschuuren; LUMC has received fees for consultations by JV from Alexion, Argenx and Ra Pharma, and royalties for antibody tests.

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