Economic Burden of Myasthenia Gravis Exacerbation and Crisis from US Payer Perspective

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Introduction

- Myasthenia gravis (MG) is a rare autoimmune neuromuscular disease characterized by muscle weakness and fatigability which significantly impacts the patient's quality of life[1,2]
- Management of generalized MG (gMG) is associated with major healthcare costs; these vary with severity of disease, therapy, as well as the presence of specific comorbidities[3]
- Little is known about the changes in healthcare costs before and after MG diagnosis, as well as the impact of clinical deterioration events on the healthcare costs among patients with MG

Objective

- To evaluate the impact of MG diagnosis, exacerbation, and crisis on healthcare costs

Methods

Patient selection criteria

- Inclusion criteria: Adults who had ≥1 inpatient or ≥2 outpatient claims (≥30 days apart) with MG diagnosis from 2017-2022, with ≥1 diagnosis provided by neurologist, and ≥12 months pre- and post-index (i.e., initial MG diagnosis) continuous enrollment were selected from the MarketScan® Commercial and Medicare Supplemental databases
- Exclusion criteria: MG diagnosis during 12 months pre-index, and diagnosis of Alzheimer's disease, Parkinson's disease, toxic myoneural disorders, Lambert-Eaton syndrome, congenital and developmental myasthenia during the entire study period (12 months before and after index diagnosis)

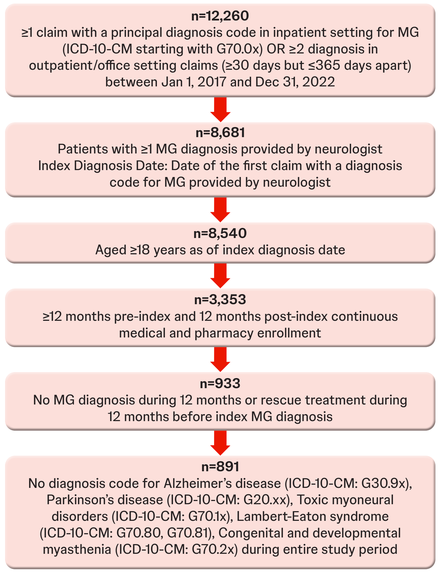
Definitions and assessments

- MG exacerbation was defined as having a claim associated with a medical diagnosis of MG exacerbation, the use of immunoglobulin or plasma exchange, or MG-related hospitalization without respiratory failure and endotracheal intubation/ventilation
- MG crisis was defined as MG-related hospitalization associated with respiratory failure and endotracheal intubation/ventilation
- Monthly all-cause healthcare costs before and after MG diagnosis were analyzed using restricted maximum likelihood controlling for age, gender, Charlson comorbidity index, payer type, presence of MG exacerbation, MG crisis, and time since index MG diagnosis, index exacerbation and index crisis

Results

- A total of 891 newly diagnosed patients with MG were identified

FIGURE 1: Patient selection



ICD-10-CM=International Classification of Diseases, Tenth Revision, Clinical Modification; MG=myasthenia gravis.

- Patients had a mean age of 55.7 years, were mostly females (52.7%), and had mean Charlson comorbidity index of 1.2

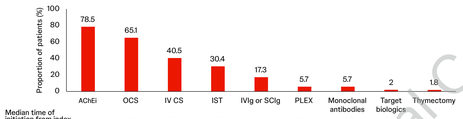
TABLE 1: Demographics and baseline characteristics

Characteristics	N=891
Age, mean (SD), years	55.7 (15.3)
≥65 years, n (%)	184 (20.7)
Sex, female, n (%)	470 (52.7)
Insurance type, n (%)	
Commercial	705 (79.1)
Medicare supplemental	186 (20.9)
Charlson comorbidity index, mean (SD)	1.2 (1.6)
Immunological disorders prior to index MG diagnosis, n (%)	
Inflammatory bowel disease	9 (1.0)
Psoriasis	10 (1.1)
Psoriatic arthritis	4 (0.4)
Rheumatoid arthritis	25 (2.8)
Sjögren's syndrome	6 (0.7)
Systemic lupus erythematosus	16 (1.8)

MG=myasthenia gravis; SD=standard deviation.

- Of the 891 patients eligible for the analysis, 93.8% (n=836) patients received MG-related treatment after index diagnosis
  - Acetylcholinesterase inhibitor was the most common treatment (78.5%), followed by corticosteroids (oral corticosteroids, 65.1%; intravenous corticosteroids, 40.5%) and immunosuppressants (30.4%)

FIGURE 2: Treatment use any time during post-index period



AChEi=acetylcholinesterase inhibitor; IST=immunosuppressant; IV CS=intravenous corticosteroid; IVIg=intravenous immunoglobulin; OCS=oral corticosteroid; PLEX=plasma exchange; SCIg=subcutaneous immunoglobulin. Monoclonal antibodies=rituximab, eculizumab, or ravulizumab. Target biologics=efgartigimod or rozanolixizumab

- During study follow-up period (median length of follow-up=28.9 months; range: 12.2 to 82.7; Q1-Q3=18.8-48.2), 371 patients experienced MG exacerbation and/or MG crisis
- Mean (SD) time to first MG exacerbation was 169 (293) days and time to first MG crisis was 304 (307) days

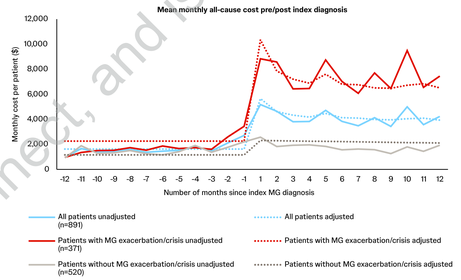
TABLE 2: Number of months with MG exacerbation and/or MG crisis during study follow-up

Event type	n (%) N=891	Mean number of months with clinical event (SD)
Patients with MG exacerbation and/or crisis	371 (41.63)	8.09 (10.74)
Patients with MG exacerbation without crisis	350 (39.28)	8.06 (10.85)
Patients with MG crisis without exacerbation	2 (0.22)	1.00 (N/A)
Patients with both MG exacerbation and crisis	19 (2.13)	9.53 (9.01)

MG=myasthenia gravis; N/A=not available; SD=standard deviation.

- Among all eligible patients (n=891), unadjusted mean (SD) monthly all-cause health care cost was $1,614 (6,031) and $4,146 (15,112) in the 12 months before and after index MG diagnosis, respectively
  - Before index MG diagnosis, unadjusted mean (SD) monthly all-cause health care cost was $1,785 (6,263) in patients with MG exacerbation/crisis and $1,491 (5,858) in patients without MG exacerbation/crisis during study follow-up
  - After index MG diagnosis, unadjusted mean (SD) monthly all-cause health care cost was $7,477 (21,756) in patients with MG exacerbation/crisis versus $1,769 (2,598) in patients without MG exacerbation/crisis
  - After controlling for covariates, adjusted mean monthly all-cause costs increased by $1,163 after index MG diagnosis (P<0.0001) compared to pre-diagnosis costs in patients who did not experience exacerbation and/or crisis

FIGURE 3: Monthly all-cause healthcare costs 12 months before and after MG diagnosis



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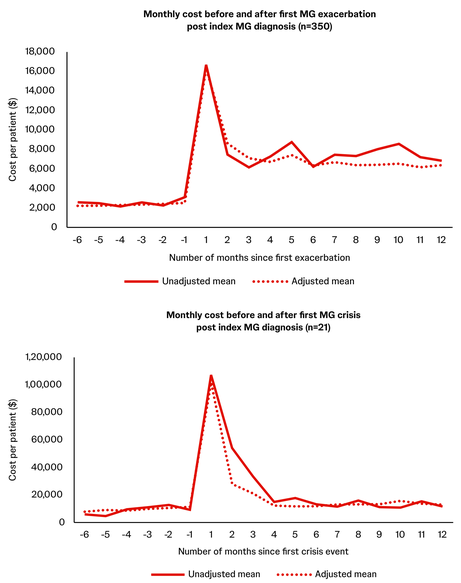
- MG exacerbation and crisis further increased adjusted mean all-cause costs in the month that the event occurred by $13,364 and $81,871 per patient, respectively (both P<0.0001)
- Adjusted mean monthly all-cause costs in the period following crisis (P<0.0001) were higher than costs prior to crisis, and continued to increase by $139 for each additional month after crisis

FIGURE 4: Monthly healthcare costs 6 months before and after first (index) MG exacerbation and MG crisis



MG=myasthenia gravis.

Key Takeaway

MG exacerbations and crises significantly increase healthcare costs in the US, highlighting the need for effective treatments to reduce the economic burden and optimize resource allocation in MG management

Conclusions

These findings from a US healthcare claims databases suggest that MG exacerbation and crisis significantly increase monthly all-cause healthcare costs

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These data could help inform healthcare providers, policymakers, and payers on strategies for optimizing care, improving resource allocation, and mitigating the economic burden associated with the management of MG

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Disclosures

Daniel Labson, Kavita Gandhi, Andreas Nikolaou, and **Winghan Jacqueline Kwong** are employees of Johnson & Johnson and may hold stock/stock options. **Qian Cai** and **Maria Ait-Tihyaty** were employees of Johnson & Johnson at the time of the study

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1. Dresser L, et al. *J Clin Med*. 2021;10(11):2235. **2.** Wu X, et al. *Front Neurol*. 2023;13:1072861. **3.** Zhdanava M, et al. *Curr Med Res Opin*. 2024;40(7):1145-1153.

Autoantibody: gMG