

Clinical Outcomes, Healthcare Resource Utilization, and Costs Before and After Immunoglobulin Initiation in Generalized Myasthenia Gravis

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Key Takeaways

Over 70% of patients initiating immunoglobulin after evidence of gMG became chronic users within a year

Despite increased immunoglobulin utilization, the proportion of exacerbations increased, and prevalence of inpatient exacerbations and crises remained unchanged; number of gMG-related inpatient admissions and emergency visits also increased

Healthcare costs rose substantially, driven largely by immunoglobulin costs

Exacerbation rates and healthcare resource use remained substantial. These findings suggest ongoing unmet clinical needs among patients with gMG initiating immunoglobulin therapy

Background

Despite conventional therapy, a substantial proportion of patients with generalized myasthenia gravis (gMG) continue to experience inadequate disease control, which may lead to exacerbations or crises¹

Immunoglobulin is often used when conventional therapy fails, both as rescue therapy and, increasingly, for ongoing maintenance management²

Immunoglobulin is resource-intensive, requiring recurring infusions and contributing substantially to healthcare resource utilization (HRU) and costs^{3,4}

Characterizing clinical outcomes, HRU, and costs following immunoglobulin initiation in patients with gMG may help identify unmet needs and inform future treatment strategies

Objective

To evaluate changes in exacerbations, crises, HRU, and healthcare costs before and after immunoglobulin initiation among patients with gMG in the United States

Methods

Study design and data source

- This retrospective, observational study used administrative claims from Komodo Research Data (KRD+) from January 1, 2017 to May 31, 2025
- The index date was the date of immunoglobulin initiation following first evidence of gMG
- The baseline period consisted of 12 months preceding the index date and was used to assess patient characteristics
- The follow-up period spanned 12 months starting on the index date

Patient selection criteria

- ≥1 inpatient admission with an MG diagnosis (International Classification of Diseases, Tenth Revision, Clinical Modification: G70.00 or G70.01) or ≥2 outpatient visits with an MG diagnosis ≥30 days apart
- ≥1 MG diagnosis by a neurologist (evidence of gMG)
- ≥12 months of continuous insurance eligibility prior to the first neurologist-diagnosed MG (i.e., wash-out period to identify incident gMG) and after the index date
- ≥1 claim for immunoglobulin after the first neurologist-diagnosed MG and within the same continuous insurance eligibility period; the first claim defined the index date
- ≥18 years old on the index date

Some patients may have had immunoglobulin claims prior to the first evidence of gMG, which may reflect treatment during progression to generalized disease or treatment for other indications

Outcomes and statistical analysis

- Immunoglobulin use patterns, gMG exacerbations and crises, HRU, and costs (2025 US dollars) were described during the baseline and follow-up periods
 - Exacerbations were defined as any diagnosis for MG with exacerbation (ICD-10-CM: G70.01) in any setting, or a diagnosis without exacerbation (ICD-10-CM: G70.00) in an inpatient or emergency setting in the primary diagnosis position
 - Crisis were defined as a claim for intubation, tracheostomy, or mechanical ventilation with an MG diagnosis during an inpatient or intensive care unit admission
- Outcomes were compared between the follow-up and baseline periods using generalized estimating equation models accounting for repeated measurements; Poisson regressions were used for count outcomes, ordinary least squares regressions were used for continuous outcomes, and log-binomial regression with robust variance for binary outcomes

Results

Patient characteristics

- The study included 1,718 patients (mean age: 60.5 years; female: 50.8%; 13.0% used immunoglobulin before the first evidence of gMG; Table 1)
- Most index immunoglobulin claims occurred in the outpatient medical setting (80.0%)
- 31.0% of the index immunoglobulin claims occurred during an exacerbation; 0.7% occurred during a crisis

Table 1. Baseline characteristics

Mean ± SD [median] or n (%)	Immunoglobulin cohort N = 1,718
Age at index date (years)	60.5 ± 16.1 [62.0]
Female	873 (50.8)
Race/ethnicity	
White	1,165 (67.8)
Hispanic or Latino	134 (7.8)
Black or African American	117 (6.8)
Asian or Pacific Islander	48 (2.8)
Other	47 (2.8)
Unknown	207 (12.0)
Payer	
Commercial	830 (48.3)
Medicare	775 (45.1)
Medicaid	113 (6.6)
Common comorbidities	
Hypertension	1,124 (65.4)
Dyslipidemia	974 (56.7)
Obesity	819 (47.7)
CMS-CCI score	2.3 ± 2.4 [2.0]
Immunoglobulin use prior to index date	223 (13.0)
Days from first gMG diagnosis to index date	194.8 ± 294.5 [75.5]
Index immunoglobulin setting	
Outpatient medical	1,374 (80.0)
Outpatient pharmacy	209 (12.2)
Inpatient	104 (6.1)
Emergency or other	31 (1.7)
Index immunoglobulin during exacerbation	532 (31.0)
Index immunoglobulin during crisis	12 (0.7)

Abbreviations: CCI = Charlson Comorbidity Index; CMS = Centers for Medicare & Medicaid Services; gMG = generalized myasthenia gravis; SD = standard deviation.

Limitations

- Patients initiating immunoglobulin may have had more severe or worsening disease, which could contribute to higher rates of exacerbations, healthcare utilization, and costs during follow-up (confounding by indication)
- Administrative claims data do not capture clinical measures of disease severity or treatment response, such as MG Activities of Daily Living (MG-ADL), Quantitative MG (QMG), MG Foundation of America (MGFA) class, or antibody status
- Exacerbations and crises were identified using claims-based algorithms and may be subject to coding error or misclassification
- Changes in concomitant gMG therapies during follow-up could not be fully accounted for and may have influenced study outcomes

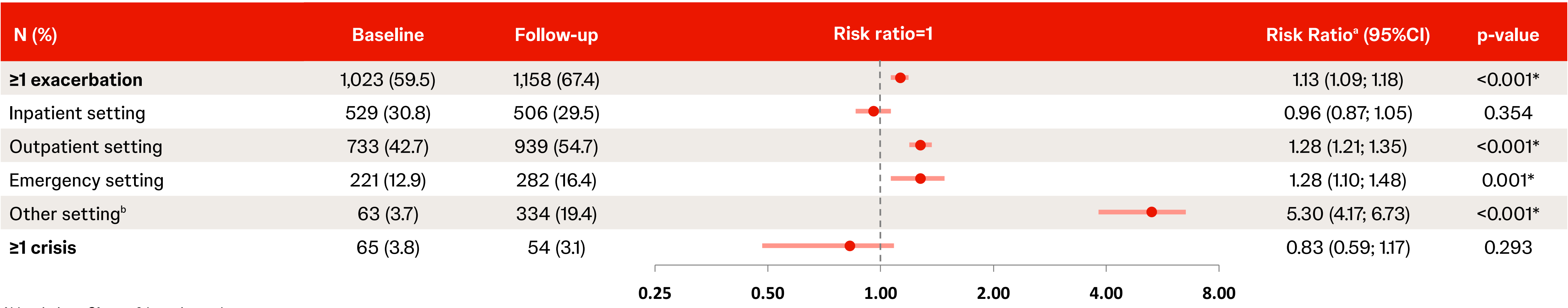
Immunoglobulin use

- The number of immunoglobulin claims increased 8.54-fold (follow-up: 12.1 claims; baseline: 1.4 claims; rate ratio: 8.54; p<0.001)
- The prevalence of chronic immunoglobulin users increased 8.25-fold (follow-up: 71.5%; baseline: 8.7%; risk ratio: 8.25; p<0.001)

Clinical events

- The proportion of patients experiencing ≥1 exacerbation increased by 13% overall and by 28% in emergency care settings
- The proportion of patients with exacerbations in the inpatient setting and crises remained similar

Figure 1. Difference in exacerbations and crises between the baseline and follow-up periods



Abbreviations: CI = confidence interval.

* denotes p-value <0.05.

Notes:

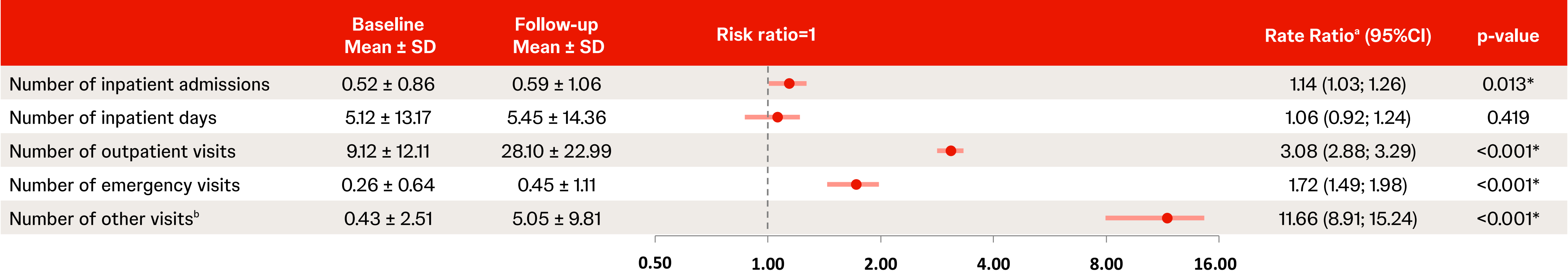
^a Risk ratios were estimated using log-binomial regression with robust variance; risk ratios >1 indicate that the risk is higher in the follow-up period compared with the baseline period.

^b Other setting included durable medical equipment, dental or vision care, and home-care services.

Healthcare resource utilization

- Rates of gMG-related inpatient admissions increased by 14%, while emergency department visits increased by 72% (Figure 2)

Figure 2. Difference in gMG-related HRU between the baseline and follow-up periods



Abbreviations: CI = confidence interval; SD = standard deviation.

* denotes p-value <0.05.

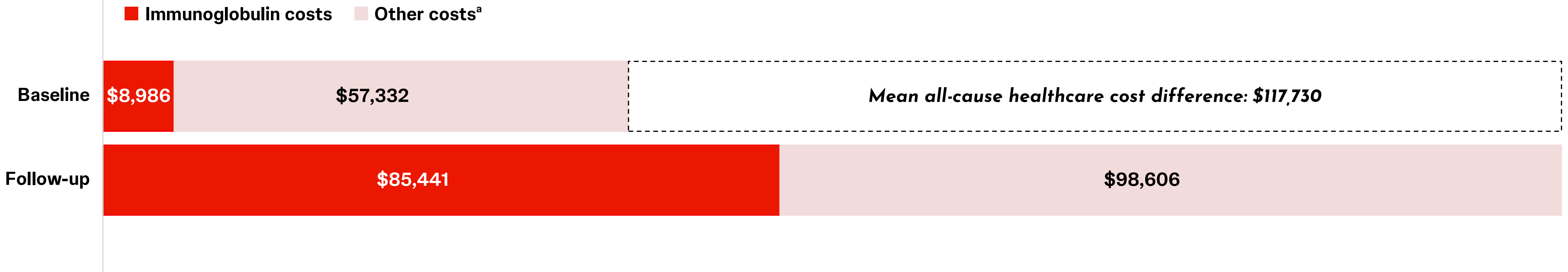
Notes:

^a Rate ratios were estimated using Poisson models; rate ratios >1 indicate that the rate is higher in the follow-up period compared with the baseline period.

^b Other visits included durable medical equipment, dental or vision care, and home-care services.

- Mean all-cause healthcare costs increased by \$117,730 per patient during follow-up compared with baseline (follow-up: \$184,047; baseline: \$66,318; p<0.001); 64.9% of the cost difference was driven by immunoglobulin costs (Figure 3)
- All-cause medical costs increased by \$5,755 following immunoglobulin initiation (follow-up: \$50,190; baseline: \$44,435; p<0.01)

Figure 3. Difference in all-cause healthcare costs between the baseline and follow-up periods



Note:

^a Other costs included medical and pharmacy costs, excluding immunoglobulin costs.