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Utilizing Real-World Evidence to Estimate Treatment Costs Among Norwegian Patients with Myasthenia Gravis Treated with Intravenous Immunoglobulin (IVIG)

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Summary and conclusions

Health technology assessments (HTAs) often rely on data from randomized clinical trials (RCTs), guidelines and expert inputs, which frequently do not adequately capture real-world treatment practice. We aimed to estimate treatment costs using real-world data for HTAs in myasthenia gravis (MG).

The costs of treating MG patients who receive intravenous immunoglobulin (IVIG) within the first five years after diagnosis are more than two times higher than for the MG population who did not receive IVIG. This difference should be accounted for in HTAs of new MG interventions.

14% of newly diagnosed MG patients in Norway received IVIG in hospital. IVIG treatment is a significant driver of direct medical costs associated with MG. Changes in these costs should be accounted for when evaluating new interventions.

MG patients receiving IVIG compared to MG patients not receiving IVIG (first year after diagnosis):

1.9 times more inpatient stays

2.5 times higher treatment costs

Figure 1 Study design

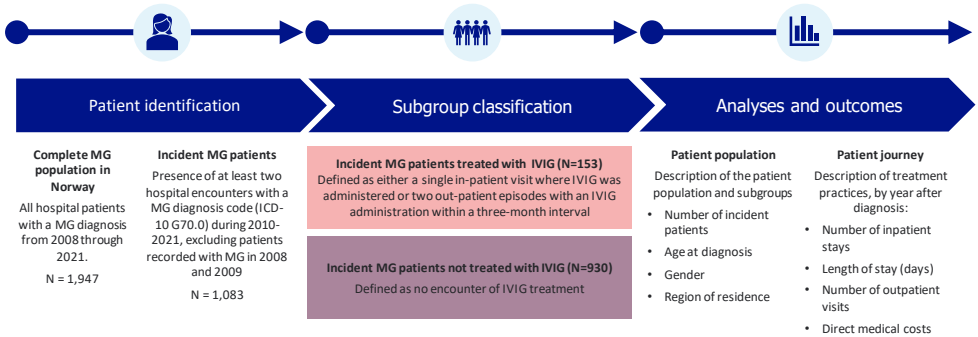
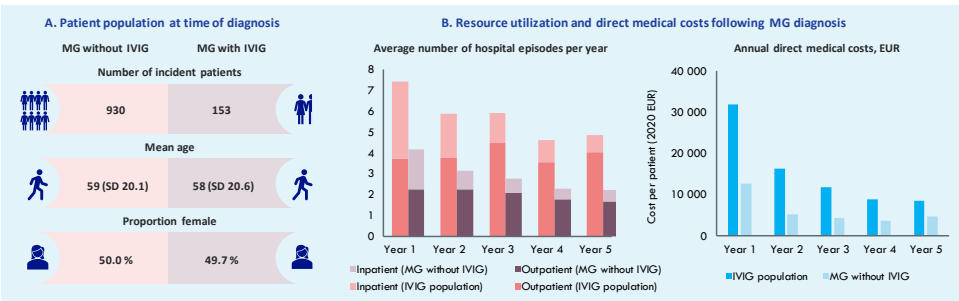


Figure 2 Results



Objective

- To describe patient characteristics, health care resource utilization and treatment costs of different sub-populations of MG patients to support future health technology assessments.

Background

- MG is a rare neuromuscular disease characterized by variable degrees of skeletal muscle weakness, with an incidence of 10-15 persons per million per year (1).
- Multiple new treatments for MG are becoming available (2), and their costs and benefits need to be evaluated in HTAs prior to funding and defining requirements for patient access.
- To support assessment of new interventions in MG, information on health care utilization and costs are needed for different subpopulations.
- Thymectomy, immunoglobulins, and plasma exchange represent widely used MG treatments. Current treatment practice defines resource use, and former studies indicate that IVIG is an important driver for the direct medical costs of MG (3).
- We aim to utilize mandatory, nationwide patient-level registry data to better understand real world treatment practice of MG to improve the quality of upcoming HTAs.

Methods

- Patient-level data were obtained from the Norwegian Patient Registry (NPR) for all MG patients in contact with a Norwegian hospital from 2008 through 2021.
- We collected information on patient characteristics (age, sex, region), type of treatment/hospital contact, treatment procedure codes, and ATC-codes for medications.
- Incident MG patients were identified in the NPR data based on the presence of at least two hospital encounters with an MG diagnosis code (ICD-10 G70.0) during 2010-2021, excluding patients recorded with MG in 2008 and 2009 (Figure 1).
- Analyses were conducted for the subgroups of MG patients receiving IVIG treatment, and MG patients not receiving IVIG treatment. IVIG treatment was identified by procedure (RPGM05) and ATC codes (J06BA02), defined as either a single in-patient episode where IVIG was administered or at least two out-patient episodes with an IVIG administration within a three-month interval.
- Annual direct treatment costs of MG related hospital episodes for each year following the MG diagnosis were estimated using Diagnosis-Related Group (DRG) cost weights according to national guidelines (4).

Results

- Among the 1,083 incident MG patients, 153 (14.1%) were treated with IVIG.
- Patients receiving IVIG had on average 3.7 inpatient stays during the first year after diagnosis, compared to 1.9 inpatient stays for those not receiving IVIG, while the average length of stay was 1.2 days longer for patients treated with IVIG (Figure 2, panel B).
- Patients receiving IVIG had 2.5-fold higher costs during the first year after diagnosis (EUR 31,832 vs. EUR 12,706) and 3.1-fold higher costs during the second year after diagnosis (EUR 16,251 vs. EUR 5,284) compared to patients not receiving IVIG.
- In the fifth year after diagnosis, IVIG patients still had higher costs than those not receiving IVIG (EUR 8,533 vs. EUR 4,722).
- During the first five years after diagnosis, average treatment costs per patient were EUR 59,931 for those receiving IVIG compared to EUR 19,800 for those not receiving IVIG. The IVIG group had 7.58 inpatient stays compared to 3.17 for those without IVIG.
- No significant differences in age, gender, or region of residence were observed between those treated with or without IVIG.

Limitations

- Hospital encounters may be registered with an MG diagnostic code by mistake, or MG may be misdiagnosed. To avoid including non-MG-patients, we applied strict criteria to identify MG patients (at least two encounters) that should favor diagnostic specificity over sensitivity.
- Subcutaneous Immunoglobulin (SCIG) was not included as we were not able to link prescription data to NPR data. However, Norwegian prescription data show that only a small proportion (1.4%) of the Norwegian MG patients received SCIG during the study period.
- DRG based costs may be inaccurate.

References: 1. Gilhus et al. Tidsskr Den Nor legeforening 2016;136:1089-94 ; 2. Schneider-Gold C, Gilhus NE. Advances and challenges in the treatment of myasthenia gravis. Ther Adv Neurol Disord. 2021;14:17562864211065406.; 3. Landfeldt E, Pogoryelova O, Sejersen T, Zethraeus N, Breiner A, Lochmüller H. Economic Costs of Myasthenia Gravis: A Systematic Review. PharmacoEconomics. 2020;38(7):715-728. 4. The Norwegian Medicines Agency (NoMA). Guidelines for the submission of documentation for single technology assessment (STA) of pharmaceuticals 2018 (Updated 2020)

Abbreviations: HTA = health technology assessments = HTA, RCT = randomized clinical trial, MG = myasthenia gravis, IVIG = intravenous immunoglobulin, SCIG = subcutaneous Immunoglobulin, NPR = Norwegian Patient Registry, DRG = diagnosis related group, ATC = Anatomical Therapeutic Chemical Classification System, EUR = Euros, ICD-10 = International Statistical Classification of Diseases and Related Health Problems (10th revision). SD = standard deviation

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