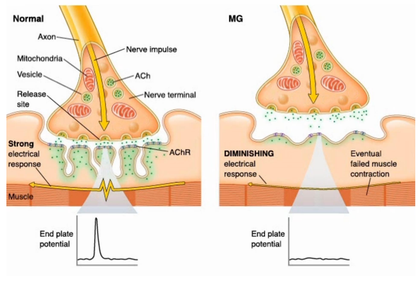
Impact of Medications on Myasthenia Gravis Patient Population at University Hospital

Rohit R. Gummi[1], Natalie A. Kukulka[1], Raghav Govindarajan MD[2]
[1] Medical Student, University of Missouri School of Medicine at Columbia, MO, 65201
[2] Department of Neurology, University of Missouri Hospital, MO, 65201

BACKGROUND

Myasthenia Gravis (MG):

- Autoimmune disorder of the neuromuscular junction with 200-400 cases per million.
- Patients can be positive for antibodies against their acetylcholine receptors(AChR), muscle-specific tyrosine kinase(MuSK), or be seronegative and still have symptoms



- **Presentation**: Weakness of ocular, bulbar, limb, and respiratory muscles in generalized MG.
  - 10% of patients have symptoms limited to extraocular muscles
- **Treatment**: Immunosuppresssants and AChE inhibitors

Myasthenia Gravis Foundation of America (MGFA):

- MGFA advises caution with the prescription of certain drugs including: fluoroquinolones, azithromycin, gentamycin, neomycin, high dose steroids, magnesium, and beta blockers.
- This recommendation is based off clinical experience and anecdotal evidence. A clinical study is needed to estimate a true relationship between the listed medications and their impact on patients.

AIMS

1. **Assess the proportion of myasthenia gravis exacerbations which involve medications that are advised against by the MGFA**
2. **Assess the type of medications most frequently prescribed to these patients**
3. **Evaluate the association between the medications and acute exacerbations**

RESULTS

OVERALL CAUSES OF EXACERBATIONS

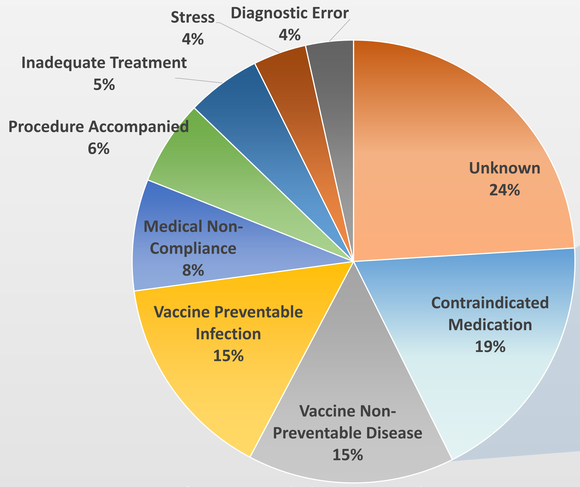
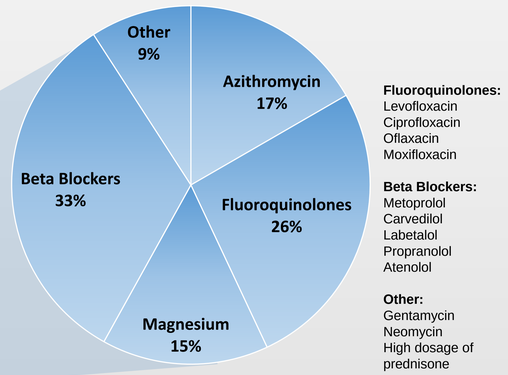


Figure 1: Exacerbations occurrence by category

MEDICATIONS PRESCRIBED



Fluoroquinolones:
Levofloxacin
Ciprofloxacin
Oflaxacin
Moxifloxacin

Beta Blockers:
Metoprolol
Carvedilol
Labetalol
Propranolol
Atenolol

Other:
Gentamycin
Neomycin
High dosage of prednisone

Figure 2: Proportions of noted medications prescribed among all patients

Population Demographics

Total Patients	127
Total Exacerbations	212
Average Age	61.91 years
Average Disease Duration	8.83 Years
Male Proportion	45.67%
Female Proportion	54.33%
Patient Race	93.7% Caucasian non-Hispanic 6.3% African American
ER Visits	106
Hospitalizations	141
Average Hospitalization	6.2 days/exacerbation
MGFA Class I at diagnosis	52%
MGFA Class II at diagnosis	17.3%
MGFA Class IIb at diagnosis	11%

Exacerbation Management

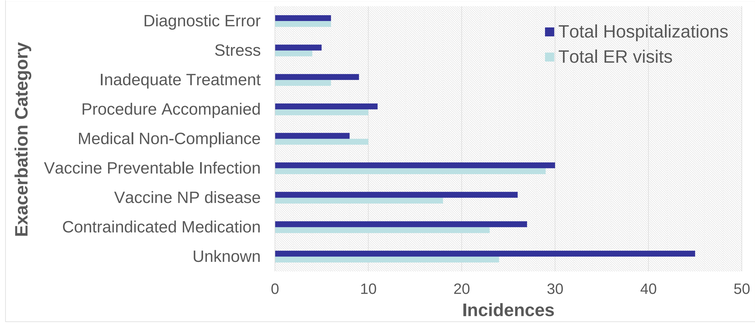


Figure 3: Number of hospitalizations and ED admissions by category.

Impact of CI Medications

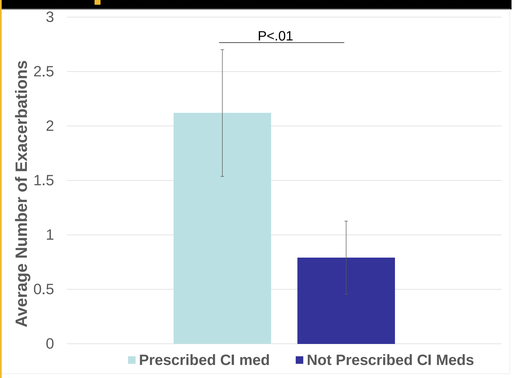


Figure 4: Average exacerbations among patients prescribed and not prescribed the medications. Error bars show 95% confidence intervals

Exacerbations by Medication

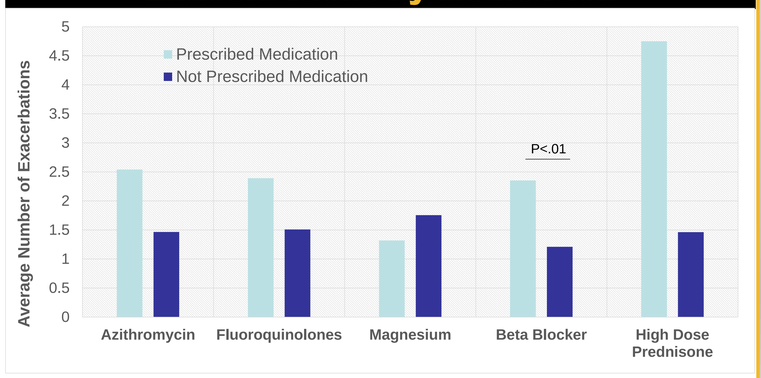


Figure 5: Average number of exacerbations among patients prescribed and not prescribed indicated medication

Methods

- 210 patients who were seen at university hospital for possible Myasthenia Gravis between 2013 and 2016 were examined. 127 of those patients had confirmed diagnoses of Myasthenia Gravis and followed up on their MG with MU neurology for at least one year.
- Using clinic notes from neurology, family medicine, and emergency room visits, data on the demographics(age, race, sex, date of diagnosis, MGFA classifications), exacerbations and medications was collected.
- 2-tailed T-test was used to analyze any differences in average number of exacerbations between those on and not on the medications.

CONCLUSION

- **Medications played a part in the plurality of exacerbations**
- **Patients on the listed medications had a significantly higher number of exacerbations than patients not prescribed those medications**
- **Beta-blockers specifically had a significant association with higher number of exacerbations.**

DISCUSSION

- Myasthenia Gravis Foundation of America advises caution with the use of the medications analyzed in this study. However, the results suggest they are prescribed too often.
- A significant association between patients on these medications and exacerbations exists.
- Physicians need to use more caution when prescribing these medications to patients with Myasthenia Gravis.
- Myasthenia Gravis patients need to be better informed on the list of medications that should be avoided and their possible effects.
- This was a retrospective study with patients from University Hospital at the University of Missouri. The findings confirm some of MGFA's recommendations and show clinical significance that warrant further prospective study. A study with a larger population that examines causation among these medications is warranted.
- A larger study would also allow for better control of confounding factors. This is important in differentiating whether the significant contributor to the exacerbation is the medication or the underlying condition that requires those medications.

ACKNOWLEDGEMENTS & REFERENCES

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