CAUTIONARY DRUGS

Certain medications and over the counter preparations may cause worsening of MG symptoms. Remember to tell any doctor or dentist about your MG diagnosis. It is important to check with your doctor before starting any new medication including over the counter medications or preparations.

Drugs to avoid or use with caution in MG*

Many different drugs have been associated with worsening myasthenia gravis (MG). However, these drug associations do not necessarily mean that a patient with MG should not be prescribed these medications. In many instances, reports of worsening MG are very rare. In some instances, there may only be a "chance" association (i.e. not causal).

In addition, some of these drugs may be necessary for a patient's treatment and should not be deemed "off limits". It is advisable that patients and physicians recognize and discuss the possibility that a particular drug might worsen the patient's MG. They should also consider, when appropriate, the pros and cons of an alternate treatment, if available.

It is important that the patient notify his or her physicians if the symptoms of MG worsen after starting any new medication. Only the more common prescription drugs with the strongest evidence suggesting an association with worsening MG are provided in this list.

- **Telithromycin**: antibiotic for community acquired pneumonia. The US FDA has designated a "black box" warning for this drug in MG. ***Should not be used in MG.***
- **Fluoroquinolones** (e.g., ciprofloxacin, moxifloxacin and levofloxacin): commonly prescribed broadspectrum antibiotics that are associated with worsening MG. The US FDA has designated a "black box" warning for these agents in MG. ***Use cautiously, if at all.***
- **Botulinum toxin**: ***Avoid.***
- **D-penicillamine**: used for Wilson disease and rarely for rheumatoid arthritis. Strongly associated with causing MG. ***Avoid.***
- **Chloroquine** (Aralen): Used for malaria and amoeba infections. May worsen or precipitate MG. ***Use with caution.***
- **Hydroxychloroquine** (Plaquenil): Used for malaria, rheumatoid arthritis, and lupus. May worsen or precipitate MG. ***Use with caution.***
- **Quinine**: occasionally used for leg cramps. ***Use prohibited except in malaria in US.***

- **Magnesium**: potentially dangerous if given intravenously, i.e. for eclampsia during late pregnancy or for hypomagnesemia. ***Use only if absolutely necessary and observe for worsening.***
- **Macrolide antibiotics** (e.g., erythromycin, azithromycin, clarithromycin): commonly prescribed antibiotics for gram-positive bacterial infections. May worsen MG. ***Use cautiously, if at all.***
- **Aminoglycoside antibiotics** (e.g., gentamycin, neomycin, tobramycin): used for gram-negative bacterial infections. May worsen MG. ***Use cautiously if no alternative treatment available.***
- **Corticosteroids**: A standard treatment for MG, but may cause transient worsening within the first two weeks. Monitor carefully for this possibility.
- **Procainamide**: used for irregular heart rhythm. May worsen MG. ***Use with caution.***
- **Desferrioxamine**: Chelating agent used for hemochromatosis. ***May worsen MG.***
- **Beta-blockers**: commonly prescribed for hypertension, heart disease and migraine but potentially dangerous in MG. May worsen MG. ***Use cautiously.***
- **Statins** (e.g., atorvastatin, pravastatin, rosuvastatin, simvastatin): used to reduce serum cholesterol. May worsen or precipitate MG. ***Use cautiously if indicated and at lowest dose needed.***
- **Iodinated radiologic contrast agents**: older reports document increased MG weakness, but modern contrast agents appear safer. ***Use cautiously and observe for worsening.***

** From the International Consensus Guidance for the Management of Myasthenia Gravis, http://n.neurology.org/content/87/4/419.long*

Addendum from MGFA's Medical and Scientific Advisory Board:

Checkpoint inhibitors: Immunotherapy for cancer is an exciting treatment advance for many types of cancers. However, one newly recognized rare side effect of some of these treatments is myasthenia gravis (MG). MG is recognized as a rare complication of immune checkpoint inhibitors (ICIs) for cancer (immunotherapy). People who did not have MG before beginning immunotherapy have a higher likelihood of developing the disease, although worsening of myasthenic weakness has been reported in people with existing, previously-diagnosed MG. The average onset of MG symptoms is within 6 weeks (range 2–12 weeks) of starting immunotherapy. To date, development or exacerbation of MG has been reported for pembrolizumab, although it has also been seen with nivolumab, ipilimumab and other ICIs. Risk may increase with administration of combinations of ICIs. Patients with MG and cancer considering cancer immunotherapy should talk to their oncologist and neurologist about this possible side effect. Likewise, doctors evaluating new-onset weakness in cancer patients on immunotherapy should consider MG. Additionally, MG with ICIs can be accompanied by inflammation of skeletal and/or heart muscle. MG patients who experience worsening weakness following ICI treatment should contact their neurologist and oncologist immediately.

Examples of immune checkpoint inhibitors (ICIs):

- Pembrolizumab (Keytruda)
- Nivolumab (Opdivo)
- Atezolizumab (Tecentriq)
- Avelumab (Bavencio)
- Durvalumab (Imfinzi)
- Ipilimumab (Yervoy)

The MGFA mission is to facilitate the timely diagnosis and optimal care of individuals affected by myasthenia gravis and closely related disorders and to improve their lives through programs of patient services, public information, medical research, professional education, advocacy and patient care.

Approved by the MGFA Medical/Scientific and Nurses Advisory Boards

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