It is strongly recommended that health professionals refer to the more detailed version of this guide at www.myastheniawa.info

**General Anaesthetic Agents**

For use only by anaesthetists

It is essential to let the anaesthetist know that MG is present, and that the anaesthetic takes place in a hospital that has an ICU with the ability to provide mechanical ventilation, should the need arise.

**Neuromuscular Blocking Drugs**

These are used to cause paralysis of muscles during an anaesthetic. On occasions this paralysis can be profound and last for days or weeks in a myasthenic. Must only be used when mechanical ventilation is possible.

**Inhalation Anaesthetics**

Can increase the effect of the neuromuscular blocking drugs used during the same operation.

**Botulinum Toxin** – Avoid use

It can have distant as well as local effects.

**Interferon Alpha** – Avoid use if possible

Use needs to be carefully considered on an individual basis.

**Narcotics (eg: Morphine)** – Use with caution

General effects of narcotics may worsen MG. Cholinesterase inhibitors such as Pyridostigmine (Mestinon™) can increase the effect of the narcotics.

**Local Anaesthetics – Can be used safely**

eg Lignocaine (Xylocaine™), Bupivacaine (Marcaine™) etc

**Magnesium**

eg in laxatives, antacids, magnesium supplements. In renal failure, the magnesium levels can rise and cause muscle weakness, and myasthenics are particularly prone.

**X-ray Examinations with Contrast**

The newer, non-ionic contrast agents are safe to use.

**A Note on Vaccinations**

Live vaccines should be used with great caution if a patient’s immunity is low due to immunosuppressive treatment. They do not have a direct effect on the MG itself. Inactivated vaccines are safe to use in MG.

The MG Support Group recommends that myasthenics discuss this pamphlet with their practitioner as MG is a disease in which it is particularly important to individualise treatment.
Drugs used in the treatment of Myasthenia Gravis:

Pyridostigmine (Mestinon™) and Neostigmine can aggravate the weakness if the dose is too high. More is not necessarily better. Corticosteroids (eg. Prednisone, Prednisolone) transient worsening of MG with high dose steroids (10mg or more per day) is common, but benefits outweigh disadvantages. Start with a low dose and build up if possible.

Drugs that may aggravate Myasthenia Gravis

Antimicrobials

1. Antibiotics.

- Telithromycin (known as ‘Ketek’ in the USA, UK and Europe) is not yet available in Australia. It stands alone in being the one medication that has been contra-indicated in MG and should not be used in any MG patient, even if their disease is well controlled. Another antibiotic should be used instead. Beware when travelling overseas, as this is an oral drug, and can therefore be given by a GP or as outpatient treatment.

2. The other antibiotics most likely to cause problems are only available as intramuscular and intravenous preparations (with the exception of clindamycin). They may need to be avoided if possible.

3. Use the following antibiotics with caution:

- Quinolone antibiotics: Ciprofloxacin, Norfloxacin, Norfloxacin, (topical preparations eg ear drops, unlikely to present a problem).

- Macrolide antibiotics: Erythromycin/Azithromycin.

- Tetracyclines - Doxycycline, Minocycline etc.

- Sulfonamides (eg Sulfasalazine). They may need to be avoided if possible.

- Ampicillin (little evidence of problems with other penicillins).

- Primazen™ (Propiomazine) only available for intravenous treatment of serious infections in hospitalised patients.


- Quinine family – Chloroquine, Hydroxychloroquine, Quinidine.


- Pyrantel (Combantrin™, Anterel™, Early Bird™)

Carbohydrate Drugs

1. Class 1 Anti-arrhythmics:

- eg Procainamide, Lignocaine (IV).

- They should only be used in a hospital setting for life threatening arrhythmias when there are no alternatives.

- Quinidine – has largely been superceded.

2. Beta Blockers:

- There are many in this class, often identifiable by the ‘ol’ ending eg Atenolol (Noten™, Tenormin™), Metoprolol (Slol™, Blokap™) etc.

3. Calcium Channel Blockers:

- Verapamil (Verapat™, Isoptin™). Documented case of worsening MG with this drug. Use others in class with caution.

4. Cholesterol lowering drugs:

- Statins eg Simvastatin (Lipex™), Atorvastatin (Lipitor™).

- Pravastatin (Pravachol™). Benefits in established IHD usually outweigh the risks.

5. Alpha Blockers:

- Alpha Methyldopa (Aldomet™, Hydopa™)

6. Diuretics:

- Monitor potassium as low levels can increase muscle weakness.

Rheumatic Disease

- Penicillamine – Use with caution.

- Chloroquine (Chlorquin™), Hydroxychloroquine (Plaquenil™) – Avoid use if possible.

Thyroid Disease

- Hyperthyroidism or excess thyroid hormone replacement can worsen MG.

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Introduction

This pamphlet is a practical guide to drugs that may affect Myasthenia Gravis (MG). Information is arranged under the heading of diseases or conditions to make it easier for the doctor or dentist to quickly see which drugs can be used.

The MG Support Group recommends that myasthenics discuss this pamphlet with their practitioners as MG is a disease in which it is particularly important to individualise treatment.

Drugs may worsen MG by

- interfering with neuromuscular transmission. As MG also affects neuromuscular transmission, it may lead to worsening symptoms. The better controlled the MG, the less the risk of these drugs being a problem.

- increasing muscle weakness in a more general manner, thus making the MG weakness more noticeable.

There are a few clear cut examples of drugs that can actually cause a temporary form of autoimmune MG which usually settles once the drug is ceased. It is less clear whether these drugs will worsen pre-existing MG.

Many reports of drugs affecting MG have caused problems in only a few people. The majority of MG patients can take the drugs without problems.

LEGEND:

Likely to worsen MG

May worsen MG but are usually tolerated.

Have been shown to cause a temporary form of MG (autoimmune).

Be Alert! It’s important that patients and doctors be alert to the early signs of an exacerbation of MG when a new drug is commenced, even if it is not on this list.

Drugs Used in Psychiatry

1. Lithium – Use with caution. It is common for Lithium to cause weakness, even in people without MG. It usually improves within 2 – 4 weeks.


Anti Angina

- Beta Blockers:

- eg Betaxolol (Betoptic™, Betoquin™), Timolol (Tenopt™, Timoptol™).

- Use others in class with caution.

Anti Spasmotics

- Anti Spasmodics

- eg Propantheline, Oxybutinin, Atropine, Buscopan

- These are anti-cholinergics, and have the opposite effect to Pyridostigmine (Mestinon™). For this reason they may be contra-indicated in the drug company literature. However, they work on different receptors and for many myasthenics they do not seem to cause problems at normal dosages. Nevertheless, a few do experience significant worsening of symptoms. Propantheline and Atropine are used for side effects of Mestinon (bowel cramps).

Ocular Drugs (Eye Drops)

- Acetazolamide.

- Proparacaine/tropicamide.

- Beta Blocker eye drops eg Betaxolol (Betoptic™, Betoquin™), Timolol (Tenopt™, Timoptol™).

- Ecotropine (Ecothiophate)