

PHARMACY

Drug Information

Medications to Treat Myasthenia Gravis



What is Myasthenia Gravis (MG)?

- Myasthenia Gravis (MG) is an autoimmune disorder that causes fatigue and muscle weakness that worsens with activity and improves with rest.
- MG occurs when the body produces antibodies that block or destroy receptors between the nerves and muscles. This disrupts the transmission of acetylcholine (a neurotransmitter) that sustains muscle contractions, resulting in muscle weakness.
- MG symptoms may be localised or generalised.
 - Localised MG affects a limited group of muscles. For example, ocular MG affects eyelid and eye movement muscles.
 - Generalised MG affects several muscles that control eyelid and eye movements, facial expression, chewing, swallowing, speech, breathing and limb strength.
- Signs and symptoms include:
 - Intermittent drooping of eyelids (ptosis)
 - Double vision (diplopia), loss of facial expression
 - Weakness in hands/legs and neck
 - Difficulties with speech (dysarthria), chewing and/or swallowing (dysphagia)
 - More effortful breathing with exertion or when lying flat
- Not all symptoms will occur at the same time or are always present. These signs usually occur slowly but may develop suddenly with generalised weakness and rapid weakening of swallowing and breathing muscles. This is termed as myasthenic crisis and needs immediate medical attention.

What are the Treatments and Medications Used in Myasthenia Gravis?

Treatment/ Medication Class	Treatment/ Medication Name	Treatment/ Medication Effect
Acetylcholinesterase inhibitors	<ul style="list-style-type: none"> • Pyridostigmine 	<ul style="list-style-type: none"> • Increase muscle strength by preventing breakdown of

		acetylcholine (a neurotransmitter) that sustains muscle contraction.
Immune suppressants or modulators (long term effect)	<ul style="list-style-type: none"> • Steroids e.g. Prednisolone • Azathioprine • Mycophenolate • Cyclosporine • Biologics e.g. Rituximab <p>(List is not exhaustive)</p>	<ul style="list-style-type: none"> • Suppress an overactive immune system and prevent abnormal antibodies from being made. • Steroids have faster onset of effect, while others suppress immune cells over time.
Anti-diarrhoeals/ Anti-spasmodics	<ul style="list-style-type: none"> • Propantheline • Loperamide • Lomotil ® (Diphenoxylate with atropine) 	<ul style="list-style-type: none"> • Relieve side effects of pyridostigmine, including diarrhoea, stomach cramps, and excessive salivation.
Fast-acting immunomodulators	<ul style="list-style-type: none"> • Intravenous immune globulin (IVIG) – contains normal antibodies derived from donated blood that temporarily counteract abnormal antibodies in the body. • Plasma exchange (Plasmapheresis) – Abnormal antibodies are filtered out of the body by a machine, 	<ul style="list-style-type: none"> • Stabilises a MG flare by rapidly modifying immune effects, such as removing abnormal antibodies that attack nerves and muscles from blood plasma.

	similar to the concept of dialysis.	
Surgery	<ul style="list-style-type: none"> • Thymectomy (removal of thymus gland) 	<ul style="list-style-type: none"> • An enlarged thymus may be associated with abnormal antibody production.

How are the Medications Administered / Taken?

- **Pyridostigmine:**
 - Take after food to reduce side effects of abdominal cramps and diarrhoea.
 - However, if you have difficulties with chewing or swallowing, you may take it half an hour before the meal to help with ingestion of food.
 - As it takes about half an hour to have effect, you may allocate sufficient time to take the dose before activity.
 - It is important to adhere to the prescribed regime and not skip doses as each dose is only effective for a fixed duration.
- **Steroids** (e.g. Prednisolone): Take after food to reduce gastric side effects. You may be placed on a regime with gradual increases or decreases in dose over several weeks - it is important to follow the gradual changes in dose, to prevent worsening of condition or a flare.
- **Immune suppressants** (e.g. Azathioprine, Mycophenolate, Cyclosporine): Take as instructed by your doctor or pharmacist. It may take a few weeks to months for the medicine to exert its effect on your immune system. Hence, it is important to take the medicine regularly even if you do not feel any difference.
- If you miss a dose, take the missed dose as soon as you remember. If it is almost time for your next dose, take only the usual dose. Do not double the dosage.
- IVIG and rituximab will be administered by medically-trained professionals in a healthcare setting.

Can the Medications be Administered / Taken With Other Medications?

- Some medications such as diuretics and certain classes of antibiotics may worsen symptoms of myasthenia gravis.

Please inform your doctor or pharmacist if you are taking or intending to take other medications, including supplements, traditional or herbal remedies.

What are the Important Side Effects?

- Medications prescribed by your doctor are beneficial for your condition even though they may result in some inevitable side effects.

Medications implicated	Side Effect	Management
Acetylcholinesterase inhibitors (Pyridostigmine)	Diarrhoea	<ul style="list-style-type: none"> Anti-diarrhoeals, e.g. loperamide, Lomotil® (diphenoxylate withatrophine) Ensure adequate water intake, or water with Oral Rehydration Salts. If symptoms are severe or persistent, consult a doctor immediately.
Acetylcholinesterase inhibitors (Pyridostigmine)	Stomach cramps, increased salivation and sweating	<ul style="list-style-type: none"> Anti-spasmodics, e.g. propantheline If symptoms are severe or persistent, consult a doctor immediately.

Steroids	Gastric upset; increased appetite, water retention, puffy face, abdominal weight gain; increased blood pressure and blood sugar level; mood changes; slower wound healing; loss of bone density	<ul style="list-style-type: none"> Consult a doctor if the symptoms bother you or are severe. Your doctor may prescribe calcium and vitamin D supplements and/or medications to slow down bone weakening. Monitor your blood pressure and sugar levels regularly and inform your doctor for advice if persistently high.
Steroids	Rare: Eye pain, blurred vision (signs of glaucoma)	Stop the medication and consult a doctor immediately.
Immune suppressants (Azathioprine, Mycophenolate, Cyclosporine)	Nausea, vomiting, gastric upset, constipation, headache, insomnia, tiredness, numbness/ nerve tingling, leg swelling, increased blood pressure, increased hair growth (cyclosporine), leg cramps	<ul style="list-style-type: none"> Take medication after food to reduce nausea and gastric upset. For persistent intolerable symptoms, stop medication and consult a doctor.
Immune suppressants	Rare: Jaundice, abdominal pain with vomiting, tea-coloured urine	Stop the medication and consult a doctor immediately.

Immune suppressants; steroids	Rare: Persistent fever, chills, mouth ulcers, sore throat, painful urination; unusual bruising/ extreme fatigue and pallor	Stop the medication and consult a doctor immediately.
Blood products e.g. IVIG, and biologics e.g. Rituximab; Plasmapheresis	Allergic reactions (rare), flushing, infusion site irritation, blood pressure changes, blood clotting (rare)	Appropriate monitoring and treatment will be given in hospital as these medications are only given while inpatient.

If you develop rashes, facial swelling or shortness of breath after taking the medication, you could be allergic to the medication. Please seek medical attention immediately.

Do I Need Regular Monitoring When Taking these Medicines?

- Your doctor will arrange for more regular blood tests to ensure normal liver and kidney functions and blood counts at initiation of medications.
- For cyclosporine, your doctor may check drug levels in the blood and lipid levels periodically.
- If severe side effects develop, consult a doctor immediately.

Are There any Special Precautions That I Need to Take?

- It is important to inform your doctor if you intend to conceive or breastfeed while taking this medication. As some immune suppressants may affect development of the foetus, your doctor may modify your treatment accordingly.
- If you experience worsening muscle weakness despite taking medications as prescribed, consult a doctor immediately.

What Else can I do to Help My Condition?

- Adequate rest can help muscles recover their strength.

How do I Store these Medications?

- Store your medications in a cool, dry place away from heat, moisture and direct sunlight.
- Store medications labeled "Refrigerate" in a refrigerator between 2 – 8°C. Do not freeze.

If you have any problem with your treatment, please contact your doctor, pharmacist or nurse clinician.

Please keep all medications out of reach of children.

