



**Veterinary Emergency
+ Referral Center**
of Hawaii

**Ettinger: Textbook of
Veterinary Internal Medicine, 7th Edition
Myasthenia Gravis
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What is myasthenia gravis?

Myasthenia gravis (MG) is a relatively uncommon disease in dogs and is rare in cats. It is a condition in which transmission of information between nerves and muscles is abnormal, causing weakness. Normally, nerves send commands to our muscles via a "messenger" called acetylcholine (Ach). The Ach attached to an acetylcholine-receptor (Ach-R), which causes the muscle to receive the information that it needs to work. In MG, there are not enough receptors available so muscle cells simply don't work. It causes weakness that tends to get worse during activity, when all the receptors are already busy. MG can be congenital (rarely), meaning that the dog is born with only a small number of Ach-R, or it can be acquired later in life. The acquired form is caused by a deregulation of the immune system (immune-mediated disease), causing the body to produce antibodies that attack and destroy the Ach-R.

What are the symptoms of MG?

MG can be generalized or focal. In the generalized form, weakness is present in most parts of the body. Pets with generalized MG tend to tire rapidly. Usually, they can walk almost normally for a little while, then they develop a stiff gait, and eventually they must sit or lie down for a few minutes to recover. After a rest, they are good for another few steps. The weakness is usually worse in the back legs and is sometimes unnoticed in the front legs. In cats, the weakness seems to be worse in the neck; a cat with MG will typically walk with its head flexed, being unable to lift his head. Most dogs will also have episodes of "vomiting." This is due to regurgitation of food and water caused by weakness and distention of the muscular tube (esophagus) connecting the throat with the stomach. This condition is called *megaesophagus*. In regurgitation, owners usually don't see the abdominal contractions typically noted with true vomiting. The food, bile, and/or thick mucus that accumulate in the megaesophagus is expelled from the mouth with almost no effort although a loud sound from the throat can be noticed. In focal MG, and sometimes in the generalized form, this can be the only clinical sign that you will see. Regurgitation can lead to severe lung infection if the food is inadvertently aspirated (aspiration pneumonia). This is one of the most serious complications of MG.

How can MG be diagnosed?

A regular x-ray of the lungs (thoracic radiographs) can reveal a megaesophagus. Aspiration pneumonia can also be identified at the same time. The most convenient, specific test for acquired MG is a special blood test that evaluates the production of antibodies against the Ach-R. An edrophonium or Tensilon test can also be done. In this test, an injection is given into a vein when the animal is weak. If the test is positive, the weakness completely disappears for a few minutes. The blood test for MG may still be recommended by your veterinarian to confirm the disease.

Because the acquired form of MG can happen in reaction to another disease or to a tumor somewhere in the body, other tests can be recommended, including a blood analysis, radiographs (x-rays), and ultrasound. The most common disease known to be a cause of MG is a tumor called *thymoma*. This tumor is usually found in front of the heart.

How can MG be treated?

Treatment consists of three parts: (1) controlling the weakness, (2) preventing and treating the aspiration pneumonia, and (3) trying to stop the immune system from attacking the Ach receptors. To control the weakness, we use a medication (pyridostigmine or Mestinon) that will delay the destruction of the Ach, giving more time for the messenger to reach a receptor. The dosage should be adjusted for each pet carefully. Side effects of the medication (vomiting, drooling, weakness, low heart rate) are sometimes difficult to differentiate from the clinical signs of MG (regurgitation, difficulty swallowing causing drooling, and weakness, but normal heart rate). The timing of side effects relative to the time that medication is given is important when determining if your pet is being given too much or too little medication. If the vomiting and/or weakness occur 2 to 5 hours after the administration of the medication, the dosage is most likely too high.

When a megaesophagus is present, upright feeding is recommended. The goal of upright feeding is to help the food getting down to the stomach by using gravity. This involves holding your pet in the upright position during and after the meals, for example, by elevating the food on a stair or another elevated surface. When this is not enough to prevent regurgitation, a feeding tube can be placed directly in the stomach (called a *P.E.G. tube*) to "bypass" the weak and dilated esophagus. If pneumonia is present, it should also be treated aggressively with antibiotics, intravenous fluid administration, and sometimes oxygen supplementation. To "slow" the immune system, cortisone (or another type of medication) can be used. This should be done with caution, however, and only after the resolution of any infection because we need the body to fight the infection. Some undesirable side effects of cortisone can worsen the disease (increase in thirst and appetite, muscle weakness) and for this reason, the treatment should be started at a small dose and adjusted for each patient.