

# LARYNGEAL PARALYSIS & POLYNEUROPATHY



Laryngeal paralysis can occur by itself or as part of a syndrome called geriatric onset laryngeal paralysis and polyneuropathy (GOLPP).

GOLPP is a common problem of older large and giant breed dogs. It is a disease of the nervous system, characterized by the slow but progressive degeneration of some of the longer nerves in the body. It results in partial paralysis of the larynx (i.e. voice box), esophagus and hind limbs. We do not know the cause of GOLPP and there is no cure for it. However, there are many things you can do to reduce the problems associated with this disease.

## What Are The Symptoms?

Laryngeal paralysis (Lar-Par) causes increased respiratory effort and "voice change". These are due to partial paralysis of the muscles that control the vocal cords of the larynx. As a result, the vocal cords hang into the airway instead of retracting out of the way during inhalation. This means they obstruct the airway and make it difficult for the pet to inhale. Reduced vocal cord movement can also change the sound of a dog's bark or a cat's meow. You can visit youtube to see videos of dogs with Lar-par. One we like is at <http://www.youtube.com/watch?v=UgRRzITqPEc>.

Decreased airway size leads to increased airflow resistance and turbulence of the air flowing through the larynx. In other words, it takes a lot of effort to get enough air through and it makes a lot of noise. It's like trying to breathe through a straw instead of a hose. This is what causes the loud noise every time the pet takes a breath. The increased force of the air moving through causes edema (swelling) of the larynx. This leads to further obstruction and can eventually cause edema in the lungs as well as the throat.



The picture on the left shows the larynx of a cat with laryngeal paralysis, viewed through a fiber optic scope. The vocal cords are closed, leaving just a slit for air to pass through.

The picture to the right shows a normal larynx, or one after surgery. The airway is wide open as the pet breathes, allowing normal air passage.



Symptoms of GOLPP can also include:

- Hind limb weakness and instability. Affected dogs will slowly lose thigh and back muscle mass, scuff the tops of their paws as they walk, have trouble pushing off from their hind end as they climb stairs or try to get into the car or up on furniture, and be easily unbalanced in their back end.

- Pronounced/repeated swallowing or coughing/hacking after eating, as well as increased drooling and lip licking. These signs relate to partial paralysis of the muscles responsible for moving food from the throat to the stomach, causing esophageal dysfunction. As a result, food, liquids and saliva are regurgitated back into the throat where they may be coughed out or inhaled into the lungs.

Dogs may initially only show signs related to breathing, but within 12 months dogs afflicted by GOLPP will have hind limb weakness. 70% of large dogs diagnosed with laryngeal paralysis eventually show esophageal dysfunction.

Medium and smaller dogs are less predictable. Chances are good that the genetic cause is different than for large dogs, as we have had quite a few patients over the years that did not progress like the Labrador, Chesapeake and golden retrievers tend to do. Several of them were Brittany spaniels. Dogs with LP are usually middle-age to elderly. Male dogs are slightly more commonly affected than females.

In cats there is no typical age, breed or sex, but it is more common to find an underlying disease or reason for the problem. Tumors, recent surgery in the throat area or a previous wound or abscess are all possible causes.

Laryngeal collapse, a separate but related condition, is most often seen in brachycephalic breeds (short nosed breeds such as pugs and bulldogs) with long-standing upper airway abnormalities. Fortunately, Lar-Par is exceedingly rare in these breeds. Permanent tracheostomy is recommended for these cases.

### **What Will Happen to My Dog If She/He Has GOLPP?**

Unfortunately, for large breed dogs GOLPP is usually a progressive disease and symptoms will worsen with time. The paralysis of the larynx generally starts on one side and then progresses to the other. Breathing will be somewhat noisy when the airway is only partially obstructed and then get worse when the other side becomes affected. The hind leg weakness and incoordination usually start after laryngeal paralysis is complete but sometimes begins earlier.

Without surgery, respiratory collapse and sudden death from suffocation can occur, especially in hot, humid weather or with stress or heavy exercise. Urgent treatment for severe respiratory distress includes a cool, non-stressful environment and sedation. Morphine alleviates the anxiety and air-hunger of acute upper airway obstruction. Morphine can be combined with a sedative if needed.

Emergency general anesthesia and placement of a tube to open the airway, or a temporary tracheostomy, are sometimes required. We had one case here at Best Friends in which we had to anesthetize the pet to pass a tube to enable breathing and then one of our technicians rode with the owner in the car to Animal Emergency Center (now Lakeshore Veterinary Specialists and Emergency Hospital). She administered the anesthetic during the drive and the dog went straight to surgery when they arrived at AEC.

Later GOLPP symptoms include inability to rise or walk without falling and inhalation of food/liquids and secondary pneumonia (i.e. aspiration pneumonia).

## How Is GOLPP Diagnosed?

We can usually diagnose GOLPP based on the characteristic noisy breathing when the dog is stressed. Hind leg muscle wasting, lack of normal paw reflexes, difficulty swallowing or regurgitation of food may also be noted. There are several other diseases that can cause hind leg weakness so we may need to rule those out with x-rays or DNA testing before deciding on treatment. There are also other causes of esophageal malfunction such as congenital megaesophagus or myasthenia gravis, which may be ruled out through a combination of x-rays and blood testing

Occasionally, laryngeal paralysis is caused by laryngeal tumors or inflammation (ruled out by examination of the larynx while the pet is sedated). Low thyroid hormone level can make things worse so we will want to check for that and treat it if necessary.

We will usually do some basic blood testing, including a thyroid hormone level, and take x-rays of the neck and chest. These tests, together with careful physical examination, will allow us to discover any underlying problem that is causing the larynx to not function properly. Low thyroid levels can worsen Lar-Par in dogs and tumors can be the reason in both dogs and cats. In one study, 70% of dogs with confirmed LP had abnormal chest x-rays, including 20% with megaesophagus (an abnormal dilated esophagus) and 15% with aspiration pneumonia. Other things to check for on chest films include heart disease, pulmonary edema (swelling or fluid in the lungs), tumors in the airway or lung cancer.

If surgical correction of laryngeal paralysis is being considered, we will recommend a sedated laryngeal exam, either here ahead of time or by the surgeon, to confirm the condition. Your dog will be lightly sedated while a veterinarian observes the movement of his or her vocal cords through the breathing cycle. Sometimes the specialty practice is able to do fluoroscopy (it's like an x-ray "movie") to evaluate how well the esophagus works.

## Treatment options

There is as yet no therapy that stops or reverses the nerve degeneration of GOLPP. Treatment focuses on limiting or adapting to the consequences. There are a variety of treatment options for each system affected by GOLPP

- Laryngeal paralysis: many dogs do well with environmental modification alone. This involves avoiding situations that will make your dog breathe hard. Avoid intense exercise and exciting situations. Longer but slower walks and avoiding exercise altogether in hot or humid weather will help. If your dog is easily excited, we will recommend having a sedative on hand to give prior to exciting events.
- If low thyroid levels are found a thyroid supplement may diminish symptoms enough to make surgery unnecessary. Weight loss is also important, as an obese pet will have much more difficulty breathing.
- More severely affected dogs might benefit from a surgical procedure called arytenoid cartilage lateralization (commonly known as tie back surgery). This involves permanently fixing one or both of the vocal cords in an open position so that they cannot interfere with air flow. This procedure can provide severely affected animals with considerable relief and be life-saving.

- Hind leg weakness and instability: physical therapy, especially underwater treadmill, helps dogs to regain their thigh and back strength and improves balance. Supplements such as Cholodin can be helpful for some dogs.
- Esophageal dysfunction: if you notice any increase in licking, drooling or swallowing, we need to focus on helping your dog's food and water travel quickly down the esophagus to the stomach. We will recommend hand feeding your dog meatballs of canned food. Training your dog to eat standing on the hind legs with the front feet and head elevated helps, too. We will also use medications that increase movement in the esophagus.

### **Tell Me More About Surgery**

Because this is a tricky surgery, with a fairly high complication rate compared to routine procedures such as spays or neuters, we will refer you and your pet to a board certified veterinary surgeon, such as at Lakeshore Veterinary Specialists. Round-the-clock monitoring is needed the first night after surgery. In milder cases we will keep in contact with you to decide if surgery is needed as time goes by.

Postoperative complications are reported in about 1/2 of dogs treated surgically. Minor wound complications are common. The most common serious complication is aspiration pneumonia, which can be fatal. Dogs with esophageal motility disturbances along will be at increased risk for developing aspiration pneumonia.

Recurrence of symptoms can occur with failure of either the sutures or the cartilage used in the tie-back procedure. If the suture breaks or the tissue the suture is tied to tears the symptoms start all over again. The surgery then needs to be repeated.

For most animals treated with one-sided surgery for paralysis, the outcome is favorable. Many owners report their elderly pet "has a new lease on life" and is "more than 100% improved". Median survival in one large retrospective study was >1,000 days, with most animals dying of unrelated causes.

Sadly, this doesn't hold true for dogs that are quickly progressing with GOLPP symptoms though. When an elderly, large dog can't get up anymore we usually have to euthanize, even if the breathing difficulty is still manageable. Whether to have surgery done on these patients is a difficult decision and will depend on our overall assessment of the patient.

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