

LARYNGEAL PARALYSIS

Modified from an article by Barbara Kirby, DVM, MS, DACVS, DECVS

Laryngeal paralysis is a common disease of older large and giant breed dogs, and a rare problem in cats and smaller dogs. It can occur when there is damage to the muscles or nerves in the throat, although in most cases we cannot identify an exact cause or event that triggered the problem. It can be an inherited problem in certain breeds, including Bouvier des Flandres, bull terriers, Siberian huskies and Dalmatians.

In all cases, the vocal cords of the larynx become paralyzed and fail to pull out of the way when air is breathed in. Instead of an open airway, it's like breathing through a straw. A lot of effort is needed to suck enough air through a narrow opening. This leads to noisy and labored breathing, which is worse in heat and under stress or exercise.



Figure 1a: This picture 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.



Figure 1b: This shows a normal larynx, or one after surgery. The airway is wide open as the pet breathes, allowing normal air passage.

Figure 1a

Figure 1b

In dogs, the diagnosis is relatively straight-forward. In cats, the condition is rare and the diagnosis is a lot more challenging. In both dogs and cats, a surgical procedure called a unilateral arytenoid lateralization ("tie-back") is the treatment of choice.

The larynx, or voice box, has 3 functions:

- 1. Respiration:** During inspiration, the arytenoids cartilage flaps actively pull apart, creating a wider opening to breathe through. During fast exercise, this wider opening is sustained during both inspiration and expiration to maximize airflow and minimize airway resistance.
- 2. Deglutition:** Reflex closure of the larynx during swallowing prevents aspiration of food and fluid into the airway.

- 3. Vocalization:** Voice production is related to movement of air over the vocal and vestibular folds, plus changes in length and thickness of the vocal folds produced by contraction of laryngeal muscles.

Laryngeal dysfunction or paralysis results in:

- 1. Respiratory dysfunction:**

- Decreased resting airway size leads to increased airflow resistance and turbulence of the air flowing through the larynx. This results in a characteristic loud noise when the pet takes a breath. In other words, it takes a lot of effort to get enough air through and it makes a lot of noise.
- This worsens with exercise, stress or heat.
- Obstruction of the airway, and the increased force of the air moving through it, causes edema (swelling) of the larynx.
- This leads to further obstruction and can eventually cause edema in the lungs as well as the throat.

- 2. Swallowing dysfunction:**

- Loss of laryngeal adduction reduces airway protection and can lead to aspiration pneumonia, a very serious and often fatal complication of both the disease and the surgery used to repair it.

- 3. Altered vocalization:**

- Change in voice or hoarse bark is common in dogs with LP
- Absence of purring is common in cats with LP

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 be able 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.

Symptoms in both dogs and cats can be quite variable. Signs are usually gradual in onset and slowly progressive, but animals with LP are often presented with acute, severe respiratory distress. Clinical signs are often exacerbated by hot weather, exercise or excitement, or the stress of examination. Common clinical signs include:

Canine LP: noisy breathing, especially on inspiration (when inhaling); cough, exercise intolerance; voice change or hoarse bark; choking or gagging; collapse; blue-tinged lips or tongue from lack of oxygen.

Feline LP: noisy breathing, absence of purring, change in meow

In order to diagnose the disease and decide on a treatment plan we will usually do some basic blood testing and 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 LP 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.

Urgent treatment for severe respiratory distress includes a cool, non-stressful environment and sedation. Morphine is the preferred sedative because it effectively alleviates the anxiety and air-hunger of acute upper airway obstruction. Morphine can be combined with a sedative to reduce anxiety. Rarely, the administration of morphine will worsen the respiratory crisis. 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 one of our technicians rode with the owner in the car to Animal Emergency Center. She administered the anesthetic during the drive and the dog went straight to surgery when they arrived at AEC.

In mild or early cases surgery may not be required. If low thyroid levels are found a thyroid supplement may diminish symptoms enough to make surgery unnecessary. Weight loss or weight control are also important, as an obese pet will have a much more difficult time breathing. If exercise brings on signs, longer but slower walks and avoiding exercise in hot or humid weather will help.

Surgical treatment of choice for LP is unilateral arytenoid lateralization. Arytenoid lateralization permanently opens the arytenoid cartilage and vocal fold on one side by suturing it out of the way. In a few cases it might be appropriate to remove part of the vocal cords with the laser but this is difficult to do and has a higher failure rate. Permanent tracheostomy bypasses the upper airway obstruction in LP, but is usually not considered the treatment of choice either. Permanent tracheostomy is recommended for cases of laryngeal collapse, which is a little bit different disease. Laryngeal collapse is most often seen in brachycephalic breeds (short nosed breeds such as pugs and bulldogs) with long-standing upper airway abnormalities. Fortunately, LP is exceedingly rare in these breeds.

Postoperative complications are reported in about 1/3 of dogs treated surgically for LP using various techniques. Minor wound complications are common. The most common serious complication is aspiration pneumonia, which can be fatal. 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.

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 AEC, to have it done. 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.

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