

# THE CUTTING EDGE

A RESOURCE FOR REFERRING VETERINARIANS

## Laryngeal Paralysis

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### INTRODUCTION

Laryngeal paralysis occurs when there is failure of the abductor muscle (cricoarytenoideus dorsalis) to adequately retract the arytenoid cartilages. The paralysis is most commonly seen bilaterally, however this could be due to the fact that unilateral paralysis may not be a clinical problem. Two forms exist. The acquired form is seen most commonly in middle age to older large breeds. Dalmatian, Bouvier, Husky, Bull terrier and Rottweiler breeds may have the congenital component and are presented at a younger age.

Many cases are idiopathic however, an underlying generalized neuromuscular disease is common. A complete neurologic exam should be performed in all cases. Hypothyroidism may be a contributing factor, therefore treatment may be of some long-term benefit. Occasionally, some cases may be affected secondary to trauma, mass lesions near the recurrent laryngeal nerve or within the anterior mediastinum.

### CLINICAL SIGNS AND DIFFERENTIAL DIAGNOSIS

Clinical signs in patients with either the congenital or acquired form exhibit exercise intolerance, progressive dyspnea, change in phonation and upper airway noise or inspiratory stridor. The clinical signs may be exacerbated by hot, humid weather. Frequent, chronic coughing, regurgitation and aspiration pneumonia may also ensue.

Differentials include foreign body; palatine, tonsillar, laryngeal or thyroid neoplasia; and myasthenia gravis.

### DIAGNOSIS

Diagnosis is assisted by airway radiographs to rule out other airway/pulmonary disease and megaesophagus. Electrodiagnostics and tidal breathing flow-volume loops, although not practical are ancillary procedures that may assist in establishing a diagnosis. Pre-anesthetic biochemistry, complete blood cell count and thyroid testing is also indicated. Definitive diagnosis is established by observation of laryngeal function under a light plane of barbiturate anesthesia. Anesthesia should be of sufficient depth that the patient retains a cough and gag reflex. In general, you will observe a failure of the arytenoid cartilages

to equally and adequately abduct during inspiration. In most cases the arytenoid cartilages remain near midline and quiver. In some cases the arytenoid cartilages may move further medially during inspiration and then abduct during expiration. Be careful not to get the false impression of normal function with this paradoxical movement.

### SURGERY

Surgery is the treatment of choice for laryngeal paralysis. The goal is to permanently widen the glottic opening so the animal can breathe more easily. Laryngoplasty may include partial arytenoidectomy, vocal fold excision, castellated laryngofissure, arytenoid lateralization or a combination of these procedures. There is still no consensus as to which is the most appropriate procedure however, most surgeons consider the lateralization (tie-back) a superior method for managing laryngeal paralysis. This technique is described below. Some reports describe good results with a simple vocal fold or arytenoid excision. All procedures are

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associated with their advantages and complications. Because of the potential for aspiration pneumonia with all procedures, remember that bigger is not always better.

The goal of arytenoid lateralization (tie back) is to enlarge the laryngeal ostia by unilaterally retracting (abducting) the arytenoid cartilage. Either side may be manipulated but usually not bilaterally. With the patient in lateral recumbency, an incision is made from the ramus of the mandible just ventral to the linguofacial vein to a level just caudal to the jugular bifurcation. The subcutaneous tissue is sharply and bluntly dissected to the level of the musculature (thyropharyngeus) covering the lateral wing of the thyroid cartilage. The dorsal edge of the wing is usually located cranial and dorsal to the cricoid cartilage. The thyropharyngeus muscle is incised at its attachment to the dorsolateral rim of the thyroid cartilage. The articulation between the thyroid cartilage and the cricoid cartilage is identified and sharply (blindly) separated. This allows for lateral and ventral retraction of the thyroid cartilage wing.

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Next, the muscular process of the arytenoid cartilage where the cricoarytenoideus dorsalis muscle attaches is palpated. The muscle which is usually atrophied is transected near this point. The articulation between the arytenoid cartilage and the cricoid cartilage is gently lifted and sharply separated. Care is taken not to penetrate the laryngeal mucosa. Finally, the dorsal sesamoid band is identified by placing a finger over the cranial edge of the corniculate process and following it dorsally. The band is located between the arytenoid cartilages and is also sharply separated. This is a "blind cut" and is aided by lifting the muscular process of the arytenoid cartilage. Incision of this interarytenoid ligament is always not necessary to achieve adequate lateralization. Two monofilament, nonabsorbable sutures (simple interrupted or horizontal mattress) are placed from the dorsal caudal aspect of the cricoid cartilage through the muscular process of the arytenoid cartilage. Occasionally the muscular process may be brittle and break when the sutures are tied. If this occurs, the procedure should be performed on the opposite side. Suture placement into the cricoid cartilage may be technically difficult due to visualization and the proximity of the esophagus. The larynx opening should be visualized during the tie back to make certain the opening is sufficient. Care should be taken not to over abduct the cartilage. In general, the presence of the endotracheal tube causes lateralization of the arytenoid cartilage therefore less tension is required when tying the suture. The epiglottis should adequately cover the opening.

## **POST-OPERATIVE MANAGEMENT AND COMPLICATIONS**

Usually recovery is uncomplicated however, the patient may experience some discomfort when swallowing and coughing after eating or drinking. The patient should have restricted activity for a total of six weeks. A soft ,canned diet with no excess gravy or crumbs is recommended to minimize the risk of aspiration pneumonia. This complication can occur at any time (days to years post-op) and is most often associated with vomiting rather than swallowing. Some gagging is expected mostly after drinking water. The patient's bark will be muted, similar to that of a debarked dog. Success rates range from 90- 100%.

Other complications include fracture of the muscular process, avulsion of the cricoarytenoid sutures, postoperative laryngeal/pharyngeal edema or hemorrhage, seroma formation, postoperative coughing and failure to achieve adequate laryngeal abduction.



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