

# Laryngeal Disease in Dogs and Cats

Catriona MacPhail, DVM, PhD

## KEYWORDS

- Upper airway obstruction • Laryngeal paralysis • Aspiration pneumonia
- Megaesophagus • Laryngeal collapse • Tracheostomy

## KEY POINTS

- The most common disease process involving the larynx is laryngeal paralysis, which occurs much more frequently in dogs than in cats.
- Diagnosis of laryngeal paralysis requires close attention to anesthetic plane and coordination of respiratory effort with laryngeal motion.
- Surgical arytenoid lateralization improves respiration and quality of life in dogs with laryngeal paralysis; however, aspiration pneumonia is a recognized complication, and generalized neuropathy can progress.
- Laryngeal collapse can result from any cause of chronic upper airway obstruction, but is most often associated with unaddressed brachycephalic airway syndrome.
- Laryngeal neoplasia, while generally uncommon, occurs more frequently in cats than in dogs. Histologic confirmation is required to exclude inflammatory laryngeal disease.

## INTRODUCTION

Laryngeal disease in dogs and cats results in varying degrees of upper airway obstruction and can be life-threatening. Conditions most commonly affecting the larynx include laryngeal paralysis, laryngeal collapse, and laryngeal masses. Differentials for laryngeal disease include nasal, nasopharyngeal, and tracheal conditions that also result in clinical signs of upper airway obstruction, such as stertor, stridor, wheezing, and gagging. Visual upper airway examination is the fundamental diagnostic tool for localizing the anatomic area involved in airway obstruction.

## ANATOMY AND PHYSIOLOGY

The larynx is the collection of cartilages surrounding the rima glottidis. It is responsible for control of airflow during respiration. The four cartilages that constitute the larynx are the paired arytenoids and the unpaired epiglottis, cricoid, and thyroid

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Department of Clinical Sciences, Colorado State University, Fort Collins, CO 80523, USA  
E-mail address: [Catriona.MacPhail@colostate.edu](mailto:Catriona.MacPhail@colostate.edu)

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cartilages. Each of the arytenoid cartilages has a cuneiform process rostrally, a corniculate process dorsally, a muscular process dorsolaterally, and a vocal process ventrally. The vocal processes are the attachment points for the vocal folds. The glottis consists of the vocal folds, the vocal process of the arytenoid cartilages, and the rima glottides. The laryngeal saccules are mucosal diverticula that sit rostral and lateral to the vocal folds. The larynx of the cat differs from that of the dog as the arytenoid cartilage lacks cuneiform and corniculate processes. Also, true aryepiglottic folds are absent and the sides of the epiglottis connect directly to the cricoid lamina by laryngeal mucosa.

The intrinsic muscles of the larynx (cricoarytenoideus dorsalis, cricoarytenoideus lateralis, thyroarytenoideus, vocalis, ventricularis, arytenoideus transversus, hyoepiglotticus, and cricothyroideus) are responsible for all laryngeal functions. These functions include regulation of airflow, protection of the lower airway from aspiration during swallowing, and control of phonation. The cricoarytenoideus dorsalis muscle is solely responsible for enlarging the glottis during inspiration. This muscle originates on the dorsolateral surface of the cricoid and inserts on the muscular process of the arytenoid cartilages. Contraction of this muscle results in external rotation and abduction of the arytenoid cartilages that then pulls the vocal processes laterally. The caudal laryngeal nerve is the terminal segment of the recurrent laryngeal nerve and is responsible for innervation of all intrinsic laryngeal muscles, except the cricothyroid muscle, which is innervated by the cranial laryngeal nerve.

## CANINE LARYNGEAL PARALYSIS

### *Cause*

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Laryngeal paralysis is a common unilateral or bilateral respiratory disorder that primarily affects older (>9 years) large- and giant-breed dogs. A congenital form occurs in certain breeds such as Bouvier des Flandres, Siberian huskies, bull terriers, and white-coated German shepherd dogs.<sup>1,2</sup> An autosomal-dominant trait has been documented in Bouvier des Flandres, resulting in Wallerian degeneration of the recurrent laryngeal nerves and abnormalities of the nucleus ambiguus.<sup>3</sup> Although the precise mode of inheritance has not been established, a hereditary predisposition has also been identified in Siberian husky dogs, Alaskan malamutes, and crosses of those 2 breeds.<sup>4,5</sup> A laryngeal paralysis-polyneuropathy complex has been described in Dalmatians, Rottweilers, Leonberger dogs, and Pyrean mountain dogs.<sup>6-9</sup>

For the more frequently encountered acquired laryngeal paralysis, the Labrador retriever is the most common breed reported, but golden retrievers, Saint Bernards, Newfoundlands, and Irish setters are also overrepresented. Proposed causes of laryngeal paralysis include accidental trauma, iatrogenic trauma, cervical masses, and neuromuscular disease (**Box 1**). In most dogs the cause remains undetermined, and these cases are traditionally classified as idiopathic.

Recently it was shown that many dogs develop systemic neurologic signs within 1 year following diagnosis of laryngeal paralysis, which is consistent with progressive generalized neuropathy.<sup>10</sup> Abnormalities in the results of electrodiagnostic tests and histopathologic analysis of nerve and muscle biopsy specimens reflecting generalized polyneuropathy have also been documented in dogs with acquired laryngeal paralysis.<sup>11</sup> It has been suggested that dogs previously thought to have idiopathic laryngeal paralysis could in fact have a progressive generalized polyneuropathy. The abbreviation GOLPP (geriatric onset laryngeal paralysis polyneuropathy) has been proposed as a more accurate term for dogs with acquired laryngeal paralysis where other causes have been ruled out.<sup>10</sup>

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