

Pacific Tide

An informational newsletter

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About our Author

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Dr. LaHue received his Doctorate in Veterinary Medicine from UC Davis in 1982. From 1982-83, he served his internship at Santa Cruz Veterinary Hospital in small animal medicine and surgery. His residency in small animal surgery was completed at both UC Davis and Santa Cruz Veterinary Hospital. He became board certified in 1989. Dr. LaHue performs soft tissue and orthopedic surgery. He has a special interest in respiratory surgery. Dr. LaHue has been a part-time teacher for 16 years and teaches AP Environmental Science at Aptos High School. He also serves as President of the Board of Directors for the Soquel Creek Water District. In addition to working hard, he also plays hard, which includes many outdoor activities, but especially surfing and more recently, hang gliding. He has been married very happily for 31 years to Paula LaHue, who is also a veterinarian. He loves being a dad and has two sons, Nate and Gabe. Nate is graduating from veterinary school at Cornell University this year and will start an internship in large animal medicine and surgery at Washington State University this summer. His younger son, Gabe just completed over 2 years of service in the Peace Corps in Paraguay as an agricultural advisor. He is currently volunteering for Heifer International at their farm and learning center in Massachusetts. They also share their life with their "perfect" Border Collie, Bonnie and their "slightly ornery" cat, Zip.



**Thomas LaHue,
DVM, DACVS**



So, why is my dog breathing like that, and can you help him?

(Answers to questions from clients about laryngeal paralysis)

Is my dog the type of dog who gets laryngeal paralysis?

Laryngeal paralysis (idiopathic) is most common in older, large breed dogs (especially Labrador Retrievers ~70% in some studies). It is rare in toy and small breed dogs, so other causes of respiratory distress should also be considered and thoroughly evaluated before laryngeal paralysis is considered the primary cause.

Are my dog's signs typical of laryngeal paralysis?

The 5 most common clinical signs are: 1) stridor (particularly inspiratory); 2) exercise intolerance (that correlates with increased respiratory effort); 3) respiratory distress (episodes of dyspnea, and possibly cyanosis); 4) voice change (~ 50% of cases); and 5) what could be described as a cough, gag, or throat-clearing (~50% of cases). These signs most often occur with a slow, insidious onset over a period of months to years (Owners sometimes think their dog is just getting old). Clinical signs are usually not evident in dogs unless the disease is bilateral. Also, it is important to know if patients are vomiting or regurgitating, as this increases the risk of aspiration pneumonia.

Will the signs get worse?

The answer is almost surely yes. Patients usually have slowly progressive stridor and exercise intolerance, but can have sudden worsening with an episode of severe dyspnea, cyanosis, and collapse (often when the weather is warmer, or with exercise, excitement, or anxiety). The long-term prognosis with medical therapy alone is poor. Surgery is considered the best method of treatment for dogs with laryngeal paralysis.

What causes laryngeal paralysis?

The primary cause of laryngeal paralysis is dysfunction of the recurrent laryngeal nerves. The specific cause of this dysfunction in acquired laryngeal paralysis is unknown, although a demyelinating disease has been suggested. The possibility of laryngeal paralysis being the initial clinical sign of a generalized polyneuropathy has been suggested.

Neurogenic atrophy of intrinsic laryngeal muscles, particularly the cricoarytenoideus dor-

salis muscle, causes failure of arytenoid cartilages and vocal folds to abduct, resulting in upper airway obstruction. The obstruction can worsen with exercise, excitement, or hot weather as increased oxygen demand causes greater inspiratory effort (greater negative pressure), which draws the arytenoid cartilages and vocal folds medially. This can become a vicious cycle, leading to cyanosis and collapse.

If he/she has an episode of difficulty breathing, what can be done?

Clients should try to get their dog in a calm, cool environment if possible until they can get to the hospital. Many patients can be managed temporarily with sedation, oxygen, and cooling if overheated. Some patients require anesthesia and endotracheal intubation, followed by gradual awakening. Patients can then be referred for definitive diagnosis and surgery. Until then, they should avoid heat, exercise, or excitement and may need oral tranquilization.

Can it be diagnosed on physical examination?

Initial physical examination, with a compatible history can get close to a tentative diagnosis (~ 90%). Exam of patients with suspected laryngeal paralysis should include auscultation of the laryngeal region with and without mild laryngeal compression. Dogs with normal laryngeal function should not have an appreciable change in upper airway noise with mild laryngeal compression. Dogs with laryngeal paralysis will exhibit a distinct worsening of the stridor as laryngeal compression is applied (especially during inspiration) because they already have a fairly narrow, relatively fixed laryngeal glottis. This may be noted while listening as the dog is panting or upon auscultation of the laryngeal region. Thoracic auscultation will often only demonstrate referred upper airway sounds, but it is extremely important in order to evaluate the patient for possible concurrent disease. Aspiration pneumonia and/or bronchial disease can occur in patients with laryngeal paralysis because these patients are unable to fully close the glottis during swallowing.

What diagnostics should be done before laryn-

gосcopy?

Radiographs: Thoracic and lateral cervical radiographs should be obtained to rule out:

- Pre-existing pneumonia or other lung pathology
- Megaesophagus
- Heart disease
- Pulmonary edema (which can be caused by inspiratory dyspnea)
- Other cause of upper airway obstruction (Foreign body?)

Patients with preexisting aspiration pneumonia should be treated prior to surgery and may be more likely to develop postoperative aspiration pneumonia. Patients with laryngeal paralysis and megaesophagus (or any cause of regurgitation) have a poor prognosis due to the extremely high likelihood of developing severe aspiration pneumonia after surgery. A study in 2010 found that aspiration pneumonia is more likely in dogs with esophageal dysfunction, and that a generalized neuropathy is likely to develop over the course of a year following diagnosis.

In addition to a CBC and chemistry profile, thyroid status is evaluated. There is an increased incidence of hypothyroidism in dogs with laryngeal paralysis, although there is not a proven cause and effect relationship. Hypothyroidism, like acquired laryngeal paralysis, tends to be a disease of older dogs. Hypothyroidism has been reported as a cause of generalized polyneuropathies. Supplementation with thyroxine will not reverse the laryngeal paralysis, but it could help prevent or slow the progression of possible hypothyroid-induced generalized neuromuscular disease.

Should an initial evaluation of the larynx be done before referral to a specialist?

If laryngeal paralysis is strongly suspected in patients with significant clinical signs, based upon history and physical examination, it is best to schedule laryngoscopy at a time when surgery could be performed immediately following laryngoscopy if indicated (only one anesthetic episode).

When is it time to go to laryngeal exam and possible surgery?

When the clinical signs are severe enough to impact the patient's quality of life, including:

Exercise intolerance

Any episode of respiratory distress

How can a diagnosis be made definitively?

Definitive diagnosis of laryngeal paralysis is made with laryngoscopy under very light anesthesia. A study in 2009 showed that direct laryngoscopy allowed the best evaluation of the larynx. In lightly anesthetized dogs with laryngeal paralysis, there is a failure of the arytenoid cartilages to abduct during inspiration. The arytenoid cartilages can also fail to abduct if the level of anesthesia is too deep. In order to make an accurate diagnosis, the patient must be under as light a plane of anesthesia as possible and the evaluation must be of adequate duration to be sure there is no effective arytenoid abduction during inspiration (at least 5-10 minutes). In some cases, there may actually be paradoxical movement of the arytenoid cartilages, where they are drawn medially due to the negative pressure created at inspiration. It is extremely important to correlate any laryngeal movement with the phase of respiration.

What treatment is recommended? (Is there anything I can do to avoid surgery?)

The long-term prognosis for patients with laryngeal paralysis is usually poor unless the disease is managed surgically. Unilateral arytenoid lateralization (Cricoarytenoid laryngoplasty or tie-back) is the preferred surgical treatment of laryngeal paralysis, as it has been successfully used by many surgeons to obtain consistently good results. The goal of surgery is to provide complete relief of the upper airway obstruction while minimizing discomfort and postoperative complications.

How soon can my dog go home after surgery?

Patients most often do very well postoperatively and usually go home the day after surgery. They are monitored very closely - continuous (24 hour) monitoring, intravenous fluid therapy, and withholding of food and water for 12-24 hours.

What will my dog's quality of life be like after surgery?

The prognosis for laryngeal paralysis with proper surgical treatment is good. Patients should have no respiratory distress, have very little or no stridor, and have no exercise intolerance (studies

show relief from signs of upper airway obstruction such as stridor, dyspnea and exercise intolerance in 82% - 100% of patients.)

What about coughing/gagging/throat clearing?

Coughing/gagging/throat-clearing is present before surgery in about 50% of cases. This may be a bit worse in the initial postoperative period, especially after drinking water, but this usually lessens after a period of adaptation.

Will my dog ever be able to bark normally again?

All patients have a hoarse, quiet voice after surgery, although it may get a little bit louder with time

What about diet? (Why do I have to feed moist food? Can I ever offer dry food again? Treats?)

A soft, canned food consistency diet with no excess gravy or crumbs is recommended to minimize the risk of aspiration pneumonia. Dry food or biscuits can break up into small pieces and be aspirated into the airway. Dry food can be soaked first to attain the right consistency (one that would allow formation of a ball that would stay in place after letting go). Very liquid food may also get into the airway more easily, so stick to the consistency of canned food. Most importantly, avoid any food that might result in vomiting, as that increases the risk of aspiration pneumonia. Staying on the same diet that works well for a particular patient, while only modifying consistency works best. Chewy treats are best.

What about complications like aspiration pneumonia?

The incidence of aspiration pneumonia preoperatively is reported to be ~5%. Incidence following surgery reportedly ranges from 5% to 23.6%. (My experience is an incidence of 5-10%.) There is an increased incidence with preexisting esophageal disease, existing respiratory tract disease, or neurologic disease. In a recent study (2010), vomiting had occurred in 64% of patients with aspiration pneumonia, and the overall prognosis for patients with aspiration pneumonia was good (overall survival of 81.6%).

If my dog vomits after surgery, do I need to bring him in right away?

The incidence of aspiration pneumonia increases with vomiting and even more with regurgitation (bringing food, saliva, etc. up without retching). But one episode of vomiting does not mean aspiration pneumonia occurred. Monitor closely for any change in clinical signs (lethargy, increased coughing frequency, deeper, more congested coughing, change in character of breathing, not eating, fever) and bring him/her in for evaluation if there is a question.

Can my dog go swimming after surgery once the sutures are removed?

Yes, I allow my patients to swim following surgery.

Can I use a neck leash after surgery?

A harness is better initially, to avoid any pressure on the healing incision. However, after all is healed, a neck leash is OK.

Can my dog cause the surgery to fail?

Disrupting the tie-back is extremely unlikely, even with coughing or lots of barking (or attempting to bark).

Scratching or rubbing at the incision could cause incisional trauma, swelling, or inflammation

So can you summarize this for me?

It is important to recognize that while bilateral laryngeal paralysis is a significant cause of upper airway obstruction in older dogs, it is surgically treatable, with a good prognosis. Familiarity with the laryngeal anatomy and experience performing the procedure is essential to a successful surgery. I recommend the unilateral cricoarytenoid laryngoplasty or other form of arytenoid lateralization because it achieves the goals of surgery in treating laryngeal paralysis, by relieving the respiratory distress, stridor, and exercise intolerance with a minimum of complications.

Our Doctors

Internal Medicine

Kelly Akol, DVM, DACVIM
Merrienne Burtch, DVM, DACVIM
Michelle Pressel, DVM, DACVIM
Ryan Garcia, DVM, DACVIM

Surgery

Lisa Metelman, MS, DVM, DACVS
Tom LaHue, DVM, DACVS

Critical Care

Colleen Brady, DVM, DACVECC
Lillian Good, DVM, DACVECC

Oncology

Theresa Arteaga, DVM, DACVIM
(Oncology)

Cardiology

Mandi Kleman, DVM, DACVIM
(Cardiology)

Radiology (VRS)

Larry Kerr, DVM, DACVR
Mark Lee, DVM, DACVR

Emergency

Christian Robison, DVM
Kim Delkener, DVM
Mark Saphir, DVM
Jessica Kurek, DVM

Behavior

Jan Brennan, DVM (practice
limited to behavior)

About Our Hospitals

PVSES was founded to provide high quality, specialized medical care to companion animal patients. Our practice is dedicated to serving the veterinary community as a partner in total patient care. We offer comprehensive specialized services including endoscopy, Doppler ultrasound, surgery, 24-hour ICU care, and emergency and critical care. Our staff is committed to providing compassionate and thorough medical care that meets the needs of the patient, client, and referring veterinarian. In September 2011 we opened PVSM and offer internal medicine, oncology, and cardiology Tuesday through Thursday in Monterey. Behavior consultation by appointment is available on Mondays.

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