Dysphonia & Respiratory Noise in a Labrador Retriever

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Bruce, an 11-year-old neutered male Labrador retriever, was presented for a hoarse bark and dysphonia, a 1-year history of increased respiratory noise, and a 4- to 6-month history of frequent and loud throat-clearing. The owners reported that he had also been increasingly intolerant of exercise for the past 6 months and occasionally stumbled on his pelvic limbs, which they attributed to arthritis and advanced age.

Presentation

On presentation, Bruce was panting and appeared anxious and excited. Marked upper respiratory stridor and associated cyanosis were noted, and SpO_2 was 87%. Acepromazine (0.03 mg/kg IV) was administered with flow-by oxygen. Within 5 minutes, Bruce's respiratory effort had decreased and his mucous membranes were pink, with a capillary refill time <2 seconds; SpO_2 was 98%.

Physical Examination

Physical examination under acepromazine sedation revealed a temperature of 102.8ºF (39.3ºC), pulse of 96 bpm, and respiratory rate of 20 breaths/minute.

Weight was 77 lb (35 kg), and BCS was 6/9. When roused, Bruce had notable inspiratory stridor localized

on auscultation to the laryngeal region. Cardiopulmonary auscultation revealed referred upper airway sounds. The abdomen was soft and compliant to palpation, and no lymphadenopathy was noted. A neurologic examination was not performed because of sedation.

Diagnosis

Three-view thoracic radiographs disclosed a mild diffuse bronchial pattern, most likely age related, and a small amount of air in the cervical esophagus consistent with aerophagia. No signs of pneumonia or megaesophagus were noted. Cardiac silhouette and pulmonary vasculature were unremarkable. A lateral cervical radiograph demonstrated no abnormalities. Results of CBC, serum chemistry profile, and urinalysis were within reference ranges.

An upper airway examination was performed after administration of propofol (initially 4 mg/kg IV then titrated to the patient's response) followed by doxapram (1 mg/kg IV bolus) to enhance respiratory excursions. Bilateral, flaccid, and complete laryngeal paralysis was noted, with decreased laryngeal sensitivity and erythematous corniculate processes. No abnormalities were noted on palpation of the larynx and trachea.

DIAGNOSIS:

PRESUMPTIVE GERIATRIC ONSET LARYNGEAL PARALYSIS POLYNEUROPATHY

Bruce was diagnosed with presumptive geriatric onset laryngeal paralysis polyneuropathy (GOLPP) based on his typical signalment (ie, elderly Labrador retriever) and the absence of other causes of laryngeal paralysis (eg, thyroid or mediastinal tumor, trauma). Historically, the onset of laryngeal paralysis in older dogs was called *idiopathic laryngeal paralysis* and was characterized as a bilateral mononeuropathy of the recurrent laryngeal nerves due to unknown etiology. More recent studies have concluded that the condition is very often a slowly progressive polyneuropathy, with laryngeal and esophageal dysfunction as the earliest manifestation.[1-5] Although conditions such as myasthenia gravis and hypothyroidism have been associated with laryngeal paralysis, the associations are rare or unsubstantiated.[1,6] In GOLPP, all of the intrinsic laryngeal muscles are affected, resulting in a flaccid laryngeal paralysis. Dogs can neither adduct nor abduct their arytenoids. GOLPP affects elderly dogs (ie, 8-13 years of age), most commonly Labrador retrievers. Other breeds, including Newfoundlands, greyhounds, Australian shepherd dogs, golden retrievers, Brittany spaniels, and some crossbreed dogs, also can be affected. Bruce's owners were advised that, although cricoarytenoid laryngoplasty (ie, "tie-back") surgery significantly improves quality of life and survival, he was likely to develop a slowly progressive, nonpainful, generalized neuropathy over the next several years.[1-4]

In dogs with GOLPP, evaluation of esophageal function is recommended, as the severity of dysfunction is correlated with developing aspiration pneumonia following cricoarytenoid laryngoplasty.[1] If an esophagram is not performed, an estimate of dysfunction can be based on clinical signs of regurgitation, coughing, and/or throat-clearing; however, this underestimates dysfunction.[1] Because Bruce required sedation on presentation, an esophagram could not be performed and was declined at a follow-up appointment. Neurologic examination was also precluded at presentation because of sedation. Approximately one-third of dogs display early signs of generalized neuropathy at the time of diagnosis.[1,6]

Treatment & Long-Term Management

Because of his critical respiratory condition and following discussion with his owners, Bruce immediately underwent a left-sided cricoarytenoid laryngoplasty under general anesthesia to permanently affix the left glottis in an abducted position. He received metoclopramide (1-2 mg/kg CRI every 24 hours) during surgery and omeprazole (1 mg/kg PO) 24 hours before surgery and 1 hour before surgery. Of note, recent studies show that

metoclopramide does not decrease the risk for aspiration pneumonia, and the author currently uses oral cisapride starting the day before surgery in nonemergent cases.[6,7] Hydromorphone should be avoided in the preoperative period, as should all pure μ agonists (eg, fentanyl, morphine, hydromorphone, oxymorphone) in the immediate postoperative period, as they may be associated with an increased risk for aspiration.[6,8]

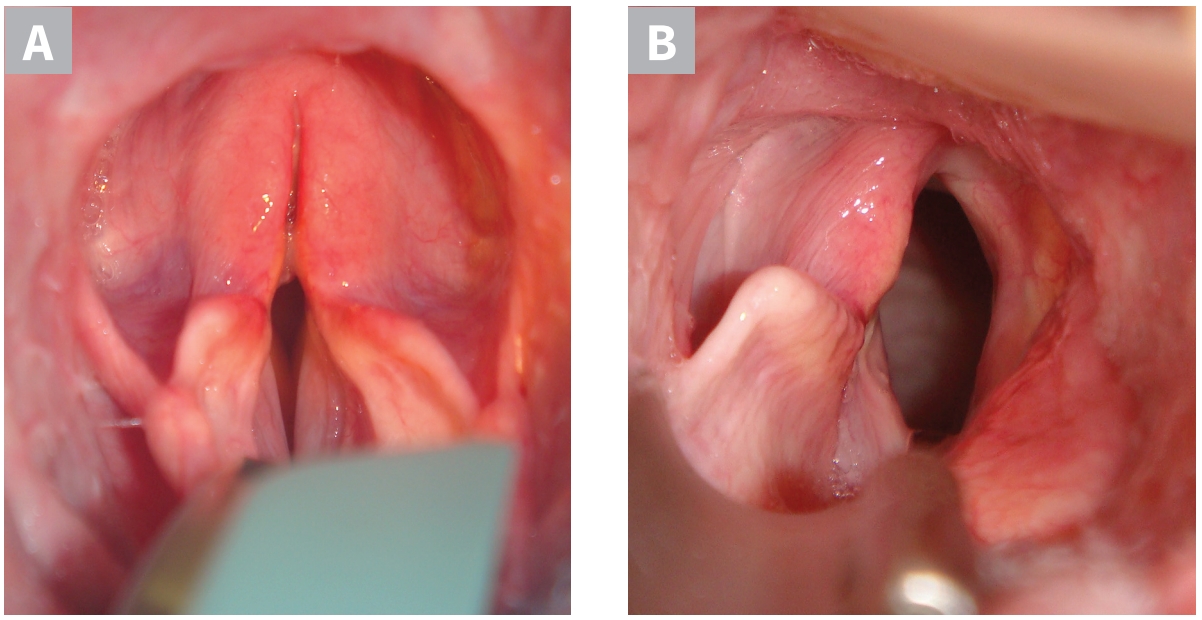
Esophageal suctioning was performed shortly after induction and intubation, before leaving the operating room, and immediately prior to extubation. Adequate abduction of the left arytenoid was confirmed postoperatively by direct visualization on extubation (***Figure***).

Bruce recovered uneventfully from general anesthesia. The following morning, his rectal temperature was 100.5ºF (38ºC), and thoracic auscultation disclosed no abnormalities. He was hand-fed large meatballs, ate well, and was discharged later that day. His healthy appetite was a positive sign of recovery, as the earliest signs of aspiration pneumonia are pyrexia, inappetence, and lethargy. At-home medications included codeine (2 mg/kg PO every

TREATMENT AT A GLANCE

- Thoracic and neck imaging should be performed in patients with airway compromise.
- A thorough upper airway examination using doxapram to stimulate robust respiratory efforts should be completed.
- Cricoarytenoid laryngoplasty should be performed to alleviate signs of upper respiratory obstruction.
- Pure μ agonists should be avoided perioperatively.
- The esophagus should be suctioned prior to extubation.
- Cisapride can be prescribed, as it may decrease the incidence of aspiration pneumonia.

GOLPP = geriatric onset laryngeal paralysis polyneuropathy



▲ **FIGURE** Per os view of the laryngeal aditus. Appearance of the paralyzed larynx before surgery (***A***). Neither adduction on sensitivity testing nor abduction on administration of doxapram was noted. Immediate postoperative appearance of the rima glottidis following left-sided cricoarytenoid laryngoplasty (***B***). This procedure provides a permanent, asymmetric widening of the paralyzed glottis, immediately relieving signs of respiratory obstruction.

6 hours for 3 days), trazodone (≈3 mg/kg PO every 12 hours for 7 days), and cisapride (0.5 mg/kg PO 30 minutes before breakfast and dinner and just before bedtime, for life). Cisapride is a prokinetic agent that may be prescribed as a long-term therapy to reduce gastroesophageal reflux and the risk for aspiration pneumonia.[9-11] Bruce was assumed to have some degree of esophageal dysfunction because of his history of throat-clearing and because most dogs with GOLPP have esophageal dysfunction.[1] Cisapride can be increased up to 1 mg/kg per oral dose if no diarrhea or abdominal discomfort is noted.

Bruce's owners were advised to prevent him from drinking too much water at one time, as this can lead to regurgitation and increased risk for aspiration pneumonia. His activity level was limited for 10 to 14 days. A physical therapy program was strongly recommended. Wading in water and swimming with his head above the water (but no diving for balls) was also encouraged. A harness rather than a collar is preferred for leash attachment to avoid sudden pressure or shear force around the laryngeal region.

At the 1-month postoperative recheck appointment, neurologic examination, including assessment of gait, muscle tone, muscle atrophy, postural reactions, patellar reflexes, and flexor withdrawal reflexes in the pelvic and thoracic limbs, showed mild ataxia without significant weakness. Bruce had mild conscious proprioceptive deficits in both pelvic limbs, and mild muscle atrophy was noted around the semimembranosus and semitendinosus musculature.

Prognosis & Outcome

A successful cricoarytenoid laryngoplasty will immediately alleviate signs of upper respiratory obstruction and significantly improve quality of life.[4] Because knowledge of laryngeal anatomy and experience with cricoarytenoid laryngoplasty technique are essential, this procedure should be performed by a board-certified surgeon. Some throat-clearing may persist for several months or may be permanent.

The most common postoperative complication is aspiration pneumonia, which occurs in ≈18% of cases without cisapride treatment.[1,6,12,13] Most cases of aspiration pneumonia respond well to medical management with antibiotics, thoracic coupage, and, if indicated, oxygen supplementation. When patients are discharged following surgery, owners must be educated to watch for the earliest signs of aspiration pneumonia (ie, inappetence, lethargy, fever) followed by soft coughing.

In patients with GOLPP, neurodegeneration typically progresses insidiously over several years, with dogs developing muscle atrophy around the pelvic limbs, torso, and temporal musculature and becoming weaker with decreased proprioceptive responses. Strength (eg, water treadmill, sit-to-stand), balancing, and coordination exercises are recommended as long-term therapy for all affected dogs, with a goal of maintaining muscle mass and increasing awareness of limb placement. Daily walks are also recommended. Dogs may show no signs of pain and can survive for several years postoperatively with an excellent quality of life. Helping harnesses may be used by owners when their dogs begin to have difficulty standing and walking. Some owners may use a cart. Owners typically request euthanasia when their dog becomes nonambulatory or has repeated episodes of aspiration pneumonia.

VIDEO

To view a video of the patient using a water treadmill as part of treatment, scan the QR code below. *Video courtesy of Dr. Sarah Shull*

Using QR codes from your mobile device is easy and quick!

Simply focus your phone's camera on the QR code as if taking a picture (but don't click!). A notification banner will pop up at the top of your screen; tap the banner to view the linked content.

At the author's clinic, the average age of dogs presented with GOLPP is 11.3 years, with an expected survival time of 2 to 4 years following surgical intervention. Many dogs die from conditions unrelated to GOLPP. A 2016 study demonstrated a 7-year postoperative survival rate of 75% in affected dogs.[6] Dogs with GOLPP should be evaluated for neurodegenerative signs every 6 months. Regular communication between owners and veterinarians, including owner education on GOLPP management, is key to a successful long-term outcome.

Bruce responded well to treatment. Two-and-a-half years after undergoing left-sided cricoarytenoid laryngoplasty, his respiratory rate and effort were normal at rest, with mild stridor on exertion from untreated right-sided flaccid laryngeal paralysis. He was continuing to receive cisapride and had not had any episodes of aspiration pneumonia. He underwent regular physical therapy twice weekly (see ***Video***) and enjoyed wading in a lake. Bruce had mild to moderate muscle wasting of the pelvic limbs, needed assistance getting into the car, and had difficulty ascending stairs; his owners used a harness to help him with these activities.

TAKE-HOME MESSAGES

- GOLPP is a common condition in older dogs and is characterized by laryngeal paralysis, esophageal dysfunction, and a slowly progressing, nonpainful, generalized neuropathy.
- GOLPP can cause severe upper respiratory compromise.
- Outcomes from cricoarytenoid laryngoplasty ("tie-back") are generally excellent when performed by experienced surgeons.
- Early recognition of aspiration pneumonia in patients with GOLPP allows early intervention and can improve patient outcome.
- Medical management of swallowing dysfunction may prevent aspiration pneumonia.
- Physical therapy exercise programs can help maintain ambulation.
- Owner education and long-term follow-up can ensure a successful outcome.

GOLPP = geriatric onset laryngeal paralysis polyneuropathy

References

1. Stanley BJ, Hauptman JG, Fritz MC, Rosenstein DS, Kinns J. Esophageal dysfunction in dogs with idiopathic laryngeal paralysis: a controlled cohort study. *Vet Surg*. 2010;39(2):139-149.
2. Thieman KM, Krahwinkel DJ, Sims MH, Shelton GD. Histopathological confirmation of polyneuropathy in 11 dogs with laryngeal paralysis. *J Am Anim Hosp Assoc*. 2010;46(3):161-167.
3. Jeffery ND, Talbot CE, Smith PM, Bacon NJ. Acquired idiopathic laryngeal paralysis as a prominent feature of generalised neuromuscular disease in 39 dogs. *Vet Rec*. 2006;158(1):17.
4. Bookbinder LC, Flanders J, Bookbinder PF, Harvey HJ, Barry JS, Cheetham J. Idiopathic canine laryngeal paralysis as one sign of a diffuse polyneuropathy: an observational study of 90 cases (2007-2013). *Vet Surg*. 2016;45(2):254-260.
5. Shelton GD. Acquired laryngeal paralysis in dogs: evidence accumulating for a generalized neuromuscular disease. *Vet Surg*. 2010;39(2):137-138.
6. Wilson D, Monnet E. Risk factors for the development of aspiration pneumonia after unilateral arytenoid lateralization in dogs with laryngeal paralysis: 232 cases (1987-2012). *J Am Vet Med Assoc*. 2016;248(2):188-194.
7. Milovancev M, Townsend K, Spina J, et al. Effect of metoclopramide on the incidence of early postoperative aspiration pneumonia in dogs with acquired idiopathic laryngeal paralysis. *Vet Surg*. 2016;45(5):577-581.
8. Ovbey DH, Wilson DV, Bednarski RM, et al. Prevalence and risk factors for canine post-anesthetic aspiration pneumonia (1999-2009): a multicenter study. *Vet Anaesth Analg*. 2014;41(2):127-136.
9. Zacuto AC, Marks SL, Osborn J, et al. The influence of esomeprazole and cisapride on gastroesophageal reflux during anesthesia in dogs. *J Vet Intern Med*. 2012;26(3):518-525.
10. Kempf J, Lewis F, Reusch CE, Kook PH. High-resolution manometric evaluation of the effects of cisapride and metoclopramide hydrochloride administered orally on lower esophageal sphincter pressure in awake dogs. *Am J Vet Res*. 2014;75(4):361-366.
11. Ogden J, Ovbey D, Saile K. Effects of preoperative cisapride on postoperative aspiration pneumonia in dogs with laryngeal paralysis. *J Small Anim Pract*. 2019;60(3):183-190.
12. MacPhail CM, Monnet E. Outcome of and postoperative complications in dogs undergoing surgical treatment of laryngeal paralysis: 140 cases (1985-1998). *J Am Vet Med Assoc*. 2001;218(12):1949-1956.
13. Hammel SP, Hottinger HA, Novo RE. Postoperative results of unilateral arytenoid lateralization for treatment of idiopathic laryngeal paralysis in dogs: 39 cases (1996-2002). *J Am Vet Med Assoc*. 2006;228(8):1215-1220.

Suggested Reading

Michigan State University College of Veterinary Medicine. GOLPP. MSU CVM website. https://cvm.msu.edu/scs/research-initiatives/golpp. Accessed October 2019.