Kristy Broaddus, DVM, MS, DACVS
VESC Richmond VA
Virginia Veterinary Conference 2016
Saturday February 27
8:00-8:55a

Kristy Broaddus
• Michigan State – DVM
• Auburn University – internship and surgery residency, masters degree
• Oklahoma State University – faculty
• Richmond, Virginia – Veterinary Emergency and Specialty Center in Carytown

Outline
• Defining the disease
• Anatomy
• Disease and dysfunction
• New theory and its prognosis
• Diagnosis
• Therapeutic decisions
  • Medical
  • Surgical
• Long term outcome

Jake
• 9 year old castrated male
Chocolate Lab
• Pool opened for summer – Jake collapses after exercise, having difficulty breathing
• Examination – BAR, tail wagging, panting with marked inspiratory and expiratory stridor

Additional history
• "Losing his voice" over past few months
• Has “arthritis” in hind end - slowing down
Laryngeal Paralysis

Index of suspicion

- Progressive inspiratory stridor
- Exercise intolerance
- Presentation may be affected by seasons and location
- Heat intolerance (stress)
- Voice changes
- Large breed dogs
  - Small breeds uncommon and cats rare

Quick Review

- Normal arytenoid function
  - Arytenoids should open during inhalation and relax during exhalation

Normal video

Laryngeal Paralysis – Defining the disease

- Inability to abduct the laryngeal cartilages in a synchronized manner to allow inspiration of air
- Lack of function of the caudal laryngeal nerve to CAD
- Can be unilateral or bilateral
  - Generally bilateral for notable clinical signs
  - Unlikely to identify a unilateral problem in normal dogs
  - Could see exercise intolerance in working animals

Upper airway

Laryngeal Paralysis

- Idiopathic #1
- Compression of recurrent laryngeal nerve or nerve tract
  - Tumor
  - Trauma/iatrogenic
- Congenital or degenerative neurological condition (young dogs) <1 year
  - Dalmatian dogs, Siberian huskies (USA),
  - Bouviers, bull terriers (Europe)
Less commonly…

- Lead or organophosphate toxicity
- Retropharyngeal infection
- Rabies
- Polyradiculoneuritis (coonhound paralysis)
- Cranial mediastinal or paratracheal mass
- Hypothyroidism

Progressive Neuropathy

- Going beyond the obvious:
  - Conscious proprioceptive deficits in hindlimbs
  - Hyporeflexia in hindlimbs
  - Weak in the hindlimbs
  - Megaesophagus and dysphagia

- Advanced Studies
  - Nerve biopsies and nerve conduction testing
  - Prove true neuropathic disorder

Physical Examination

- General PE wnl (except for stridorous breathing)
  - Shuffling, short-strided hind limb gait
  - Goose stepping
  - Moderate hind limb muscle atrophy
  - Mild discomfort on hip extension
  - Normal proprioception, no back pain
  - Weak withdrawal reflexes
  - Absent patellar reflexes
Additional history....

- Gags when eating/drinking, and has been “throwing up” right after eating
- On further questioning, there is no active component

Progressive Neuropathy

- Most dogs will develop clinical signs of generalized neuropathy within 1 to 2 years of LP diagnosis.
- Progressive disease
- Laryngeal paralysis is easily documented but you will find other symptoms once you go looking
- Reason not to do surgery?

Starting the conversation

- Mild signs. Some stridor, mild hind end paresis
- No true distress
- Good segue into the conversation of “your dog likely has laryngeal paralysis.
  - Recommend a thorough work-up:

Stable dog approach

- Thorough evaluation
  - Physical examination
  - Neck for masses
  - Neurologic examination
    - Normal
    - CP deficits
    - Weak withdrawals
    - LMN

Stable dog approach

- CBC/chemistry/UA
- Chest radiographs
  - Good in aging dog for general health check
  - Chest masses
  - Aspiration pneumonia
  - Megaesophagus***
    - Deal breaker for tie back
    - Tracheostomy is only option
  - +/- Neck radiographs
When is surgery indicated?

- Early disease
- Can they live with it for awhile?
- Lifestyle changes
  - Minimize stress
  - Seasons
  - Activity level
  - Consequences of surgery

Stable dog approach

Make owner aware that this is a progressive disease!

- We can offer a laryngeal exam when you feel you are ready to consider intervention.
- We cannot restore normalcy but we can improve the quality of life for your pet with surgery.
- The disease will continue to progress

When to consider an oral examination

- If not an incidental finding:
  - Presenting complaint of an episode(s) of dyspnea, stridorous breathing or cyanosis
  - Excitement or exercise typically exacerbates signs to point of distress
  - If emergency treatment is ever necessary
  - Quality of life is suffering**
  - Surgery is being strongly considered
Crisis Mode

- Respiratory distress = fighting to survive
- Key is to break cycle of stridor and dyspnea
  - "breathing through a straw"
  - Harder they try, the worse it gets
- Paradoxical motion
- Edema
- Sedation
  - Acepromazine: start low (0.01mg/kg IV or IM and repeat as needed)
  - Give oxygen
  - +/- Dex SP

If this doesn’t work, be prepared to for induction of general anesthesia

Laryngeal Paralysis

Airway examination

- Oral examination
  - Pre-oxygenate
  - Light anesthesia (thiopental / propofol)
  - Excessive pre-medications may affect laryngeal function
  - Monitor respiration during observation
  - Intravenous doxapram (2 mg/kg IV) stimulates breathing – may highlight laryngeal function
- Wait until dog is rousing from anesthesia before deciding
  - Coordinated movement with respiration
  - Just enough sedation to get the job done

Laryngeal Paralysis – Oral examination

- Overall evaluation of the oral cavity
  - Any other contributing factors for respiratory distress
- Lightly depress the epiglottis
- Evaluate laryngeal cartilages and saccules

What you will see on airway exam…..
Airway examination-LP

- lar par with scope video
- st. bernard video

Laryngeal Paralysis – Considerations

- Anesthesia concerns
  - Induction
  - Recovery
- Ideally perform a definitive repair immediately following sedated examination
- “Get all of your ducks in a row”
  - Owner consent and understanding of extent and progression of disease
  - We are NOT restoring normal
  - Aspiration
  - Life style changes
  - Long term effects of neuromuscular disease

Laryngeal Paralysis

Surgical Anatomy

- Cricothyroid
- Recurrent laryngeal nerve
- Laryngeal cartilages
  - Arytenoid
  - Thyroid
  - Cricoid

Laryngeal Paralysis

Surgical options

- Unilateral arytenoid lateralization
  - AKA “Tie-back”
  - My preferred procedure
  - Permanent abduction of the arytenoid cartilage to the side of the larynx

From: Current techniques in Small Animal Surgery (Bojrab)
Laryngeal Paralysis - Lateralization surgery

- Incise thyropharyngeus
- Identify cricoarytenoideus dorsalis muscle
- Transect
- Leave a tag for manipulation

Exubation and evaluation
- Remove tube check abduction before tying (or after closure)
- If abduction is inadequate, more dissection to release

Post-surgical oral examination
- Recheck laryngeal abduction before anesthesia recovery
- Document degree of abduction
Extreme lateralization is not desirable

Laryngeal Paralysis - Lateralization

- Routine incision closure
- Harness
- Stockinette
- Antibiotics
- Aspiration pneumonia present
- Endocrine condition such as hypothyroidism, diabetes, cushings

Laryngeal Paralysis - Complications

- Aspiration (MAJOR PROBLEM)
  - Estimated to be a problem between 5 to 35% of cases
  - Airway is now permanently partially opened
  - Substantial increase in risk with
    - Bilateral procedure (not recommended) or
    - Patients with concurrent disease (i.e., megaesophagus or neurological problems)
  - Highest risk during recovery
    - Sedation
    - Anxiety
    - Nauseating medications

Contraindications

- Esophageal dysfunction
- Megaesophagus
- Aspiration pneumonia?

Aspiration Pneumonia #1 complication

- 18.6% at one year, 27.2% at two years, 31.8% at three years, 31.8% at 4 years
- Survival rate for dogs with post op AP was 83.1% at one year, 51.5% at 3 years, 25.8% at 4 years
- 75% of dogs alive at 7 years!
- None of the dogs with preoperative pneumonia developed post operative pneumonia
**Risk Factors for Aspiration Pneumonia**
- Aspiration pneumonia was the number one complication
- Preexisting aspiration pneumonia was not a risk factor
  - GER relieved by correcting airway obstruction?
- Post operative megaesophagus was a significant risk factor for eventual AP
- Administration of an opioid was significant risk factor for AP

**Aspiration Pneumonia Paranoia!**
- Avoiding pure mu opioids (GI stasis / vomiting) and oversedation
  - Buprenorphine for analgesia
  - Local block (bupivicaine/lidocaine)
  - Tramadol after surgery
- Prokinetic/antacid/antinausea agents
  - Famoldine/Pantoprazole
  - Cerenia
  - Metoclopramide (SC and CRI)

**Aspiration Pneumonia Paranoia!**
- These are often highly anxious dogs that scarf their food!!
- And now they have an open air way, yikes!!
  - Wake up anxious, bark
  - Overly sedated, leads to aspiration
- I now send home dogs the same day! (dirsko von pfeil ACVS symposium)
  - Restore normalcy
  - Calm as possible
  - Avoid over sedation

**Laryngeal Paralysis - Complications other than AP**
- Suture / cartilage breakdown
- Inadequate lateralization
- Surgical site infection
- Difficulty eating / drinking (coughing)
  - Decreased protection of airway
  - Concurrent esophageal dysfunction
- Progression of neurologic signs
  - 100% of dogs had neurologic signs by 1 year after diagnosis of laryngeal paralysis (Stanley, Vet Surg; 2010)
  - Only 11% euthanized for neuro issue in (Wilson et al., JAVMA, 2016)

**Long term issues**
- No swimming
- Controlled eating regime
- Avoid stressful situations
  - Hot weather
  - Anxiety inducing scenarios
  - Overexertion

**Conclusion**
- Complex disease
- Neuropathic component
- Progressive
- Appropriate time for surgical intervention to IMPROVE quality of life but does not restore normalcy
- Aspiration pneumonia paranoia
- Life style changes
- Relief

Questions??

[Image of two children smiling]