Surgical Diseases of the Upper Airways

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Surgical Diseases of the Upper Airways

- General Considerations
- Brachycephalic Syndrome
- Laryngeal Paralaysis
General Considerations

- Anesthesia
- Antibiotics
- Postoperative Management
- Complications
Anesthesia

- Extreme risk
  - Induction/recovery
- Minimize restraint / stress
- Preoxygenation
- Rapid induction → intubation
- Avoid opioids which promote vomiting/ regurgitation
Antibiotics

• Prophylactic usually recommended
• If airway penetrated then therapeutic
Postoperative Management

- Close monitoring
- Intubated as long as possible
- Supplemental oxygen
- Minimize excitement/pain
Complications

- Acute respiratory obstruction
- Aspiration pneumonia
Brachycephalic Syndrome
Brachycephalic Syndrome

• Components
  1. Stenotic nares
  2. Elongated soft palate
  3. Everted laryngeal saccules
  4. Laryngeal collapse/stenosis
Elongation of soft palate
Eversion laryngeal saccules
Edema & inflammation

Stenotic nares
Distortion pharyngeal tissue

LARYNGEAL COLLAPSE
Laryngeal Collapse
Pathophysiology

• Gastrointestinal lesions
  – ↑ inspiratory effort → low negative intrathoracic pressure → gastroesophageal reflux/hiatal hernia
  – Esophagitis 83%
  – Chronic gastritis 98%
Epidemiology

- Brachycephalic breeds
  - Bulldogs
  - Boston Terriers
  - Pugs
  - Pekinese
  - Shih Tzu
  - Boxer
- Mean age 2-4 years
Presenting Complaint

- Noisy, stridorous breathing
  - Exacerbated by exercise, stress, heat
- Varying respiratory distress
- Concurrent GI signs
  - Dysphagia
  - Ptyalism
  - Regurgiation / vomiting
Physical Exam

- Stertor
- Inspiratory stridor
- Orthopneic posture
- Restless/anxious
- Hyperthermia
- Stenotic nares
Diagnostic Plan

- Visual inspection of face
- Radiograph of neck AND thorax
- Laryngeal exam

- BE PREPARED FOR TRACHEOSTOMY
Radiographs

- Noncardiogenic pulmonary edema
- Aspiration pneumonia
- Hypoplastic trachea
Medical Management

- Weight loss
- Exercise restriction and environmental modifications
- Anti-inflammatory dose steroids
Stenotic Nares

- Thickened and collapsed dorsolateral nasal cartilages \( \rightarrow \) obstruct airflow
- Causes secondary airway collapse due to negative pressure generation
- 50% of cases
Rhinoplasty

- Vertical wedge
Rhinoplasty

- Punch resection alaplasty
Rhinoplasty

- Punch resection alaplasty
Rhinoplasty

- Punch resection alaplasty
Elongated Soft Palate

- Soft palate should not extend beyond tip of epiglottis
  - Neutral position, without ET tube
- Resection to level of caudal 1/3 of tonsillar crypt
- 80-100% of cases
Elongated Soft Palate
Traditional Staphylectomy
CO$_2$ Staphylectomy
Everted Laryngeal Saccules

- Result from prolonged upper airway obstruction
- Tissue just cranial to vocal folds pulled into ventral glottis
- First stage of laryngeal collapse
- 40-60% of cases
Everted Laryngeal Saccules
Everted Laryngeal Saccules
Complications

- Pharyngeal edema
- Nasal regurgitation
- Aspiration pneumonia
- Dehiscence of rhinoplasty
- Voice change
- Persistent upper airway noise
Laryngeal Paralysis
Laryngeal Paralysis

- Failure of one or both arytenoid cartilages to abduct during inspiration
Epidemiology

• Congenital/Inherited
  – Siberian Huskies (USA)
  – Bovier des Flandres (Netherlands)
  – Bull Terriers (Britain)
  – White-coated GSD

  – <1 year of age
Epidemiology

- Congenital Laryngeal Paralysis-Polyneuropathy Complex
  - Dalmatians
  - Rotties
  - Leonbergers
  - Pyrenean Mountain Dogs
Epidemiology

- Acquired
  - Geriatric (>9 years)
  - Large and giant-breed dogs
    - Labs, Goldens, St. Bernards, Newfies, Irish Setters
  - Males > Females (3:1)
Pathophysiology

- Congenital (< 1 year of age)
- Acquired
  - Trauma / Iatrogenic
  - Compression
  - Hypothyroidism
Pathophysiology

- **Idiopathic**
  - Progressive, non-inflammatory, degenerative disease
  - Manifestation of polyneuropathy
Pathophysiology

- **Manifestation of polyneuropathy**
  - Lahue 1989
    - 56% paresis
  - Jeffrey 2006
    - EMG & neuro abnormalities in all dogs
  - Theiman 2007
    - LMN all dogs within 2 yrs
    - atrophy cranial tibial m. and peroneal n.
  - Stanley 2010
    - abnormal cervical and cranial thoracic esophageal motility
History

- Voice change
- Loud breathing
- Coughing/gagging
- Exercise intolerance
- Dysphagia
- Regurgitation

- Severe dyspnea
- Cyanosis
- Syncope
- Exercise
- Obesity
- Excitement
- Warmer weather
Clinical Signs

Source: Griffin and Krahwinkel, Compendium 2005
Physical Exam

- Stridor
- Referred upper airway sounds
- +/- Fever
- +/- Pulmonary crackles
- Respiratory distress
Diagnostic Testing

- Neurologic examination
  - Ataxia
  - Pelvic limb CP deficits
  - Decreased postural reactions
Diagnostic Testing

- CBC - unremarkable
- Chemistry - unremarkable
  - ↑ cholesterol/lipid/LES
- Free T4 +/- cTSH
  - 30-40% of cases
Diagnostic Testing

- Thoracic radiographs
  - Aspiration pneumonia 7-10%
  - Megaesophagus
Diagnostic Testing

• Laryngeal examination
  – Rigid laryngoscope
  – Preoxgenate
  – Propofol 12-16 mg/kg to effect
Diagnostic Testing

• Laryngeal examination
  – Cartilages in paramedian position
  – NO abduction during inspiration
  – Dopram 2.2 mg/kg IV
  – Rule-out laryngeal mass
  – DON’T confuse PARADOXICAL movement
Laryngeal Collapse
Treatment Options

- Emergency management
  - Oxygen
  - Sedation
    - Acepromazine 0.02mg/kg IV
    - Butorphanol 0.4 mg/kg IV
  - Anti-inflammatory steroids
  - External cooling if hyperthermic
  - Temporary tracheostomy
Treatment Options

- Medical management - mild clinical signs
  - Weight loss
  - Cool environment
  - Low stress
  - Harness
  - Exercise restriction
  - +/- steroids if laryngeal edema
Treatment Options

• Surgical Management
  – Ventriculocordectomy
  – Partial laryngectomy
  – Unilateral arytenoid lateralization
  – Permanent tracheostomy
Ventriculocordectomy
Partial Laryngectomy
Unilateral Arytenoid Lateralization
Unilateral Arytenoid Lateralization
Permanent Tracheostomy
Postoperative Management

- Close monitoring in ICU
- Soft food in meatball form
- Feed from ground
- Metoclopramide
- +/- Antibiotics
- +/- Sedatives

Laryngeal Paralysis
(Post op care instructions)
No Neck Leads!
Water- Small amounts only
Dog should be standing with the water bowl placed on the floor.
HIGH RISK OF ASPIRATION
Food- Hand feed meatballs
(3-4 small meals a day)
Complications

- Aspiration pneumonia 8-33%
- Coughing / gagging 16%
- Return of clinical signs 4-8%
- Respiratory distress 2-4%
- Sudden death 3%
Prognosis

• 90% of dogs
  – Reduced respiratory signs
  – Increased exercise tolerance

• Majority of owners report
  – Improvement in QOL
  – Satisfied with decision to do surgery
Summary - Brachycephalic Syndrome

- Multiple components
- Progressive
- Can lead to respiratory distress
- Concurrent GI disease common
- Surgical management early in disease
- Critical anesthesia patients
Summary - Laryngeal Paralysis

- Common and important cause of URT obstruction in dogs
- Thorough evaluation for concurrent disease
- Medical management with mild signs
- Surgical management when more severe or with decreased quality of life
- Lifelong aspiration pneumonia risk
Thanks!

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Inspiratory Stridor
Normal Laryngeal Exam
Laryngeal Paralysis
Larynx Anatomy

Cranial view of a dissected canine larynx. (a) Corniculate process of arytenoid cartilage, (b) cuneiform process of arytenoid cartilage, (c) epiglottis, (d) vocal fold, (e) laryngeal ventricles, (f) cricoid cartilage, (g) muscular process of arytenoid cartilage.