

**Title:**

Diagnosis and Management of Upper Airway Disease

**Session Description:**

Clinically, there is a significant difference in the way our patients present with upper airway disease versus parenchymal disease. Rapid diagnosis of upper airway disease starts with a thorough assessment and physical examination of patients with labored breathing. This hour will be dedicated to discussion of methods to diagnose and treat upper airway disease in dogs and cats.

**Lecture Notes:**

Patients presented with labored breathing can be challenging in terms of the ability to rapidly obtain a diagnosis for timely treatment. Any patient that displays signs associated with labored breathing/hypoxia (cyanosis, orthopnea, collapse) should receive the benefit of supplemental oxygen. An all too common mistake made in the emergent situation is to rush to diagnostics prior to stabilization. Patients are likely to benefit from time with supplemental oxygen prior to performing diagnostics. While some advocate for a cocktail of sedation, corticosteroids and furosemide for patients presenting with labored breathing, a step-wise approach may be of more benefit not only for obtaining an accurate diagnosis but also for creating a treatment plan tailored to the patient's needs. While the patient is resting and receiving oxygen close attention to the breathing pattern can help focus the diagnostic course. Stridor and inspiratory effort indicate an upper airway issue while biphasic or expiratory effort are more indicative of lower airway or parenchymal disease. Patients with upper airway disease and labored breathing are stuck in a cycle of breathing heavily due to airway obstruction and worsening obstruction due to airway edema secondary to their breathing pattern. In these situations, sedation with butorphanol/benzodiazepine can help break the cycle. If supplemental oxygen, sedation and rest do not elicit the desired response, then the patient's airway may need to be secured with an endotracheal tube. While propofol or alfaxalone may be necessary to achieve a plane of sedation amenable to intubation, we prefer to rely on sedatives that do not affect the cardiovascular system. Upper airway obstruction can lead to cardiovascular instability which in turn can worsen as a result of sedation. For this reason, we try to intubate using a benzodiazepine and as little propofol/alfaxalone as possible. Intubation can be challenging in patients with an airway obstruction. An over-the-wire technique with a guidewire or long red rubber catheter may help guide the endotracheal tube through a tight spot. If intubation is not possible then a temporary tracheostomy must be performed. This is a life-saving procedure, so while attention to technique and sterility are important, speed is paramount. Once the patient is intubated, administration of supplemental oxygen in sternal recumbency can help improve oxygenation.

The cause of upper airway obstruction can be elucidated with knowledge of signalment and history in many cases. Small breed dogs will often have a collapsing trachea, brachycephalic breeds may have excessive upper airway tissue and large breed dogs are more likely to have laryngeal paralysis. A goose honking cough is common in dogs with tracheal collapse while a

throat-clearing cough and voice change are common in dogs with laryngeal paralysis. Upper airway examination and laryngoscopy/bronchoscopy are needed to confirm these diagnoses in order to accurately create a treatment plan for each individual patient. Regardless of the cause, early intervention may improve long-term outcome. Dogs with upper airway obstruction require high airway pressures to overcome the obstruction. The increase in airway is not isolated to the area of obstruction, but rather transferred to the lower airways as well. This can lead to shear injury to the alveoli, chronic inflammation and poor oxygen movement across the blood-air barrier (i.e. chronic bronchitis, fibrosis, etc.). In turn, chronic hypoxia can lead to pulmonary arterial hypertension and worsening of the hypoxia. For these reasons, early intervention may be of benefit to some patients. Classically, we have opted to exhaust medical management for diseases such as collapsing trachea and brachycephalic airway disease. However, waiting for salvage procedures may not be of benefit for our patients when chronic inflammation and secondary changes such as fibrosis and tracheal collapse could have been avoided.

Cats with upper airway obstruction can be very challenging to diagnose and manage. It is important to remember that cats can be affected with bacterial laryngitis that can completely obstruct their airway. If an upper airway exam in a cat is planned, it is strongly recommended to be ready for a tracheostomy. While the prognosis for laryngeal neoplasia is poor, there are reports of successful management of laryngeal paralysis and bacterial laryngitis in cats using temporary and permanent tracheostomy techniques.

#### References

- Temporary tracheostomy. Mazzafero EM. Top Companion Anim Med. 2013 Aug;28(3):74-8.
- Brachycephalic airway syndrome: management. Lodato DL, Hedlund CS. Compend Contin Educ Vet. 2012 Aug;34(8):E4
- Idiopathic Canine Laryngeal Paralysis as One Sign of a Diffuse Polyneuropathy: An Observational Study of 90 Cases (2007-2013). Bookbinder LC, et al. Vet Surg. 2016 Feb;45(2):254-60.