

WORLD SMALL ANIMAL VETERINARY ASSOCIATION WORLD CONGRESS - VANCOUVER 2001

[Front Page](#) | [Congress Site](#) | [WSAVA Site](#) | [Author Index](#) | [SEARCH](#)



Respiratory Endoscopy—A Visual Assessment of the Respiratory Tract

Brendan McKiernan ■ United States

Respiratory endoscopy (when performed by an experienced veterinarian) is one of the most valuable diagnostics available for the evaluation of airway diseases in dogs and cats. Specific procedures have been developed which allow for the assessment of the nasal cavity, larynx, tracheobronchial tree and pleural space. This seminar will focus on the indications, equipment, procedure and visual appearance of small animal airways as viewed using rhinoscopy, laryngoscopy and tracheobronchoscopy. As with many procedures, the benefits and results obtained from these procedures will be related to the degree of experience of the endoscopist. General anesthesia is required for all these procedures; I prefer gas anesthesia for rhinoscopy and injectable anesthetics for laryngoscopy and bronchoscopy. Pre-anesthetic laboratory tests are indicated to exclude co-existing diseases that might influence the choice of anesthetics or affect the animal's recovery.

Rhinoscopy

Rhinoscopy is the visual assessment of the nasal cavity, nasopharynx (NP) and in some instances the paranasal sinuses. A complete examination (involving both anterior and posterior rhinoscopy) requires general anesthesia and specific endoscopic equipment. The indications for rhinoscopy include sneezing and reverse sneezing, nasal discharge, and/or often some degree of airflow obstruction. Animals with epistaxis should have a coagulation profile (e.g., platelet count, and either an ACT or PT/PTT) performed and their blood pressure checked prior to starting.

For a complete evaluation of the nasal cavity, sinuses and nasopharynx should include skull radiographs, rhinoscopy and periodontal probing. Due to strong airway protective reflexes (sneezing and gagging), rhinoscopy requires a deep plane anesthesia, especially for posterior rhinoscopy. Topical lidocaine, sprayed on the mucosal surfaces, may help blunt some of these reflexes. Some degree of patience and practice is required to maneuver a flexible endoscope around the soft palate and into a position to clearly visualize the NP. It is helpful to remember that the retroflexed endoscope will invert the image as seen by the endoscopist. When properly positioned the following structures should be visible: free edge of the soft palate, soft palate, mucosa of the dorsal nasopharyngeal wall, opening to the eustachian tubes (on the dorsal, lateral walls), choanae, and some of the ectoturbinates in either nasal cavity or vomer bone and the nasal septum. The mucosa should be pink and not friable; there should be minimal secretions and the choanae should be patent.

Typical lesions that I have encountered in the NP include:

- Mucosal abnormalities: inflammation, hyperemia, increased mucosal fragility or friability, and lymphoid follicle development (indicates chronicity) or mucosal proliferation (this may be lymphoma in cats).
- Loss of the normal amount of space in the NP: due to tumor, polyp, foreign body, stricture, web, or excess secretions.

Alternative Medicine
Anesthesia
Animal Welfare
Behaviour
Cardiology
Clinical Pathology
Dental Congress 1: 1
Dental Congress 1: 2
Dental Congress 1: 3
Dental Congress 2: 1
Dental Congress 2: 2
Dental Congress 2: 3
Dermatology
Emergency & Critical Care
Feline Endocrine & Infectious Dz
Feline Gastroenterology
Feline Urology/Nephrology
Gastroenterology
Imaging
Infectious & Zoonotic Diseases
Management
Medicine
Neurology
Nutrition
Oncology
Ophthalmology
Pharmacology
Respiratory Medicine
Sneezing and Snorting
Dyspnoea and Coughing
▶ Respiratory Endoscopy
Inhaled Drugs for Feline Asthma
Bacterial Pneumonia
Canine Chronic Bronchitis
Pulmonary Mycoses
Bronchopulmonary Parasite Infections
Surgery & Sports Medicine
Surgery
Oral Presentations
Poster Presentations

- Miscellaneous: parasites (mites), drainage from eustachian tubes, NP wall abscess.

Once the NP has been examined, the mouth gags can be removed and anterior rhinoscopy performed. The endoscope should initially be directed dorsally and medially (to bypass the bulbous alar cartilage) and then straightened out and advanced into the nasal cavity (parallel to the nasal septum). This will ensure that the scope enters the common meatus and minimizes the potential to traumatize tissues at the entrance of the nasal cavity. With a small scope and a larger sized animal, it may be possible to traverse the length of the nasal cavity and enter into the NP.

The following structures are routinely visible during anterior rhinoscopy:

- Opening to the nasolacrimal duct—ventral edge of the alar cartilage.
- Nasal septum (vertically aligned, opposite of turbinates).
- Turbinates (dorsal and ventral conchae), all arise from lateral aspect of the nasal cavity.
- Four meatii (dorsal, middle, ventral and common)—it is very important to note the size of these airways!
- Ethmoidal labyrinth caudally.
- Maxillary and frontal sinuses—only reached if there has been turbinate destruction/loss.

Anterior rhinoscopy can be made very simple if the size of the air channels (the meatii) or simply the amount of visible space is carefully evaluated. The amount of visible space can **only** be: 1) normal; 2) increased; or 3) decreased. As in the NP, the anterior respiratory mucosa should be pink, not friable with minimal secretions present.

Typical lesions that I have encountered during anterior rhinoscopy include:

- Mucosal abnormalities: inflammation, hyperemia, increased mucosal fragility or friability, lymphoid follicle development (less commonly found than in the NP).
- Increased amount of visible space: turbinate loss, chronic inflammation (usually associated with such conditions as canine nasal aspergillosis or secondary to bacterial infections, e.g., tooth abscess, foreign body or feline viral infection).
- Decreased amount of visible space: the normal air space (meatus) is filled by secretions, tissue (tumor, granuloma, polyp), and foreign body.
- Secretions: all types.
- Miscellaneous findings: parasites (nasal mites), fungal plaques.

Cultures from the nasal cavity, although frequently positive, are not thought to represent primary bacterial disease. Most nasal bacterial infections are secondary to another problem and usually clear up with minimal antibacterial treatment if the underlying and primary problem is resolved (e.g., tooth root abscess, foreign body). Pinch biopsy forceps may be passed through the endoscope (rigid and flexible) or along side the scope to biopsy a lesion in question using direct visual guidance. Care must be taken to obtain multiple biopsies and to get samples deep within the tissue (to avoid sampling the necrotic edge of a lesion). In the study by Lent and Hawkins, 83% of 94 cases had a definitive diagnosis made using gross rhinoscopy and rhinoscopic assisted biopsy. Touch imprints for cytology can be reviewed while awaiting histopathology results.

Laryngoscopy

Laryngoscopy is the gold standard for assessing laryngeal disease as it allows for the evaluation of both anatomic lesions as well as disorders of intrinsic laryngeal function/motion. Although routine equipment may be used (tongue depressor, light source), using an endoscope allows for a more detailed evaluation of the larynx. I will also use the endoscope to look into the NP and down into the trachea for any co-existing problems. Prior to anesthetizing the animal, be sure to evaluate for any loss of sensory function (gag reflex) in the oropharynx, as this may be associated with an increased risk of aspiration in the future. Normally, a light plane of anesthesia (ideally so the animal is still gagging) is used. Following assessment of the anatomic aspects, I routinely recommend the use of a respiratory stimulant (doxopram HCl, Dopram-V, 1 mg/lb BW IV) to overcome concerns about anesthetic depth and to maximize intrinsic laryngeal motion; the onset is fast, usually within ~15–30 sec, with a duration ~2–3 minutes.

Typical lesions that I have observed in the pharynx/larynx during laryngoscopy include:

- Elongated soft palate: should be anticipated and treated at the time of scoping if possible (resection).
- Laryngeal mucosal edema: this can be severe in animals with a chronic history of upper airway noise.
- Edematous/everted laryngeal sacculles (lateral ventricles): eversion can be very dynamic so look closely!
- Laryngeal paralysis: may be unilateral or bilateral.
- Laryngeal collapse: a life threatening complication of chronic upper airway obstruction.
- Laryngeal neoplasia: lymphoma, squamous cell carcinoma, other carcinomas are the common types.
- Epiglottic entrapment: secondary to other inspiratory problems, typically very intermittent.

Biopsies may be taken under direct visualization. Edema is often diagnosed or may result from vigorous laryngeal manipulation; it should be treated with corticosteroids following completion of the procedure. Severely obstructive lesions may require the placement of a temporary tracheostomy to maintain a patent airway while ancillary measures are taken to treat the obstruction (corticosteroids for edema, laser resection of mass lesions, or perhaps definitive laryngeal paralysis surgery).

Bronchoscopy

Bronchoscopy has been an integral part of respiratory practices in veterinary medicine since at least the early 1970s. There is no question that bronchoscopy (including bronchoalveolar lavage for cytology and culture) is the gold standard for the diagnosis of lower respiratory tract diseases in small animals. Bronchoscopy may be used for diagnostic, therapeutic and prognostic purposes. Diagnostic bronchoscopy obtains visual information concerning the airways (e.g., compression, dynamic collapse, and dilation) as well as samples (cytology, culture, and occasionally biopsy) to help establish a specific etiologic diagnosis. General anesthesia is necessary to control these reflexes during bronchoscopy, thereby preventing trauma to the airways, and at the same time protecting the endoscope throughout the procedure. The ideal anesthetic should provide good patient restraint, have minimal cardiorespiratory effects, be either reversible or of short duration and allow for a smooth recovery period. The availability of newer, short acting and/or reversible injectable anesthetics has allowed bronchoscopy to be performed on patients with

minimal concern. My current anesthetic protocol utilizes either atropine or glycopyrolate, either acepromazine or butorphanol with propofol for the procedure. This form of anesthesia is very beneficial because it not only provides adequate anesthesia for the procedure, but also allows for rapid patient recovery, an important factor in geriatric patients.

The bronchoscopist must have a good understanding of normal endoscopic lung anatomy if she/he is to recognize abnormalities and diseases. The differentiation (recognition) of normal from what is abnormal is a subjective one. Experience and practice greatly improve the clinician's ability to detect lesions at an early stage. I routinely examine the larynx (anatomy and intrinsic function/motion if possible), the cervical and intrathoracic trachea and then the carina before sequentially evaluating all the lobar and finally as many segmental and/or sub-segmental bronchi as possible (the latter varies with patient and endoscope size). Changes in gross anatomy, fixed and dynamic lumen size, abnormalities in airway shape, mucosal/submucosal characteristics, and the presence of secretions should be noted. Examples of normal and abnormal endoscopies will be shown; current references also contain excellent color photographs of these scopings. Experience and practice will improve an endoscopist's ability to detect early lesions. Samples obtained (cytology, culture, and biopsy) are then relied upon to establish a specific diagnosis.

Bronchoalveolar lavage (BAL) is essentially a washing of the distal airways and alveoli. Material obtained from this area is thought to represent the distal airways, alveoli, and the intersitium of the lungs. The bronchoscope (or catheter) is gently wedged in a selected bronchus and then 10–20ml of sterile saline is flushed into the airways and immediately aspirated using gentle syringe suction. I use two aliquots per site and two sites per animal. The sites are evaluated individually with total cell counts and a cytospin for differential cell counts but the fluid is combined for quantitated culture. Difficulties with the procedure (poor returns) may be expected when a proportionately large endoscope prevents wedging in a smaller bronchus, or when the airways are malacic. In the former situation, the fluid is dispersed into too large an area to be easily retrieved, and in the latter, the airways collapse (even with gentle suction), preventing the return of any significant volume of the infusate. The predominant cell in all species should be the alveolar macrophage (70+ %), with less than 3–8% of all other cell types (except the cat which may have up to 20+ % eosinophils and still be considered healthy).

Cultures from the lower airways are helpful in establishing a specific diagnosis and selecting an appropriate antibiotic based on sensitivity results. Gram stain cytology helps in interpreting the culture results. Contamination resulting from the mixing of upper respiratory tract secretions with lower airway samples must obviously be avoided. (This is suggested upon by finding squamous epithelium and/or the large bacterium *Simonsiella* spp. which are both common to the oral cavity). Peeters *et al.*, has recently shown that quantitated BAL cultures are important in the differentiation of airway colonization from actual infection. Mycoplasma cultures are possible using specialized transport media (e.g., Amies media) and overnight shipment to selected laboratories. Microbiological results must always be interpreted in light of the cytology obtained from the same site.


Reading List on Request





27 WSAVA CONGRESS
8 FECAVA CONGRESS
30 AVMA CONGRESS

3-9-56 OCTOBER 2002
GRANADA, SPAIN



powered by **VIN**

[WSAVA Contact Information](#)
Copyright 2005, WSAVA