



International Journal of Veterinary Sciences and Animal Husbandry



ISSN: 2456-2912

NAAS Rating (2025): 4.61

VET 2025; 10(12): 631-635

© 2025 VET

www.veterinarypaper.com

Received: 02-09-2025

Accepted: 06-10-2025

David Karunyakaran H

Ph.D. Scholar, Department of
Veterinary Clinical Medicine,
Madras Veterinary College,
Tamil Nadu Veterinary and
Animal Sciences University,
Chennai, Tamil Nadu, India

Canine upper respiratory tract diseases: What do we need to know?

David Karunyakaran H

DOI: <https://www.doi.org/10.22271/veterinary.2025.v10.i12j.2900>

Abstract

Upper airway disorders are a major cause of chronic respiratory signs in dogs, often presenting with overlapping clinical features that challenge diagnosis and management in practice. Nasal disease commonly manifests with discharge, sneezing, epistaxis, facial deformity, and airflow reduction, with differentials including neoplasia, fungal rhinitis, inflammatory rhinitis, dental disease, and systemic illnesses. Thorough history, targeted physical examination, advanced imaging, rhinoscopy, and histopathology form the backbone of diagnostic workup, guiding specific interventions. Laryngeal diseases such as laryngeal paralysis, laryngeal collapse, and laryngeal masses lead to upper airway obstruction, stridor, exercise intolerance, and potentially life-threatening dyspnea; management ranges from emergency stabilization to surgical procedures like arytenoid lateralization or permanent tracheostomy. Tracheal collapse and bronchomalacia in small breeds produce a characteristic chronic honking cough and dynamic airway obstruction, requiring long-term medical management, environmental modification, and, in refractory cases, stenting or ring placement. Brachycephalic obstructive airway syndrome in short-muzzled breeds reflects congenital anatomical compromise, with progressive secondary changes that necessitate early surgical correction and lifelong management to optimize quality of life.

Keywords: Canine nasal disease, laryngeal and tracheal collapse, BOAS

Introduction

Canine Nasal Disease

Nasal conditions in dogs often present with signs such as nasal discharge, sneezing, epistaxis (nosebleeds), pawing at the muzzle, changes in facial shape, facial pain, excessive tearing, loss of nostril pigmentation, mouth breathing, bad breath, noisy breathing, coughing, and very rarely seizures. Although signs are typical for nasal disease, they also manifest as symptoms of systemic illnesses like coagulopathies, hypertension, distemper, or ehrlichiosis.

Gathering Clinical Information

A comprehensive history and physical exam are vital first steps. Nasal disorders are more prevalent in dolichocephalic (long-nosed) and mesaticephalic (medium-nosed) breeds, with long-nosed and larger dogs having a higher risk for developing nasal tumours, especially as they age. Key points in patient history include:

- Other symptoms not directly related to the nose (like weight loss or bruising)
- Onset and duration of nasal symptoms
- Response to previous treatments
- Unilateral (one-sided) versus bilateral (both sides) nasal discharge
- Changes in the type of discharge over time
- Seasonal variations
- Environmental changes
- Progression of symptoms

Corresponding Author:

David Karunyakaran H

Ph.D. Scholar, Department of
Veterinary Clinical Medicine,
Madras Veterinary College,
Tamil Nadu Veterinary and
Animal Sciences University,
Chennai, Tamil Nadu, India

Generally, acute unilateral nasal discharge points toward foreign bodies or trauma, whereas chronic, bilateral, or progressive signs raise suspicion for conditions like neoplasia (tumours) or fungal rhinitis.

Physical Examination

A detailed physical examination should focus on:

- The type and location of nasal discharge
- Signs of facial deformity or ulceration
- Patency of airflow from each nostril
- Dental and gum health
- Oral health (roof of mouth to pharynx)
- Eye pain or bulging
- Lymph node enlargement

Findings such as facial asymmetry, ulceration, and epiphora (excessive tearing) are often clues to underlying tumours, particularly if airflow is reduced on one side. Loss of nostril pigmentation can suggest naturally occurring fungal infections (aspergillosis), while severe malodour or purulent discharge may indicate infection or necrosis.

Diagnostic Approaches

Imaging

The choice of imaging depends on resources and the owner's willingness to pursue advanced care:

- **Dental radiographs:** For checking dental and periodontal disease.
- **Skull and thoracic radiographs:** Assess bony and soft tissue structures, though sensitivity is lower than other modalities.
- **Computed tomography (CT) and magnetic resonance imaging (MRI):** Provide superior detection and differentiation of soft tissue versus bone changes; CT is particularly helpful for evaluating tumour margins, bone invasion, and sinus involvement.
- **Rhinoscopy:** Direct visual access to nasal passages; useful for identifying objects, fungal plaques, or structural abnormalities, and for guiding biopsies.

	Skull Radiographs	CT	MRI
Availability	Readily available	Moderate availability	Least available
General anesthesia	Required	Anesthesia or sedation	Required
Cost	Least expensive	Moderately expensive	Most expensive
Show cribriform plate integrity	Poor	Excellent	Excellent
Ability to discriminate between tissue and mucus	Poor	Excellent (with contrast)	Excellent
Sensitivity to detect soft tissue changes	Poor to moderate	Good	Excellent
Sensitivity to detect bony changes (lysis or hyperostosis)	Moderate	Excellent	Good
Ability to evaluate sinuses	Moderate	Excellent	Good to excellent

Imaging should be done before rhinoscopy due to possible bleeding from rhinoscopy that can obscure radiographic findings.

Laboratory and Other Tests

- **Serological tests:** Particularly useful for detecting sinonasal aspergillosis and other infections.
- **Fine-needle aspiration (FNA) of lymph nodes:** Not highly sensitive but can detect metastatic spread of tumours.
- **Cytology:** Smears from biopsies, nasal swabs, or discharges may sometimes aid diagnosis.

- **Biopsy and histopathology:** The gold standard for definitive diagnosis of neoplasia, fungal infection, or chronic inflammatory rhinitis.
- **Nasal and fungal cultures:** Bacterial cultures are rarely useful except in cases of suspected primary infection; fungal cultures are reserved for cases with visible plaques.
- **Nasal lavage/hydropulsion:** Can help retrieve cells or tissue for analysis, or dislodge foreign materials.

Surgical Diagnostics

If less invasive tests fail, surgical approaches like rhinotomy or sinusotomy may be necessary for diagnosis and sometimes for therapy, especially for certain tumours and otherwise unreachable fungal lesions.

Types of Nasal Disease

- **Nasal Neoplasia:** Accounts for a significant percentage of chronic nasal discharge cases, with adenocarcinoma being the most common in dogs. Other types include undifferentiated carcinoma, chondrosarcoma, squamous cell carcinoma, fibrosarcoma, osteosarcoma, sarcoma, lymphoma, and rare tumours like melanoma or neuroendocrine carcinoma.
- **Inflammatory Rhinitis:** Includes idiopathic lymphoplasmacytic rhinitis, suppurative, eosinophilic, and granulomatous forms.
- **Fungal Rhinitis:** Sinonasal aspergillosis is a classic example, characterized by the loss of pigmentation and white plaques on examination.
- **Periodontal/Oral Disease:** Dental abscesses and oronasal fistulas can cause or mimic nasal disease.
- **Systemic Illness:** Differs by presenting as acute onset of epistaxis or discharge without other nasal findings.

Diagnostic and Treatment Pathway

Owners should be informed about the likelihood of various diagnoses according to the dog's breed, age, and presenting symptoms, and a stepwise protocol should guide diagnostics:

- Exclude systemic and oral/dental diseases first.
- Use imaging and endoscopy for further evaluation.
- Biopsy is often required for a final diagnosis, especially in cases of neoplasia or persistent rhinitis.
- Treatment, including surgery, radiation, or antifungal therapy, depends on diagnosis, owner's willingness, and resources.

Laryngeal Diseases

Diseases affecting the larynx in dogs and cats can lead to varying degrees of upper airway obstruction, which may be potentially life-threatening if not addressed promptly. The most commonly encountered laryngeal conditions include laryngeal paralysis, laryngeal collapse, and the presence of laryngeal masses or tumours. Animals with such diseases frequently show clinical signs like noisy breathing (stertor or stridor), wheezing, coughing, gagging, and might develop severe difficulty breathing. Accurate diagnosis typically begins with a thorough visual examination of the upper airway to determine the precise location and extent of the obstruction.

Laryngeal Anatomy and Function

The larynx is composed of several cartilages—paired arytenoids and unpaired epiglottis, cricoid, and thyroid—which together surround the rima glottidis (the opening

between the vocal cords). These structures, along with the intrinsic laryngeal muscles, control airflow during breathing, protect the lower airway during swallowing, and have a role in vocalization. The cricoarytenoideus dorsalis muscle plays a crucial part in enlarging the glottis during inspiration. The caudal laryngeal nerve (a branch of the recurrent laryngeal nerve) controls all intrinsic laryngeal muscles except the cricothyroid, which is innervated by the cranial laryngeal nerve.

Laryngeal Paralysis in Dogs

Causes

Laryngeal paralysis is a commonly observed disorder in older, large-breed, and giant-breed dogs, and it can occur either as a congenital or acquired condition. Certain breeds like Bouvier des Flandres, Siberian Huskies, Bull Terriers, and white-coated German Shepherds are predisposed to congenital forms, often tied to specific genetic mutations. Acquired laryngeal paralysis is more typical in Labrador Retrievers, Golden Retrievers, Saint Bernards, and Newfoundlands. Causes include nerve or muscle damage due to polyneuropathy, trauma (accidental or surgically induced), or the presence of neck or thoracic masses. Sometimes the exact cause can't be identified, and such cases are termed idiopathic; however, mounting evidence suggests many cases actually represent a progressive generalized polyneuropathy, known as GOLPP (geriatric-onset laryngeal paralysis polyneuropathy).

Clinical Presentation

Affected dogs often present with noisy inspiratory breathing and exercise intolerance. Early signs can include a change in bark, mild coughing, or gagging. As the disease advances, severe respiratory distress, cyanosis (bluish gums), and collapse may occur. Some dogs also have swallowing difficulties (dysphagia) and progressive weakness in their hind limbs due to neuropathy. Signs may worsen during exercise or in hot, humid environments. The classic exam finding is upper airway stridor.

Diagnosis

Diagnosis includes a combination of physical examination, neurologic and orthopedic assessments, bloodwork, thyroid function tests, and thoracic radiographs (to exclude aspiration pneumonia and other problems like megaesophagus). Definitive diagnosis requires examination of the larynx under light anesthesia using a laryngoscope or similar tool; the lack of abduction (opening) of the arytenoid cartilages during inspiration is diagnostic. Certain drugs (propofol, alfaxalone) are commonly used for anesthesia during diagnosis, and doxapram may be administered to enhance respiratory movement during assessment.

Management

Emergency Care

For animals in acute distress, priority is given to *oxygen therapy*, *short-acting steroids* (dexamethasone 0.1-1 mg/kg IV), and *sedatives* such as acepromazine, butorphanol, or buprenorphine. *Cooling* measures may be necessary for hyperthermic patients. When conservative measures fail, intubation or temporary tracheostomy may be required, though the latter is associated with significant complications. Mild cases, especially unilateral paralysis, may be managed with *weight loss*, *exercise restriction*, and *anti-inflammatory medication*. Surgical intervention is recommended for bilateral paralysis, with unilateral arytenoid lateralization (tie-

back surgery) being the procedure of choice. Other techniques include partial laryngectomy (removal of vocal cords and parts of arytenoids) or permanent tracheostomy for irreversible or severe cases. Each method carries risks, with aspiration pneumonia being the most significant long-term complication. Factors increasing risk include pre-existing aspiration, oesophageal dysfunction, and post-operative opioid use.

Prognosis

Most dogs receiving surgery for laryngeal paralysis experience improved airway function and quality of life. However, up to 21% may develop aspiration pneumonia post-operatively, with the risk persisting lifelong. Dogs with pre-existing neurologic disease, or those needing preoperative tracheostomy, have a worse prognosis. Owner satisfaction and survival rates are generally high, particularly if major complications are avoided.

Laryngeal Collapse

Laryngeal collapse most often results from chronic upper airway obstruction, frequently associated with brachycephalic airway syndrome (short-nosed breeds like bulldogs and pugs). The constant increased airway pressure over time leads to cartilage fatigue and collapse, which is graded in stages:

- **Stage 1:** Everted laryngeal sacculles
- **Stage 2:** Aryepiglottic collapse with medial deviation of cuneiform processes
- **Stage 3:** Collapse of corniculate processes

Diagnosis requires careful laryngeal examination under anaesthesia. Surgical correction may be effective in early stages (with saccule removal), but options for advanced collapse are limited. Some brachycephalic dogs benefit from additional surgical procedures to correct elongated soft palates and narrowed nostrils. Permanent tracheostomy may be necessary in severe, refractory cases, but entails a high degree of risk and long-term management needs.

Laryngeal Masses

Tumours of the larynx are rare in both dogs and cats. In dogs, various malignant and benign tumour types have been reported. In cats, squamous cell carcinoma and lymphoma predominate. Small masses may be removed surgically, while larger or more invasive tumours require palliative interventions or, in some cases, radiation. The prognosis is generally guarded due to late presentation and difficulty achieving a cure. Inflammatory laryngeal disease is similarly rare and is usually treated with steroids, debulking, or permanent tracheostomy.

Tracheal Collapse

Tracheal and airway collapse, particularly tracheal collapse, is a frequent cause of chronic cough in dogs. The condition arises when the tracheal cartilage loses its strength, leading to a flattening of the rings and protrusion of the tracheal membrane, which narrows the airway and restricts airflow. This results in the characteristic dry, honking cough and can cause varying degrees of breathing difficulty. Severe cases may display a W-shaped distortion of the trachea.

Key Concepts

- Tracheal collapse mainly affects the cervical (neck) and intrathoracic (chest) portions of the trachea. It is most prevalent in middle-aged or older small and toy breeds,

including Yorkshire Terriers, Pomeranians, and Chihuahuas.

- Bronchomalacia, which is similar but involves the large bronchi containing cartilage, can affect any breed and is also known as airway or bronchial collapse. The condition is marked by structural weakness in bronchial cartilage, leading to chronic cough, wheezing, and breathing difficulties.

Causes and Pathophysiology

- The root causes of airway collapse are multifaceted and not entirely clear. Possible factors include congenital cartilage abnormalities, chronic inflammation, loss of water and matrix elements from cartilage (e.g., glycosaminoglycan deficiency), and external pressures.
- Secondary triggers, such as irritants, bronchitis, obesity, and prior tracheal intubation, can precipitate clinical symptoms.
- Dynamic airway collapse may worsen tracheal inflammation and mucus accumulation, creating a persistent cycle of airway obstruction.

Clinical Presentation

- Most affected dogs are middle-aged to elderly and often overweight.
- Clinical signs typically include a dry, harsh cough provoked by excitement, physical activity, eating, drinking, or pulling on the leash.
- In severe cases, dogs may develop rapid breathing, exercise intolerance, and cyanosis due to severe airway narrowing.
- Bronchomalacia is often seen alongside tracheal collapse, notably in brachycephalic breeds, and can be associated with laryngeal abnormalities.

Diagnostic Approach

- Diagnosis is based on clinical signs, examination, and imaging studies. Bloodwork and heartworm tests are used to exclude concurrent disorders.
- Radiographs (X-rays) are useful but may miss or underestimate collapse, especially at the carina (the division of the trachea into the bronchi). Fluoroscopy can better visualize dynamic collapse but is mostly limited to referral centers.
- Bronchoscopy is considered the gold standard, directly visualizing the airways and grading the extent of collapse (Grade 1 - 25% collapse, Grade 2 - 50% collapse, Grade 3 - 75% collapse, Grade 4 - 90% collapse). Bronchoalveolar lavage during bronchoscopy can help detect underlying inflammation or infection.

Treatment Strategies

- Medical management targets symptom reduction and controlling secondary complications:
- Environmental management (cool, low-humidity conditions; stress reduction; use of a harness instead of a collar).
- Weight loss is crucial for improving symptoms, especially for overweight dogs.
- Sedatives and Cough Suppressants
- Acepromazine
- 0.01-0.1 mg/kg subcutaneously every 4-6 hours.
- Butorphanol

- 0.05-0.1 mg/kg subcutaneously every 4-6 hours (for sedation and cough suppression).
- 0.55 mg/kg orally 2-4 times per day (as antitussive in medical management).
- Hydrocodone
- 0.22 mg/kg orally 2-4 times per day (for cough suppression).
- Anti-inflammatory Drugs
- Prednisone
- 0.5 mg/kg orally twice daily for 5 to 7 days (short-term, for inflammation control).
- Fluticasone Propionate (inhaled corticosteroid)
- 110 micrograms per puff, administered via face mask and spacing chamber.
- Bronchodilators
- Theophylline (methylxanthine bronchodilator, extended release)
- 10 mg/kg orally every 12 hours.
- Antibiotics are reserved for treating secondary infections.
- Surgical options include extraluminal tracheal rings (for cervical collapse) and intraluminal stents (for intrathoracic collapse) when medical therapy fails. Both approaches have possible complications, and case selection is essential.

Prognosis

The long-term outlook for dogs with tracheal or airway collapse depends on disease severity, response to therapy, and ongoing management. Most dogs can achieve good quality of life with dedicated care focusing on weight control, infection management, and—if necessary—surgical intervention.

Brachycephalic Obstructive Airway Syndrome

Brachycephalic Obstructive Airway Syndrome (BOAS) is a chronic, lifelong condition primarily affecting brachycephalic (short-headed or short-muzzled) dog breeds and occasionally cats. It is characterized by a group of anatomical abnormalities in the upper airway that lead to partial airway obstruction and respiratory difficulties.

It is a pathological condition of obstructed airflow through the upper respiratory tract in animals with brachycephalic skull conformation. The condition arises due to anatomical abnormalities related to the shortened muzzle and compressed skull bones in affected breeds like English bulldogs, pugs, French bulldogs, Boston terriers, and others. This syndrome can cause severe respiratory distress ranging from noisy breathing to life-threatening airway obstruction.

Etiology

The etiology of BOAS is mostly genetic and breed-related, linked to selective breeding for a short muzzle and a flattened face. The abnormal skull conformation leads to upper airway anatomical defects, including stenotic (narrowed) nostrils, elongated soft palate, hypoplastic (underdeveloped) trachea, and secondary issues such as everted laryngeal sacculles, laryngeal collapse, and redundant nasal turbinates.

Pathogenesis

The primary anatomical abnormalities include

- **Stenotic nares:** Narrowed nostrils restrict airflow through the nose.
- **Elongated soft palate:** The soft palate is excessively long, partially blocking the entrance to the trachea.

- **Hypoplastic trachea:** Smaller-than-normal tracheal diameter.

These abnormalities increase airflow resistance, forcing the animal to work harder to breathe. The increased negative pressure in the airway leads to secondary changes such as:

- Everted laryngeal sacculles (protrusion of tissue into the airway)
 - Laryngeal collapse (collapse of laryngeal cartilages)
 - Swelling and inflammation of airway tissues
- This worsens airway obstruction, leading to a vicious cycle of respiratory distress, hypoxia, and increased respiratory effort.

Clinical Signs

Clinical signs vary by severity but commonly include:

- Noisy breathing or snoring
- Mouth breathing and increased respiratory effort
- Frequent panting and exercise intolerance
- Cyanosis (bluish discoloration of tongue/gums)
- Gagging, difficulty swallowing
- Collapse or fainting episodes in severe cases

Secondary signs may include gastrointestinal issues like reflux due to increased intra-thoracic pressure and chronic hypoxia consequences. Signs often worsen with heat, stress, exercise, or with aging due to progressive airway deterioration.

Diagnosis

Diagnosis is based on clinical signs, breed predisposition, and physical examination. Definitive diagnosis requires a sedated upper airway examination (endoscopy) to visualize the airway abnormalities. Additional diagnostics like thoracic radiographs and fluoroscopy help assess airway structure and function. Owners' observations of breathing problems and exercise tolerance are important clinical clues.

Treatment and Management

Treatment aims to correct anatomical abnormalities surgically and provide medical management for respiratory support:

- Surgical correction typically includes widening stenotic nares (nares resection), shortening the elongated soft palate, and removing everted laryngeal sacculles.
- In advanced cases, procedures may address laryngeal collapse.
- Medical management includes weight control, avoidance of heat and stress, anti-inflammatory medications, and sometimes oxygen therapy during crises.

Management is usually lifelong, with early intervention improving quality of life and prognosis. Owners must monitor for worsening signs and prevent obesity and overheating.

Conflict of Interest

Not available

Financial Support

Not available

References

1. Cohn LA. Canine nasal disease: an update. Vet Clin North Am Small Anim Pract. 2020;50(2):359-374.

2. MacPhail CM. Laryngeal disease in dogs and cats: an update. Vet Clin North Am Small Anim Pract. 2020;50(2):295-310.
3. Della Maggiore A. An update on tracheal and airway collapse in dogs. Vet Clin North Am Small Anim Pract. 2020;50(2):419-430.
4. Johnson LR, Pollard RE. Tracheal collapse and bronchomalacia in dogs: 58 cases (7/2001-1/2008). J Vet Intern Med. 2010;24(2):298-305.
5. Mitze S, Barrs VR, Beatty JA, Hobi S, Bęczkowski PM. Brachycephalic obstructive airway syndrome: much more than a surgical problem. Vet Q. 2022;42(1):213-223.

How to Cite This Article

Karunyakaran DH. Canine upper respiratory tract diseases: What do we need to know? International Journal of Veterinary Sciences and Animal Husbandry. 2025;10(12):631-635.

Creative Commons (CC) License

This is an open-access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.