

Tracheal Collapse

(Abnormality of the Windpipe)

Basics

OVERVIEW

- “Upper respiratory tract” (also known as the “upper airways”) includes the nose, nasal passages, throat (pharynx), and windpipe (trachea)
- “Lower respiratory tract” (also known as the “lower airways”) includes the bronchi, bronchioles, and alveoli (the terminal portion of the airways, in which oxygen and carbon dioxide are exchanged)
- The windpipe or trachea is the large airway that carries air from the nose and throat to the airways (bronchi) that go to the lungs
- “Tracheal collapse” is a reduction in the diameter of the lumen of the windpipe (trachea) during breathing; it is considered to be a “dynamic” process as the lumen's diameter changes with the movements of breathing (inspiration and expiration)
- May involve the windpipe (trachea) in the neck (known as the “cervical trachea”), the windpipe (trachea) within the chest (known as the “intrathoracic trachea”), or both segments
- “Broncho-” refers to the bronchus (plural, bronchi); “malacia” refers to weakening or softening of an organ or tissue; “bronchomalacia” refers to a condition in which the bronchi and smaller airways collapse due to weakening of the walls of the bronchi—bronchomalacia may be present by itself or may be present at the same time as collapse of the windpipe or trachea (tracheal collapse)
- Compression of the windpipe (trachea) or bronchi as a result of enlarged lymph nodes or the presence of tumors are not considered part of this condition



GENETICS

- Unknown

SIGNALMENT/DESCRIPTION OF PET

Species

- Primarily dogs, rarely cats

Breed Predispositions

- Miniature poodles, Yorkshire terriers, Chihuahuas, Pomeranians, and other small- and toy-breed dogs

Mean Age and Range

- Middle-aged to elderly—onset of signs at 4–14 years of age
- Severely affected pets may be less than 1 year of age

SIGNS/OBSERVED CHANGES IN THE PET

- Usually worsened by excitement, heat, humidity, exercise, or obesity

- Dry, honking cough
- May have long-term (chronic) intermittent coughing or difficulty breathing
- Retching (attempting to vomit)—often seen due to attempts to clear respiratory secretions from the voice box (larynx)
- Rapid breathing (known as “tachypnea”), exercise intolerance, and/or severe breathing difficulty (known as “respiratory distress”)—common
- Breathing difficulty (respiratory distress)—seen during inspiration (breathing in) with collapse of the windpipe in the neck (cervical tracheal collapse); seen during expiration (breathing out) with collapse of the windpipe within the chest (intrathoracic tracheal collapse)
- Bluish discoloration of the skin and moist tissues (mucous membranes) of the body caused by inadequate oxygen levels in the red blood cells (known as “cyanosis”) or fainting (known as “syncope”)—may see in severely affected individuals
- Increased tracheal sensitivity
- Whistling sounds (wheezing) or musical sounds over the narrowed area of the windpipe may be heard while listening with a stethoscope (known as “auscultation”)
- A “snap” sound may be heard (when listening with a stethoscope) at the end of expiration, when large segments of the windpipe (trachea) collapses within the chest (intrathoracic tracheal collapse) during forceful expiration
- Abnormal breath sounds on listening to the lungs with a stethoscope (auscultation)—increased intensity or breath sounds over the bronchi; short, rough snapping sounds (known as “crackles”); and squeaking or whistling sounds (known as “wheezes”)—indicate coexistent small airway disease
- Heart murmurs (mitral valve insufficiency murmurs)—often are found in small-breed dogs with tracheal collapse
- Normal to low heart rate
- Loud second heart sound detected when listening to the heart with a stethoscope (auscultation)—suggests increased blood pressure within the lungs (known as “pulmonary hypertension”)
- Enlarged liver (known as “hepatomegaly”)—cause unknown

CAUSES

- Unknown cause
- Defects in the development of cartilage in the windpipe (trachea) or nutritional factors are suspected
- Long-term (chronic) small-airway disease suggested to contribute to development of weakening of the bronchi (bronchomalacia), but relationship is not clear

RISK FACTORS

- Obesity
- Infection or inflammation of the airways
- Upper airway blockage or obstruction
- Intubation with an endotracheal tube (passage of an endotracheal tube through the mouth and into the windpipe [trachea] to allow oxygen to reach the lungs)

Treatment

HEALTH CARE

- Outpatient—stable pets
- Inpatient—oxygen therapy and sedation for severe breathing difficulty (respiratory distress) or for severely anxious pets

ACTIVITY

- Severely limited, until the pet is stable
- During management of disease—gentle exercise recommended to encourage weight loss

DIET

- **Most affected dogs improve after losing weight**
- Institute weight-loss program with a high-fiber reducing diet or metabolic diet

- Feed 80% of total daily requirement of calories; use a slow weight-loss program

SURGERY (RARE)

- Surgery—may benefit some pets, primarily those with collapse of the windpipe (trachea) in the neck (cervical tracheal collapse)
- Treatment of upper airway obstructive disorders (such as elongated soft palate or turning inside-out of a portion of the voice box or larynx [known as “everted laryngeal sacculae”])—may reduce tracheal signs Placement of stents to keep the lumen of the windpipe open, in selected pets (primarily with collapse of the windpipe [trachea] in the neck [cervical tracheal collapse]) by a skilled surgeon—will enhance quality of life and reduce clinical signs when adequate stabilization of the airway can be achieved and when weakening of the bronchi (bronchomalacia) does not limit resolution of disease
- A “stent” is a medical tube used to hold open an airway; stents can be life-saving in certain cases with airway collapse within the chest

Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

- Sedation and cough suppression—butorphanol; addition of a tranquilizer (acepromazine) may enhance sedative effects and further reduce the cough reflex; narcotic cough suppressants (butorphanol or hydrocodone) effective for long-term (chronic) treatment
- Drugs to dilate the bronchi and bronchioles (known as “bronchodilators”); dilation of small airways and lowering pressure gradients with lower airway disease—sustained-release theophylline or terbutaline; bronchodilators have no effect on the diameter of the windpipe (trachea)
- Bacterial infection is uncommon; however, doxycycline is an antibiotic that is sometimes beneficial by decreasing the number of bacteria in the airway or by reducing inflammation
- Reduction of inflammation of the windpipe (trachea)—prednisone; consider inhaled steroids given via face mask and spacer chamber
- Robitussin DM—may provide relief to pet, reduce the severity of the cough, but is not a cure (known as “palliation”); use any medications only under the direction of your pet's veterinarian

Follow-Up Care

PATIENT MONITORING

- Body weight
- Exercise tolerance
- Pattern of breathing
- Incidence of cough

PREVENTIONS AND AVOIDANCE

- Avoid obesity in breeds commonly afflicted with tracheal collapse
- Avoid heat and humidity
- Use a harness rather than a collar (a collar puts pressure on the windpipe, and may aggravate the problem)

POSSIBLE COMPLICATIONS

- Severe breathing difficulties that do not respond to medical treatment (known as “intractable respiratory distress”) leading to respiratory failure or euthanasia
- Consider likelihood of complications after surgery (such as persistent cough, severe breathing difficulty [respiratory distress], or paralysis of the voice box (larynx; laryngeal paralysis]);
- Some pets may require a permanent surgical opening into the windpipe or trachea (known as a “permanent tracheostomy”)

EXPECTED COURSE AND PROGNOSIS

- Combinations of medications, along with weight control, may reduce clinical signs; however, pet likely will

cough throughout life and can have periods when clinical signs worsen

- Surgery—may benefit some dogs, primarily those with collapse of the windpipe (trachea) in the neck (cervical tracheal collapse)
- Stent placement—benefits some dogs, primarily those with windpipe (trachea) collapse within the chest
- Prognosis—based on evidence and degree of airway blockage

Key Points

- “Tracheal collapse” is a reduction in the diameter of the lumen of the windpipe (trachea) during breathing; it is considered to be a “dynamic” process as the lumen's diameter changes with the movements of breathing (inspiration and expiration)
- Obesity, overexcitement, and humid conditions may precipitate a breathing crisis
- Use a harness instead of a collar
- Combinations of medications, along with weight control, may reduce clinical signs
- Tracheal collapse is irreversible; treatment is designed to decrease triggers of cough
- Complications may occur following surgery; complications include persistent cough, breathing distress, or paralysis of the voice box or larynx (laryngeal paralysis)
- Some pets may require a permanent surgical opening into the windpipe or trachea (permanent tracheostomy)
- Extensive follow-up is required for pets that have stents placed in the airways, to monitor for damage to the stent and for migration of the stent