



# Difficulty Breathing and Respiratory Distress

## Basics

### OVERVIEW

- Difficulty breathing (known as “dyspnea”)—a subjective term that in human medicine means “an uncomfortable sensation in breathing” or a sensation of air hunger; in veterinary medicine, it means difficulty breathing or respiratory distress
- Rapid breathing (known as “tachypnea”) is an increased respiratory rate
- Panting is rapid, shallow, open-mouth breathing
- The respiratory tract consists of the “upper respiratory tract” (the nose, nasal passages, throat, and windpipe [trachea]) and the “lower respiratory tract” (the bronchi, bronchioles, and alveoli [the terminal portion of the airways, in which oxygen and carbon dioxide are exchanged])
- The “large airways” are the windpipe (trachea) and large bronchi that branch from the trachea to the right and left lungs
- The smaller bronchi and bronchioles are considered to be “small airways”

### SIGNALMENT/DESCRIPTION OF PET

#### Species

- Dogs and cats; no breed, age, or sex predilection

### SIGNS/OBSERVED CHANGES IN THE PET

- Sudden (acute) or long-term (chronic) in onset
- May be associated with coughing, rapid breathing (tachypnea), exercise intolerance
- General signs of respiratory distress—increased abdominal effort when breathing; nasal flaring (esp. cats); open-mouth breathing; neck extension; moving the elbows out, away from the body to an attempt to increase lung capacity (elbow abduction); other signs depend on underlying cause
- Nasal disease—noisy breathing when inhaling (known as “stertor”); lack of airflow through nostrils; difficulty breathing improves with open-mouth breathing
- Upper airway laryngeal disease (involving nose, throat and/or windpipe, so-called “upper airway”)—high-pitched, noisy breathing (known as “stridor”); increased body temperature (known as “hyperthermia”); difficulty breathing (dyspnea) on breathing in (inhalation or inspiration)
- Fixed obstruction, such as a mass or foreign body in a large airway—difficulty breathing in (inhalation or inspiration) and breathing out (exhalation or expiration)
- Collapse of the windpipe (trachea)—honking cough
- Lower airway disease (involving the windpipe within the chest, bronchi and lungs, so-called “lower airway”)—

cough; wheezes heard on listening to the lungs (auscultation) on exhalation or expiration; increased abdominal effort when breathing

- Lung disease—may have crackles heard on listening to the lungs (auscultation); may have normal lung sounds
- Pneumonia—fever, windpipe (trachea) sensitivity
- Heart-related buildup of fluid in the lungs (known as “pulmonary edema”)—heart murmur; low body temperature (known as “hypothermia”); pale gums and moist tissues of the body (mucous membranes); the pink color of the gums is slow to return when the gums are blanched by finger pressure (known as “poor capillary refill time”)
- Diseases involving the space between the chest wall and the lungs (known as “pleural-space disease”)—diminished breath sounds
- Chest-wall disease—visible trauma
- Blood clots to the lungs (known as “pulmonary thromboembolism”)—may have clinical signs of the underlying disease leading to the formation of the blood clots
- Other signs will pertain to the underlying disease, such as shock, trauma

## CAUSES AND RISK FACTORS

### Difficulty Breathing (Dyspnea)

#### *Upper Airway Disease*

- Involving nose, throat and/or windpipe in the neck region, so-called “upper airway”
  - ♦ Disorders of the nasal passages leading to blockage of the airways (nasal obstruction)—narrowed nostrils (known as “stenotic nares”); polyp; infection; inflammation; cancer; trauma; blood-clotting disorders (known as “coagulopathy”) or bleeding disorders
  - ♦ Disorders of the throat (pharynx)—overly long soft palate; foreign body; cancer
  - ♦ Disorders of the voice box (larynx)—paralysis of the larynx; turning inside-out of a portion of the voice box or larynx (known as “everted laryngeal sacculles”), such that the space for air to pass through the larynx is decreased; fluid buildup of the laryngeal tissues (known as “laryngeal edema”); collapse of the voice box or larynx (known as “laryngeal collapse”); foreign body; cancer; trauma
  - ♦ Disorders of the windpipe (trachea)—windpipe collapse (known as “tracheal collapse”) within the neck; narrowing of the windpipe (known as “tracheal stenosis”); trauma; foreign body; cancer; parasites

#### *Lower Airway Disease*

- Involving the windpipe within the chest, bronchi, and lungs, so-called “lower airway”
  - ♦ Windpipe (trachea) collapse within the chest
  - ♦ Squeezing or compression of lung tissue secondary to enlarged lymph nodes, enlarged left atrium (one of the chambers of the heart), or heart-based tumors

#### *Small Airway Disease*

- Involving the bronchi, bronchioles, and alveoli of the lungs
  - ♦ Allergy; inflammation (such as bronchitis); infection (for example, *Mycoplasma*); parasites; cancer (bronchogenic carcinoma)

#### *Lung Tissue (Pulmonary Parenchymal) Disease*

- Involving the lung tissue or cells
  - ♦ Fluid buildup (known as “pulmonary edema”)—heart-related (cardiogenic) or non-heart related (non-cardiogenic)
  - ♦ Pneumonia—contagious; parasitic; aspiration (inflammation of the lungs, caused by accidentally inhaling food, vomit, or liquids); eosinophilic, characterized by the presence of numerous eosinophils (a type of white blood cell) in the lung tissue
  - ♦ Cancer (primary or metastatic)
  - ♦ Inflammatory disease—acute respiratory distress syndrome; uremic pneumonitis (inflammation of the lung tissue secondary to the presence of urea and other nitrogenous waste products in the blood)
  - ♦ Bleeding (hemorrhage)—trauma; blood-clotting disorders (coagulopathy)
  - ♦ Blood clots in the lungs (pulmonary thromboembolism)—immune-mediated breakdown of red blood cells (known as “hemolytic anemia”); loss of proteins through the kidneys (known as “protein-losing nephropathy”) or through the intestinal tract (known as “protein-losing enteropathy”); heartworm disease; excessive production of steroids by the adrenal glands (known as “hyperadrenocorticism” or “Cushing's syndrome”); cancer

### ***Pleural Space Disease***

- Involving the space between the chest wall and the lungs)
  - ♦ Air in the pleural space (known as “pneumothorax”)—trauma; secondary to lung tissue (pulmonary parenchymal) disease; ruptured bubble-like areas (known as “bullae”) in the lungs; migrating foreign body; spontaneous
  - ♦ Fluid in the pleural space (known as “pleural effusion”)—secondary to congestive heart failure; cancer; twisting of a lung lobe (known as “lung-lobe torsion”)
  - ♦ Pus in the pleural space (known as “pyothorax”)—infectious; parasitic; cancer (rare)
  - ♦ Blood in the pleural space (known as “hemothorax”)—trauma; clotting disorder (coagulopathy); twisting of a lung lobe (lung-lobe torsion); spontaneous bleeding of the thymus
  - ♦ Milky fluid in the pleural space (known as “chylothorax”)—unknown reasons (known as “idiopathic”); congestive heart failure; trauma
  - ♦ Presence of masses or abdominal organs in the pleural space—cancer; secondary to a tear or abnormal opening in the diaphragm (diaphragmatic hernia) through which abdominal contents enter the chest

### ***Chest Wall Disease***

- ♦ Trauma; cancer; paralysis due to botulism; nervous system disease

### ***Abdominal Distention***

- Putting pressure on the chest and lungs
  - ♦ Enlarged organs—enlargement of an organ due to an increase in the number of normal cells (known as “hyperplasia”); cancer; pregnancy; obesity; fluid buildup in the abdomen (known as “ascites”); accumulation of air in the stomach with or without twisting of the stomach (known as “bloat” or “gastric dilatation” or “gastric dilatation/torsion” or “gastric dilatation/volvulus”)

## **Treatment**

### **HEALTH CARE**

- Inpatient care until the cause is identified and treated or determined not to be life-threatening; therapy based on underlying cause
- Oxygen should be administered until the pet's ability to oxygenate is determined
- Keep the pet lying on chest (that is, not on its side) until stabilized; and turn hips every 3–4 hours
- Lower airway disease—drugs to enlarge or dilate the bronchi (known as “bronchodilators,” such as terbutaline); oxygen therapy until stable; systemic steroids may be necessary to stabilize cats with acute narrowing or decrease in size of the opening of the bronchi (known as “bronchoconstriction”)
- Lung tissue (pulmonary parenchymal) disease—oxygen therapy; antibiotics, if pneumonia; treat blood-clotting disorders; heart-related fluid buildup (known as “cardiogenic edema”) requires diuretics with or without drugs to cause the blood vessels to dilate (known as “vasodilators”); fluid buildup related to non-heart causes (known as “noncardiogenic edema”) requires oxygen therapy; use of a hand-controlled bag attached to the airway to push air into the airway or a ventilator (known as “positive-pressure ventilation”) may be necessary
- Pleural-space disease—chest tap (known as a “thoracocentesis”) to remove air and/or fluid from the space between the lungs and chest wall—remove as much as possible; chest tube, if repeated chest taps are needed to keep the pet stable
- Chest-wall paralysis or muscle fatigue—positive-pressure ventilation may be necessary, if the pet has high levels of carbon dioxide in the blood (known as “hypercapnia”)
- Abdominal distention—drain fluid (ascites) as needed to keep the pet comfortable; relieve stomach distention (as in “bloat”)
- Oxygen therapy may be provided via an oxygen cage; a delivery device into the nose (nasal cannula); by making an oxygen “tent” with an Elizabethan collar covered in plastic wrap; an oxygen mask; or allowing oxygen to flow by the pet's face—nasal oxygen should be humidified, if administered for more than a few hours

### **ACTIVITY**

- Strict cage confinement until difficulty breathing is resolved

### **DIET**

- Weight-reducing diet, if obesity is contributing to the difficulty in breathing

## **SURGERY**

- Carefully tailor anesthesia to the pet; securing an airway is essential and the ability to use positive-pressure ventilation often is necessary
- Surgery for diaphragmatic hernias or spontaneous pneumothorax (free air in the space between the lungs and chest wall)
- Chest-wall disease—surgery as indicated, particularly if open-chest wound is present

## **Medications**

Varies with underlying cause

## **Follow-Up Care**

### **PATIENT MONITORING**

- Pets receiving oxygen therapy can be monitored by assessing the degree of respiratory effort; measurement of arterial-blood gases (measurements of oxygen and carbon dioxide levels in arterial blood) can be useful
- Pulse oximetry (a means of measuring oxygen levels in blood ) is effective for monitoring pets breathing room air; allowing the pet to try breathing room air (room-air trial) can be useful in evaluating the pet's response to treatment, degree of breathing difficulty and ability to oxygenate blood (by measuring blood gases)
- Repeat X-rays (radiographs) often are indicated in assessing pulmonary parenchymal disease and pleural-space disease
- Monitor body temperature regularly, as pets with difficult breathing often develop high body temperatures (that is, become hyperthermic), and the increased body temperature (hyperthermia), in turn, will worsen the breathing difficulty (dyspnea)

### **PREVENTIONS AND AVOIDANCE**

- Depends on underlying cause
- Weight reduction, if obesity is contributing to the difficulty in breathing

### **POSSIBLE COMPLICATIONS**

- Breathing difficulties and resulting low oxygen levels in the blood (known as “hypoxia”) can be life-threatening; pets with signs of difficulty breathing should be evaluated by a veterinarian as soon as possible; pets with severe breathing difficulties should be considered an emergency
- Animals with upper airway blockage (obstruction) are fragile and can deteriorate rapidly
- Difficulty breathing (dyspnea) associated with a mass in the voice box (laryngeal mass) can respond to surgery to decrease size of the mass (known as “debulking”), but fluid buildup (laryngeal edema) and bleeding can worsen the condition

### **EXPECTED COURSE AND PROGNOSIS**

- Depends on underlying cause

## **Key Points**

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- Pets with signs of difficulty breathing should be evaluated by a veterinarian as soon as possible
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# Notes

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