

Interstitial Pneumonia

Basics

OVERVIEW

- “Interstitial” relates to spaces within tissues or organs; the “interstitium” is the small narrow space or gap between tissues or parts of an organ
- The alveolus (plural, alveoli) is the terminal portion of the airways, in which oxygen and carbon dioxide are exchanged
- “Pneumonia” is inflammation of the lungs
- Interstitial pneumonia is a form of pneumonia in which the inflammatory process occurs in the alveolar walls or interstitial space of the lungs
- “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)



SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs
- Cats

Breed Predispositions

- Canine distemper virus infection—greyhounds, Siberian huskies, Weimaraners, Samoyeds, and Alaskan malamutes have higher likelihood than other breeds to be infected; any breed may be infected
- Interstitial lung disease is recognized most commonly in West Highland white terriers, and possibly white cairn terriers and bull terriers
- *Pneumocystis carinii* is a protozoa that causes lung disease—miniature dachshunds

Mean Age and Range

- Canine distemper virus infection is most common in puppies 3–6 months of age
- Interstitial lung disease is recognized most commonly in middle- to old-age West Highland white terriers
- *Pneumocystis carinii*—miniature dachshunds less than 1 year of age at risk
- Endogenous lipid pneumonia is a type of interstitial pneumonia characterized by the presence of macrophages (types of cells that scavenge and clear bacteria and foreign substances out of body tissues) containing lipids (a group of compounds that contain fats or oils) that originated from breakdown of lung tissue and/or blood; it most commonly affects older cats

- Feline idiopathic pulmonary fibrosis-like conditions are characterized by excessive fibrous or scar-type tissue as part of a reactive process in the lungs; these conditions are of unknown cause and are therefore called “idiopathic”; they typically are seen in middle-aged to older cats
- Toxoplasmosis most commonly affects middle-aged cats

Predominant Sex

- Toxoplasmosis most commonly affects male cats

SIGNS/OBSERVED CHANGES IN THE PET

- Depend on severity of disease
- Rapid breathing (known as “tachypnea”); coughing; difficulty breathing (known as “dyspnea”); standing with the elbows away from the body in an attempt to increase lung capacity (known as “orthopnea”); 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”); open-mouth breathing; exercise intolerance; abnormal breath sounds on listening to the lungs with a stethoscope (known as “auscultation”); possible spitting up blood from the lungs (known as “hemoptysis”)
- Mild fever and discharge from the eyes and/or nose often are present with canine adenovirus-2 infection
- Gastrointestinal signs; fever; discharge from the eyes and/or nose; thickening of the skin (known as “hyperkeratosis”) of the footpads; nervous system deficits; and twitching or contraction of a group of muscles (known as “myoclonus”) may be seen with canine distemper virus infection
- Pets with paraquat toxicity often have vomiting, diarrhea, and ulcers in their mouths and throats; they may produce only small amounts of urine (known as “oliguria”); excessive excitability and nervous system signs may be seen in the early phase of poisoning
- Inflammation of the retina (the back part of the eye, condition known as “retinitis”); inflammation of the iris and other areas in the front part of the eye (known as “uveitis”); nervous system signs, and/or gastrointestinal signs with toxoplasmosis

CAUSES

Congenital (Present at Birth)

- Bronchiolitis obliterans–organizing pneumonia (BOOP) is characterized by inflammation of the bronchioles (small airways) and surrounding tissue; the inflammation partially obliterates or closes the airway; it has been described secondary to an inherited disorder in which the normal secretion clearance mechanism of the lungs is defective (known as “primary ciliary dyskinesia”)

Metabolic

- Inflammation of the lungs, associated with uremia (excess levels of urea and other nitrogenous waste products in the blood; condition is known as “uremic pneumonitis”), possibly in association with BOOP; liver disease; or inflammation of the pancreas (known as “pancreatitis”) in cats

Cancer

- Cancer may lead to long-term (chronic) dilation of bronchi or bronchioles, as a consequence of inflammation or blockage of the airway (known as “bronchiectasis”) or to BOOP
- Lung cancer (known as “pulmonary carcinoma”) is associated with the development of excessive fibrous or scar-type tissue as part of a reactive process (known as “pulmonary fibrosis”) in the lungs of cats

Idiopathic (Unknown Cause)

- Pulmonary interstitial fibrosis (excessive fibrous or scar-type tissue as part of a reactive process in the lungs) and desquamative interstitial pneumonitis, a condition in which macrophages (types of cells that scavenge and clear bacteria and foreign substances out of body tissues) are found in the alveoli; some cases of endogenous lipid pneumonia; BOOP; primary pulmonary alveolar proteinosis (PAP; condition in which the alveoli fill with a protein-containing material)

Inflammatory

- Endogenous lipid pneumonia (a type of interstitial pneumonia characterized by the presence of macrophages [types of cells that scavenge and clear bacteria and foreign substances out of body tissues] containing lipid [a group of compounds that contain fats or oils] that originated from breakdown of lung tissue and/or blood) is seen most commonly in cats with inflammation of the bronchi (known as “bronchitis”) and long-term (chronic) dilation of bronchi or bronchioles, as a consequence of inflammation or blockage of the airway (bronchiectasis)

or inflammation of the bronchioles characterized by tissue death (known as “necrotizing bronchiolitis”)

Infectious

- Dogs—canine distemper virus, canine adenovirus-2, *Leishmania chagasi*, *Pneumocystis carinii*, *Angiostrongylus vasorum*, *Toxoplasma*
- Cats—*Toxoplasma*, feline immunodeficiency virus (FIV)

Toxic

- Inhalation of dusts, gases, or vapors, thiacetarsemide (drug used in the treatment of heartworm disease; no longer available in the United States), aspiration of petroleum-based products in cats, secondary pulmonary alveolar proteinosis (condition in which the alveoli fill with a protein-containing material), paraquat toxicity, silica dust (leading to “silicosis”), asbestos (leading to “asbestosis”)

Vascular (Involving the Blood Vessels)

- Blood clots to the lungs (thromboembolism)
- Parasite larvae circulating in the lungs (known as “larval migrans”)

Treatment

HEALTH CARE

- Inpatient care, oxygen therapy, and monitoring for pets with evidence of severe breathing difficulties (known as “respiratory distress”)
- Minimize exposure to house dust, vapors, chemical fumes, or tobacco smoke
- Humidification of the inspired air (using a nebulizer or vaporizer) to liquefy secretions
- Pulmonary alveolar proteinosis (PAP)—therapeutic flushing of the bronchi, bronchioles, and alveoli (known as “bronchoalveolar lavage”) to remove the protein-containing material

ACTIVITY

- Exercise restriction for pets with increased breathing effort
- Use a harness, rather than a restraint collar

DIET

- Weight loss is indicated, if pet is obese

SURGERY

- Definitive diagnosis of interstitial pneumonia requires microscopic examination of lung biopsy (known as “histopathology”)
- If available, a CT scan may help identify appropriate location for lung biopsy

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
- Antibiotics should be used, as indicated by results of bacterial culture and sensitivities
- Inhaled steroids (such as fluticasone) can be beneficial in pets that require anti-inflammatory drugs; administered by face mask and spacing chamber
- Drugs to enlarge the bronchi and bronchioles (known as “bronchodilators,” such as sustained-release theophylline or terbutaline) can be administered by mouth or injection; inhaled bronchodilators can also be administered via face mask and spacing chamber
- *Angiostrongylus vasorum*—levamisole, with or without aspirin or steroids; alternative therapies include fenbendazole, mebendazole, and ivermectin
- BOOP—steroids (prednisone) have been used with clinical success in one case report
- Idiopathic pulmonary fibrosis—no effective therapy available; may try anti-inflammatory steroid therapy with prednisolone and drugs to enlarge the bronchi and bronchioles (bronchodilators), with or without drugs to control cough (known as “antitussives”) or antibiotics, if indicated
- *Leishmania chagasi*—meglumine antimonite or sodium stibogluconate
- Paraquat toxicity—induce vomiting and administer activated charcoal, if recent ingestion is known; supportive

care, increase production of urine (known as “diuresis”) using furosemide, a diuretic; oxygen therapy as needed; consider use of drugs to decrease the immune response (known as “immunosuppressive drugs”), such as dexamethasone, cyclophosphamide, nicotinamide, superoxide dismutase, and vitamin A

Follow-Up Care

PATIENT MONITORING

- Monitor breathing rate and effort
- Observe response to therapy
- Repeat physical examination and listen to the lungs with a stethoscope (auscultation), chest x-rays (radiographs), laboratory tests, and arterial blood-gas analysis (to evaluate the levels of oxygen and carbon dioxide in the blood), as indicated

PREVENTIONS AND AVOIDANCE

- Avoid proximity to toxic fumes or paraquat (not legally sold in the United States)
- Vaccinate and deworm pets, as recommended by your pet's veterinarian
- Appropriate insect control

POSSIBLE COMPLICATIONS

- Secondary lung infections are common with most forms of interstitial pneumonia
- Increased blood pressure in the lungs (known as “pulmonary hypertension”)

EXPECTED COURSE AND PROGNOSIS

- Guarded prognosis with *Pneumocystis carinii*, *Toxoplasma*, *Angiostrongylus vasorum*, canine distemper virus, *Leishmania chagasi*, and endogenous lipid pneumonia
- Poor long-term prognosis with idiopathic pulmonary fibrosis (mean survival time from the beginning of clinical signs is 17 months in dogs and 5.5 months in cats)
- Poor prognosis with feline immunodeficiency virus (FIV) infection and uremic pneumonitis
- Paraquat toxicity is commonly fatal in dogs

Key Points

- Interstitial pneumonia is a form of pneumonia in which the inflammatory process occurs in the alveolar walls or interstitial space of the lungs
- The alveolus (plural, alveoli) is the terminal portion of the airways, in which oxygen and carbon dioxide are exchanged
- Specific treatment for interstitial pneumonia has not been determined; treatment is symptomatic and designed to control signs and improve the pet's condition, but not to cure (known as “palliative treatment”)