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Allergic Bronchial-Pulmonary Disease

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Canine and feline allergic bronchial-pulmonary disease is characterised by coughing, varying degrees of respiratory distress and is considered a syndrome with several differential diagnoses. As allergic bronchial-pulmonary disease can be a life-long chronic condition that often requires corticosteroids and/or other immune-suppressive therapy, an accurate diagnosis before implementing treatment is warranted.

FELINE BRONCHIAL DISEASE

Feline bronchial disease is caused by many aetiologies, with allergic bronchial disease or feline asthma arguably the most important. As the term: feline asthma does not cover all of these diseases, it should not be used unless correctly diagnosed. Differential diagnoses include acute and chronic bronchitis and emphysema.

Asthma

The underlying pathophysiology of asthma is reversible bronchoconstriction due to a type I hypersensitivity reaction to inhaled allergens and the subsequent release of inflammatory mediators into the airway. Inciting allergens include pollen, cigarette smoke, deodorants, perfumes, litter dust, and household chemicals. The net result of asthma on the airway is:

- Epithelial hypertrophy, metaplasia, and erosions.
- Hypertrophy of the goblet cells and submucosal glands.
- Bronchoconstriction and hypertrophy of the bronchial smooth muscle.
- Cellular infiltration.

There is an interaction between activated T-lymphocytes and eosinophils within the airways. Cytokines secreted by activated CD4 lymphocyte cells promote eosinophil survival, activation, and recruitment into the airways. Thus, the typical cell infiltrates seen within airway secretions is the eosinophil.

Although any breed may be affected, oriental cats, especially the Siamese, have a higher incidence (around 5%). The disease usually occurs in middle age animals.

Acute bronchitis

This is a reversible airway inflammation of short duration that often develops secondary to a viral, bacterial, mycoplasma or parasitic infection. Neutrophils and macrophages in airway secretions characterise this

Chronic bronchitis

The prolonged airway inflammation of 2-3 months duration that results in irreversible airway damage.

Airway secretions generally have a mixed population of cells such as neutrophils, eosinophils and macrophages. To confound the problem further, bronchial asthma may co-occur with chronic bronchitis.

Emphysema

Any long-standing chronic airway disease can result in cavitary lesions within the lung parenchyma such as bullae and cysts and often co-occur with chronic bronchitis.

DIAGNOSIS

As the various feline bronchial diseases have very similar clinical signs, an attempt to categorise and make a specific diagnosis should be made.

History and clinical examination

Typical clinical signs are coughing, dyspnoea, wheezing, and retching. Although these signs are characteristic of lower airway disease, they do not indicate the underlying aetiology. Owners may report that certain activities worsen clinical symptoms, such as the spraying of deodorants and perfumes.

On clinical examination, crackles, wheezes, and dyspnoea may be present, but normal respiration and lung sounds may be present as the disease typically waxes and wanes.

Blood smear and/or haematology

Peripheral eosinophilia can be present in some cases of bronchial asthma.

Radiography

Radiographs can confirm the presence of bronchial disease and can help to classify the syndrome further. Bronchial changes and emphysematous changes may be present. Although normal thoracic radiographs may be present with asthma, reported abnormalities can be:

- Bronchial pattern with peri-bronchial cuffing.
- Mild interstitial to alveolar pattern.
- Over-inflation of the lung with flattening of the diaphragm.
- Atelectasis/consolidation of the accessory lung lobe.

Bronchial fluid analysis

Evaluation of tracheal aspirate or broncho-alveolar lavage cytology is necessary for diagnosis, as it will possibly allow classification of

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the various syndromes – asthma, acute or chronic bronchitis, or emphysema. Besides cell infiltration, cytology can also indicate the presence of microorganisms and parasites. However, the fluid's culture and/or PCR will be required to rule in/out bacterial and mycoplasma infections conclusively.

TREATMENT

The mainstay of therapy for feline bronchial disease is corticosteroids and bronchodilators with medication administered orally, parenterally, or inhalation.

Treatment must be individualised, and client compliance is of utmost importance as a primary goal of management is client education.

The client must realise that:

- The disease has a waxing and waning course.
- Relapses are common and can be more severe and difficult to treat.
- At best, the condition can be managed rather than cured, and they may have to be satisfied with a 7080% improvement in their pets' clinical condition.
- Treatment is protracted and can be lifelong.
- An attempt should be made to identify and eliminate potential triggers such as food, smoke, and aerosols.

Corticosteroids reduce airway inflammation and mucus production and are used for ongoing management even in the absence of clinical signs. Bronchodilators reduce bronchoconstriction by relaxing the smooth muscles but are not to be used as monotherapy.

Bronchodilators generally are considered rescue medications and may help coughing flare-ups. The bronchodilator albuterol should not be used chronically, as it may worsen airway inflammation.

Inpatient therapy

The presence of dyspnoea and cyanosis signifies a potentially fatal disease and thus necessitates aggressive therapy and management.

These cats require:

- Fluid therapy as rehydration is vital to decrease the viscosity of the bronchial secretions.
- Intravenous prednisolone at 24 mg/kg repeated 46 hours later and then followed by oral prednisolone.
- Bronchodilators.
- Oxygen supplementation.

Outpatient therapy

The initial treatment depends on the severity of clinical signs. If signs are intermittent or mild (2-3 bouts of coughing per day), then corticosteroids and bronchodilators are used as needed. If signs are severe (>5 coughing bouts per day), then a combination of bronchodilators and corticosteroids are indicated.

Oral/parenteral therapy

Bronchodilators recommended for use in the cat are aminophylline (5mg/kg bid-tid), theophylline (4mg/kg bid-tid) or terbutaline (0.625mg/cat bid).

The only oral corticosteroid that should be used is prednisolone, initially at 1 mg/kg bid for 2-3 weeks. As clinical signs improve, the dose should be gradually tapered to alternate day therapy.

Some owners find oral administration of tablets impossible, and in these cases, long-acting corticosteroids (Depomedrol) can be used (10-20 mg/cat) every 6-8 weeks, bearing in mind the potential long-term consequences of using this drug.

Inhaled therapy

Corticosteroids (fluticasone, mometasone, budesonide) and bronchodilators (albuterol, salbutamol) can be given effectively by inhalation, and both classes of drugs are available as metered-dose inhalers (MDI). Combination inhalers (fluticasone/salmeterol, budesonide/formoterol) are also available and can be considered as a step-up therapy The MDI is used with a spacer, either veterinary specific (AeroKat) or a paediatric aero chamber. The spacer is a plastic chamber that, on one end, has the MDI and the other end a facemask.

The end with the facemask has an inner rubber or silicone gasket that acts as a one-way valve so that medication within the spacer can only leave the spacer via inhalation. The MDI is attached to the spacer and then depressed twice to fill with medication. The mask side of the spacer is then gently placed over the cat's nose and face and kept there for 7-10 breaths.

Other therapy

Antibiotics

Antibiotics are rarely indicated in cats with asthma and are only appropriate when there is evidence of airway infection.

Allergy testing

Serum testing for allergens followed by desensitisation therapy can be considered.

Cyproheptadine

It acts as an anti-histamine and anti-serotonin drug, and there are anecdotal reports that it may be helpful in some cats with asthma.

Anti-leukotriene drugs

Drugs such as montelukast and zafirlukast are leukotriene antagonists that inhibit the leukotriene receptor, thus inhibiting the pro-inflammatory products of the arachidonic cascade.

There is, however, no current data that supports that they have a role to play in the treatment of cats with asthma.

Cyclosporine

Cyclosporine inhibits the function of T-cells and thus appears to be beneficial in cats with asthmatic disease as an adjunct and steroid-sparing therapy.

Cromolyn/nedocromil

These drugs reduce mast cell degranulation and the release of preformed chemical mediators of inflammation. They, however, can only be given via inhalation therapy. Studies have also shown conflicting results and are not widely used in clinical situations.

CANINE ALLERGIC BRONCHITIS

Canine allergic lung disease has not been well described. The term is used to define bronchitis with eosinophilic inflammation that responds to the elimination of offending allergens and/or corticosteroids therapy. Parasites, collapsing trachea, or bacterial infection may be underlying causes.

EOSINOPHILIC BRONCHOPNEUMOPATHY

Eosinophilic bronchopneumopathy or pulmonary infiltrates with eosinophils (PIE) is characterised by the interstitial and/or alveolar infiltration of eosinophils. Diseases that can cause an eosinophilic reaction are respiratory parasites, bacteria, fungi, neoplasia and allergy. In some cases, eosinophilic infiltration occurs in multiple organs, including the lung.

The primary complaint is often coughing, which is generally non-responsive to antibiotic therapy. Weight loss, depression, and anorexia can also be present.

DIAGNOSIS

Clinical examination

On clinical examination, pyrexia may be present. Pulmonary crackles and wheezes may be auscultated due to the presence of exudation and airway narrowing. There may also be absent or decreased lung sounds resulting from areas of consolidation.

Blood smear and/or haematology

Haematological/blood smear typical reflects an eosinophilic response; however, eosinophilia may not be present in all cases.

Radiographs

Radiographs can vary from a mild interstitial pattern to an alveolar pattern and even pulmonary nodules that can be confused with neoplasia. Hilar lymphadenopathy may also be present.

Cytology

Cytologic evaluation is necessary for diagnosis, obtained by tracheal aspirate, broncho-alveolar lavage, or rarely lung aspirates. A profound eosinophilic inflammation is evident in cytology.

It is vital that bacteria, fungi, parasites, and neoplastic cells be excluded as all can result in eosinophilic infiltration.

TREATMENT

Wherever possible, the underlying aetiology should be identified and treated.

If no underlying cause is evident, immunosuppressive therapy with corticosteroids at 1 mg/kg bid is frequently successful.

Radiographs should be repeated after 7-10 days of therapy to assess response to treatment and identify any change that might suggest deterioration due to undiagnosed, primary disease.

The corticosteroid dose can be tapered down over 6 weeks and then discontinued if signs have resolved. Some cases may require long-term alternate day therapy and/or the use of cyclosporin, azathioprine, cyclophosphamide, and chlorambucil.

The SAVA Stress Management Hotline is there to assist members who are experiencing personal problems by offering access to professional counselling/advice.

The hotline can assist with referrals or simply offer much needed emotional support when anxiety, depression, anger, grief, loneliness and fear are at their highest.



The following SAVA members are available on the SAVA stress management hotline. If required, they will refer you to professionals.

Ken Pettey	082 882 7356	ken.pettey@gmail.com
Tod Collins	083 350 1662	tcollins@isat.co.za
Aileen Pypers	072 599 8737	aileen.vet@gmail.com
Willem Schultheiss	082 323 7019	willem.schultheiss@ceva.com
Mike Lowry	084 581 2624	mikelowry@sai.co.za

MULTIPLE-CHOICE QUESTIONS

QUESTION 1

Which of the following statements regarding allergic bronchial-pulmonary disease is INCORRECT?

a. Can be considered a lifelong condition
b. The major clinical sign is coughing
c. Can result in dyspnoea
d. Is consider a diagnosis and not a syndrome
e. Treated with immune-suppressive therapy

QUESTION 2

Which of the following is NOT considered a differential diagnosis for feline bronchial disease?

a. Pulmonary emphysema
b. Acute bronchitis
c. Broncho-pneumonia
d. Asthma
e. Chronic bronchitis

QUESTION 3

Which of the following is NOT associated with the pathophysiology of feline asthma?

a. Type IV hypersensitivity
b. Activation of CD4 lymphocytes
c. Recruitment of eosinophils into the airways
d. Associated with the release of cytokines
e. Type I hypersensitivity

QUESTION 4

With time asthma will result in changes within the airways. Which of the following has NOT been described?

a. Metaplasia of the bronchial epithelial cells
b. Hypertrophy of the bronchial cartilage
c. Erosions of the bronchial mucosa
d. Hypertrophy of the goblet cells
e. Hypertrophy of the bronchial smooth muscle

QUESTION 5

Which of the following statements regarding acute bronchitis is INCORRECT?

a. There is reversible airway inflammation
b. Characterised by macrophages within the airway secretions
c. Condition is often of short duration
d. Can be secondary to a mycoplasma infection
e. Characterised by eosinophils within the airway secretions

QUESTION 6

Which of the following is NOT indicated in the treatment of an acute asthmatic attack?

a. Prednisolone
b. Intravenous fluid therapy
c. Cyclosporine
d. Bronchodilator
e. Oxygen supplementation

QUESTION 7

Which of the following is NOT a radiographic feature of eosinophilic bronchopneumopathy?

a. Interstitial pattern
b. Presence of pulmonary nodules
c. Alveolar pattern
d. No obvious radiographic changes
e. Hilar lymphadenopathy

QUESTION 8

Which of the following drugs is NOT indicated in the management of eosinophilic bronchopneumopathy?

a. Cyclosporine
b. Antibiotic
c. Prednisolone
d. Azathioprine
e. Cyclophosphamide

QUESTION 9

What would be the MOST likely diagnosis in a 4-year-old Burmese cat that is presented for acute onset coughing?

a. Hypertrophic cardiomyopathy
b. Viral bronchitis
c. Asthma
d. Pleural effusion
e. Eosinophilic bronchopneumopathy

QUESTION 10

On tracheal wash cytology from a dog, cocci bacteria and eosinophils are present. Which of the following would be the MOST likely diagnosis?

a. Bacterial infection
b. Eosinophilic bronchopneumopathy
c. Pulmonary neoplasia
d. Chronic bronchitis
e. *Ancylostoma* helminth migration

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