

Canine chronic bronchitis

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Introduction

Chronic bronchitis in dogs, as defined in 1974 can be diagnosed when 3 diagnostic criteria are met: chronic cough that occurs on most days of 2 or more months, hypersecretion leading to excessive mucus in the bronchial tree and exclusion of other active disorders causing chronic coughing. It is an incurable, chronic inflammatory disease accompanied by airway remodelling and altered lung function. The aetiology is poorly understood and different causes are discussed. The most important aetiologic factors in humans are air pollution and tobacco smoke exposure and these are also most likely causative in dogs. Other discussed reasons for chronic bronchitis are former infections, or a genetic predisposition.

Chronic bronchitis is usually seen in middle old to older dogs of small breeds (although large dogs can also be affected). Many affected dogs are obese, they show a sensitive trachea, exaggerated expiration, increased lung sounds, dry crackles, wheezing and clicking noises during auscultation. However, lung auscultation may be normal in affected dogs. Dogs with chronic bronchitis often have a pronounced sinus arrhythmia or bradycardia due to a high vagal tone, typically seen in respiratory diseases (and in contrast to dogs with heart diseases).

Differentials for chronic coughing are: airway collapse, which typically occurs in dogs with similar signalment. To further complicate things, tracheal- and/or bronchial collapse may coexist with chronic bronchitis and airway collapse may be a predisposing factor for chronic inflammation or the consequence of airway remodelling. Mitral valve disease is commonly seen in dogs with a signalment similar to dogs with chronic bronchitis. Patients with cardiogenic edema will rather present with tachypnea/dyspnea, although they may occasionally present with acute coughing if the amount of fluid is severe enough to reach larger airways (bronchi) and stimulate coughing receptors. Cardiomegaly, in particular left atrial enlargement (LAE), is associated with an increased risk of cough in dogs, thought to be caused by an irritation of the stem bronchi by the enlarged left atrium. However, airway inflammation might represent the major cause of coughing in such patients and mitral valve disease and chronic bronchitis might be commonly coexisting disorders.

Lung worms and heart worm disease have to be excluded in dogs with chronic coughing. Infections with systemic mycoses like blastomyces, histoplasma and coccidioides are not encountered in central Europe. Other differentials for chronic coughing are bronchial neoplasia and idiopathic pulmonary fibrosis (West Highland White Terriers, and other terrier breeds). Eosinophilic bronchopneumopathy occurs in young dogs of large breeds, with an over-representation in northern breeds and the Rottweiler. It seems to be a hypersensitivity reaction, although bronchospasms are not a feature of the disease.

Diagnosis

Blood work is usually unspecific in uncomplicated cases. The classic thoracic radiographic pattern in chronic bronchitis includes a bronchial pattern (doughnuts or tramlines) and bronchiectasis. An interstitial lung pattern and calcifications are not signs of chronic bronchitis and may be seen in older dogs. Fecal examination is mandatory as part of the diagnostic work-up, to rule out/detect lung worms as a cause for chronic coughing. A heartworm antigen test should be performed in endemic regions. Bronchoscopy typically reveals excessive mucus and/or mucus plugs in the bronchial trees. Additionally mucosal erythema and edema, mucosal irregularities as well as airway collapse might be seen. Cytologic examination of airway samples, obtained by bronchoscopy and BAL or endotracheal wash (blind BAL) typically provides evidence of a non-septic neutrophilic airway inflammation. The BAL fluid (BALF) should also be analysed by culture and sensitivity and a culture or PCR for mycoplasma. Bacteria in the respiratory tract may be contaminants, commensals or true infection which may be primary or a consequence of airway remodelling. The decision to treat with antibiotics should be based on the clinical picture.

Other diagnostic procedures like CT, fluoroscopy, arterial blood gases, 6-minute walk test are unspecific for chronic bronchitis. The analysis of biomarkers in BALF or exhaled breath condensate collection may be beneficial in the future.

Treatment

The treatment of chronic bronchitis comprises the avoidance of unspecific triggers like cigarette smoke, dust, spray cleaners and deodorants. Carpets should be vacuumed frequently. Body weight should be controlled, since weight loss leads to an improvement of cardiopulmonary function and a marked improvement in clinical signs. A harness should be used in place of a collar, and stress/excessive barking should be minimized. Glucocorticoids are the mainstay of treatment of chronic bronchitis, due to

their anti-inflammatory and anti-fibrotic effects (e.g. prednisolone 0,5-1mg/kg PO q12h for 1-2 weeks, followed by gradual taper). The use of inhaled medications using a metered dose inhaler, a spacing chamber and a face mask is becoming commonplace, since side effects can be reduced.

Budesonid (e.g. Budecort® MDI, Budiair®) 200µg inhaled 2 puffs q12h, in stable patients reduce to 1 puff q 12h

Fluticasone (e.g. Flixotide) 125µg 1 puff q12h in dogs < 20 kg

Fluticasone (e.g. Flixotide) 250µg 1 puff q12h in dogs > 20 kg

Combination: Fluticasone 125µg/Salmeterol 25µg (e.g. AirFluSal MD®) 1 puff q12h

Fluticasone 250µg/Salmeterol 25µg 1 puff q 12h in dogs > 20 kg

Bronchodilators can be used additionally, if glucocorticoids alone are insufficient. Since there is no bronchoconstriction in canine chronic bronchitis their reported benefit may be due to their additional anti-inflammatory and mucociliary clearance improving effects. However, there are no controlled studies supporting their use in canine chronic bronchitis (e.g. terbutalin 1,25-5mg/dog PO q8h, terbutalin 0,625 mg PO 2x day). Mucolytics (e.g., acetylcysteine, bromhexine) reduce the viscosity of airway secretions, therefore improving the removal of airway secretions.

Cough suppressants (e.g., butorphanol, codeine, tramadol) inhibit the cough reflex. Cough suppressants are helpful for the comfort and relief of both dogs and owners, when cough is exhausting and refractory to antiinflammatory therapy. Most cough suppressants have sedative effects. They have to be used cautiously and should not be combined with mucolytics. Antibiotics are warranted in dogs with an acute exacerbation of chronic bronchitis and a reasonable suspicion of infection. Doxycycline and Fluoroquinolones have good tissue penetration. Concurrent administration of fluoroquinolones with theophylline can result in theophylline toxicosis.

Prognosis

Chronic bronchitis is a slowly progressive inflammatory disease. It is not curable and airway remodeling is not reversible. The course of disease is often waxing and waning and individual flexible treatment plans are mandatory for every patient. Most dogs can be managed satisfactorily and have a good quality of life.