Feline lower airway disease: more than just ‘asthma’

Feline lower airway disease includes the conditions asthma and chronic bronchitis, both of which cause significant morbidity in cats. Presentations can vary from a chronic cough to acute respiratory distress. The diagnosis is ideally based on bronchoalveolar lavage results and treatment is aimed at reducing airway inflammation. Inhaled therapy may reduce the adverse effects of long-term oral glucocorticoid treatment, and is well tolerated by the majority of cats.

Key words: asthma, chronic bronchitis, inhaled therapy, corticosteroids, bronchodilators

Introduction
Lower airway disease, specifically bronchial disease, is common in cats, and likely under diagnosed. The predominant presenting clinical sign is a cough, which owners may mistake for furballs, especially as the cat may ‘retch’ during a coughing episode. Coughing in cats is rarely cardiac in origin, but there are differentials beyond inflammatory bronchial disease, which is the focus of this article, as listed in Box 1. Inflammatory bronchial disease is the most common lower airway disease in cats (Foster et al. 2004a), and is frequently termed ‘feline asthma’. However, feline asthma likely represents just one end of a spectrum of non-infectious inflammatory lower airway diseases seen in cats, with chronic bronchitis also associated with significant respiratory morbidity in this species.

What is ‘asthma’?
The term ‘asthma’ is commonly used to describe inflammatory bronchial disease in cats, and is compared to the condition in humans. However, human asthma is characterised by dyspnoea, caused by spontaneous bronchoconstriction, and airway remodelling. It is often diagnosed on the basis of forced-exhalation spirometry, a test we are unable to perform in cats. Cats with inflammatory bronchial disease can also present acutely dyspnoeic, but a chronic cough is the more common presenting sign. Certainly some cats suffer true bronchoconstriction, eosinophilic airway inflammation and respond to bronchodilator treatment, but many cats with bronchial disease have predominantly neutrophilic airway inflammation, or a mixed cell cytology, with a minimal response to bronchodilation. The author considers non-infectious inflammatory bronchial disease in cats to be a spectrum, as seen in Figure 1, and in a clinical setting, without bronchoalveolar lavage, defining the underlying condition may not be possible. However, cats can still be effectively treated as described later in this article.

Pathophysiology

Asthma: Cats with asthma show reversible airflow limitation and air trapping due to bronchoconstriction, excessive mucous production and smooth muscle hypertrophy, likely the result of eosinophilic airway inflammation resulting from a Type 1 hypersensitivity reaction. Histamine and leukotrienes are released from sensitised mast cells on second exposure to inhaled antigens, attracting eosinophils, promoting vascular permeability and smooth muscle contraction. Interestingly, in experimental studies of feline asthma-like disease, increases in neutrophils have been documented along side expected eosinophilic inflammation (Kirschvink et al. 2007) and as mentioned, naturally occurring bronchial disease is often neutrophilic, emphasising our lack of complete understanding of the condition. Multiple triggering allergens may worsen clinical signs in affected cats, including dusty cat litter, house dust mites, strong chemical smells, building dust, perfumes, hairspray, cigarette smoke and pollens (Baral 2012).

In chronic bronchitis neutrophilic inflammation predominates, with excessive mucous production, and although spontaneous bronchoconstriction does not occur, air-flow is restricted by airway remodelling, inflammation and mucous. This condition does not seem to be acutely triggered by allergens but the causes are not fully understood.
Box 1:

Differential diagnosis of coughing in cats

Oropharyngeal disease: pharyngitis,* foreign body, polyp, neoplasia

Upper airway disease: laryngitis/tracheitis,* laryngeal paralysis, foreign body, neoplasia

Bronchial disease: asthma, chronic bronchitis, Mycoplasma, Bordetella, lungworm, foreign body, neoplasia

Pulmonary parenchymal disease: bronchopneumonia (bacterial, parasitic, protozoal, secondary to aspiration), oedema (cardiogenic and non-cardiogenic), haemorrhage, idiopathic pulmonary fibrosis

Pleural space disease: pleural effusion, mediastinal neoplasia

*commonly secondary to feline herpesvirus or calicivirus

The role of Mycoplasma species has been investigated in both upper and lower airway disease in cats and current understanding is summarised in Box 2.

Reduced airflow occurs in both conditions due to oedema, mucous, inflammation and epithelial alterations. These changes in airway diameter, even if small, result in significant reductions in airflow. Over time changes become permanent, including fibrosis and emphysema.

Signalment and clinical signs

Affected cats are often young to middle aged, and Siamese cats are over-represented (Foster et al. 2004b). A chronic cough is the most common presenting sign, due to airway narrowing, mucous, and direct effects of inflammation on mechanoreceptors in the airways. As mentioned, owners may report retching or ‘hairballs’, and should be questioned further if hairballs or vomit are seen less often than retching/coughing episodes. See Figure 2 and video 1. Cats at the asthma end of this disease spectrum are more likely to develop respiratory distress due to bronchoconstriction, and particularly expiratory dyspnoea with increased effort on exhalation compared to inspiration. Paying close attention to the respiratory pattern of a dyspnoeic cat can be useful in narrowing the differential diagnoses. Episodes of tachypnoea, wheezing and exercise intolerance may be noted, although harder to appreciate than in dogs.

Box 2:

The role of mycoplasma in feline lower airway disease

Mycoplasmas are small bacterial organisms widely considered to be commensals found in the feline upper respiratory tract. Their role in lower airway disease is debated. Although the majority of studies have not detected Mycoplasma species in the lower airways of healthy cats, Mycoplasma infection has been reported in association with lower airway, pulmonary and pleural disease (Lee-Fowler, 2014), and it is likely that if not the cause of the disease, Mycoplasma species may be responsible for exacerbating respiratory conditions. It is sensible to test for this bacteria in bronchoalveolar lavage (BAL) samples from coughing cats. Recent publications suggest that PCR is more sensitive than culture, although performing both may be prudent given that PCR provides no information as to the viability of the organism (Schulz et al. 2014). Treatment options for Mycoplasma species include tetracyclines (doxycycline in particular is frequently used, ensure tablets are followed by food or water to prevent oesophageal injury) and fluoroquinolones.

Figure 1: Lower airway disease is a common clinical entity in cats, but terminology is poorly defined. Broadly, cats are diagnosed with asthma or chronic bronchitis but there are no widely excepted criteria and they may present very similarly

Figure 2 and Video 1: A coughing cat may be reported by owners to be retching or suffering ‘hairballs’