

## CHRONIC COUGHING IN CATS Part I: Causes

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### INTRODUCTION

Many cats are presented to veterinary practice because they have a chronic cough. While these cases can be very complex and/or protracted, undertaking their investigation and treatment is often highly rewarding.

The first step of the investigation is to determine whether or not the cat is actually coughing. Careful questioning of the owner should rule out retching, gagging, or vomiting (particularly of fur balls). However, some cats will occasionally retch or vomit following a forceful bout of coughing, so the presence of a terminal retch should not be misinterpreted as evidence of gastrointestinal (GI) disease.

#### *Why do cats cough?*

Coughing results from stimulation of the cough receptors that are located within the larynx, trachea, and bronchial tree. In cats, coughing is usually a sign of disease affecting the lower respiratory tract (LRT), particularly the larger airways. It can also be associated with upper respiratory tract (URT) disease, but is rarely associated with disease of the lung parenchyma, heart or pleural space.

In cats, most coughing is caused by irritation or inflammation of the trachea or bronchial tree. This can result from the presence of foreign material, inhaled liquids or gases, be caused with infectious agents, allergic or hypersensitivity reactions or, occasionally, with neoplastic processes. Since there are no cough receptors in the peripheral lung tissue, disease affecting just the periphery of the lungs will not cause coughing, that is, until it extends into the upper airways.

Cats, unlike dogs, rarely cough in association with heart disease, or with disease affecting the mediastinum. This may result from a number of different factors, including the finding that the trachea and main-stem bronchi in the cat appear to resist compression that results in coughing much more commonly in dogs (Figure 1).



*Figure 1. Lateral radiograph of a 2 year old Siamese with an FeLV-negative anterior mediastinal lymphosarcoma. Note the extreme compression of the trachea and main-stem bronchi – this cat had dyspnoea and regurgitation, but was not coughing!*

Coughing associated with URT disease usually results from inflammation of the larynx. It can also occur where disease within the nose results in mucopurulent material from the caudal nasopharynx dripping down and irritating the larynx (termed ‘post-nasal drip’).

When trying to determine which part of the respiratory tract may be affected, the presence or absence of dyspnoea can be a very useful guide. Dyspnoea is difficulty in breathing. Since it can result from a decrease in ventilatory capacity, or an increase in ventilatory demand it can result from respiratory or non-respiratory causes. However, when coughing is also present, it is most likely to be of respiratory origin. Expiratory dyspnoea (i.e. difficulty breathing out) is typically associated with LRT disease. Inspiratory dyspnoea is usually associated with URT disease (when it is causing airway obstruction), or pleural disease (when it is preventing full lung expansion). The presence of other clinical findings may help to direct the clinician to the particular area of concern. For instance, URT disease is typically accompanied by sneezing, nasal discharge, wheezing, snoring, snorting, facial deformity, obstructed nares, or dysphagia, while laryngeal disease may cause a change in the cat’s voice. Tachypnoea (rapid breathing) or orthopnoea (dyspnoea when recumbent) do not help in localising the cause of the dyspnoea. (See Table 1).

*Table 1. Localisation of the cause of dyspnoea*

<b>Cause</b>	<b>Nature of dyspnoea</b>	<b>Sneezing/nasal discharge</b>	<b>Cough</b>
<b>Non-respiratory</b>	Tachypnoea	No	No
<b>URT</b>	Inspiratory	Yes or No	Yes or No
<b>LRT</b>	Expiratory	No	Yes or No
<b>Pleural disease</b>	Inspiratory	No	Very rarely

URT – upper respiratory tract disease, LRT – lower respiratory tract disease

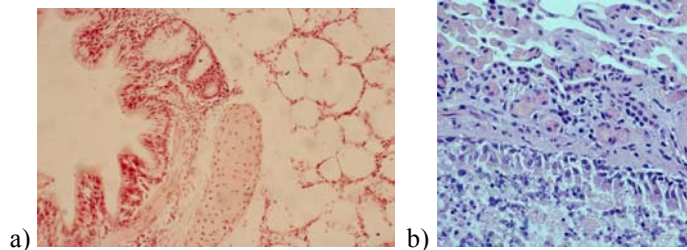
## **CAUSES OF CHRONIC COUGHING**

In cats, the most common cause of chronic coughing is chronic bronchopulmonary disease. Because of this, it may, on occasion, be tempting to make a presumptive diagnosis, rather than undertaking a full investigation. However, this is not to be recommended as many of the other differential diagnoses carry very different treatment options and/or prognoses. In addition, different types of chronic bronchopulmonary disease may respond better to slightly differing treatment approaches and are frequently complicated by secondary infections.

### *1. Chronic bronchopulmonary disease:*

This describes a commonly occurring yet poorly understood group of conditions that affect the airways and alveolar space. It includes ‘feline asthma’, chronic bronchitis, chronic broncho-pneumonia, chronic obstructive pulmonary disease (COPD), and emphysema. By definition, asthma is characterized by airway hyper-responsiveness and reversible bronchoconstriction, while chronic bronchitis (or COPD) is characterized by airway inflammation and excessive mucus production, and leads to irreversible

narrowing of the airways. However, given current diagnostic facilities the distinction between the two disease entities is at best difficult, and often completely arbitrary. Somewhat incorrectly, the term ‘feline asthma’ tends to be used for those cases that are found to have a strong component of airway hypersensitivity, combined with an increased number of eosinophils on bronchoalveolar lavage (see later). In most cases, the exact aetiopathogenesis of the different conditions remains unclear. (Figure 2).



*Figure 2. Histopathological sections, H&E stain a) Normal feline bronchus (with small area of cartilage) and normal alveoli. (Courtesy of B. Corcoran) b) Severe bronchopulmonary disease with complete loss of normal lung architecture.*

The main clinical signs are coughing, wheezing, dyspnoea and respiratory distress. Clinical signs may be episodic, intermittent or persistent, and arise because of:

- Tracheobronchial inflammation and irritation
- Excessive airway secretion
- Bronchoconstriction

Disease is seen most frequently in young to middle aged cats (2-8 years of age), with Siamese, Burmese and other Oriental breeds being over-represented (Figure 3). Historically, the cats may have previously experienced cat ‘flu’, have initially shown a degree of seasonality to their disease, or had their clinical signs exacerbated by airway irritants (smoke, temperature changes, aerosols, dusty cat-litter, or sleeping on their owners bed – sometimes seen as ‘worse at night’). Coughing may conclude with a terminal retch to clear mucus from the pharynx.



*Figure 3. 6 year old Siamese cat with chronic bronchopulmonary disease – Oriental cats are predisposed to chronic bronchopulmonary disease.*

In cats with episodic signs clinical examination is often unrewarding. During an episode of coughing or in cats with more protracted disease, increased lung sounds may be heard on auscultation (typically wheezes and, in more severe cases, crackles). In severe cases the chest may be barrel-shaped, and a ‘heave line’ may be evident.

## 2. *Pneumonia:*

This can be caused by various infectious agents (viruses [feline herpes virus FHV-1, feline calicivirus FCV, cow pox virus], bacteria [*Pasteurella multocida*, *Bordetella bronchiseptica*, *Mycoplasma spp.*, *Escherichia coli*, *Mycobacterium bovis*, *M. microti*], parasites [*Toxoplasma gondii*, lungworms e.g. *Aelurostrongylus abstrusus*]), or inhaled or circulating toxins or irritants (lipid or food aspiration, smoke inhalation, uraemia, pancreatitis, sepsis).

*Bacterial pneumonia* is seen most frequently in immunocompromised individuals, or in individuals with compromised lung function. Bacterial bronchopneumonia usually presents with a cough, tachypnoea, dyspnoea, nasal discharge, fever and depression. Auscultation may reveal increased lung sounds, crackles, wheezes, and silent areas (due to pulmonary consolidation). Primary bacterial pneumonia, with mixed and pure cultures of *B. bronchiseptica* may be found in kittens of 5-10 weeks of age that have come from environments where husbandry is poor. The latter infection can also be spread from dogs. (Figure 4).

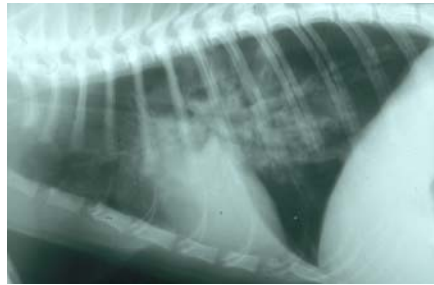


Figure 4. Lateral radiograph of a bacterial bronchopneumonia caused by *B. bronchiseptica* in a 4 month old British Blue cat.

Primary bronchopneumonia may also result from infection with members of the tubercle group (typically *Mycobacterium microti* [caught from voles and mice] or *M. bovis*). These infections are seen quite regularly in the UK and Ireland. Clinical signs are rather insidious in onset, dyspnoea is usually more obvious than coughing, and cutaneous lesions are usually present. (Figure 5).

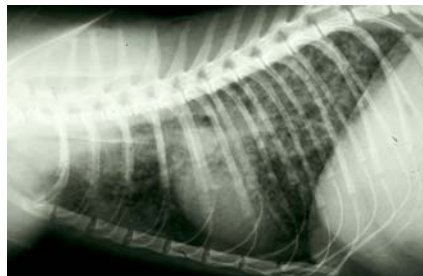


Figure 5. Lateral radiograph of a bacterial bronchopneumonia caused by *Mycobacterium bovis* in a 1 year old Domestic Short-Haired (DSH) cat. Note the enlarged pre-sternal and hilar lymph nodes. (The pulmonary changes caused by tuberculosis can be very varied).

Bacterial pneumonia can also arise secondary to other disorders. These include chronic bronchopulmonary disease, the long-term presence of a foreign body, or previous damage

from inhalation or aspiration. With chronic bronchopulmonary disease secondary infection occurs most typically with *Mycoplasma spp.*, *P. multocida*, or *B. bronchiseptica*, and in these cats the signs of pneumonia are often quite subtle, usually presenting as an exacerbation of an already chronic condition.

*Parasitic pneumonia: Aelurostrongylus abstrusus* is probably the most common lungworm of cats, although *Capillaria aerophilia* infection may also occur. While *A. abstrusus* may be present in up to 20% of free-roaming cats, it rarely causes clinical signs of disease. Clinical signs are more prevalent in immunosuppressed cats. Cats are infected by eating infected slugs or snails (the intermediate host), or infected rodents, lizards or birds (the transport hosts) (Figure 6). Affected cats may present with a chronic cough, with associated crackles and wheezes. Perhaps the most important consideration of *A. abstrusus* infection is its differentiation from chronic bronchopulmonary disease, particularly ‘feline asthma’. Since both conditions can result in an eosinophil-rich bronchoalveolar lavage fluid (see later) it is advisable to treat all coughing cats with a therapeutic course of fenbendazole (see later), prior to undertaking further investigations.



Figure 6. Cats that hunt and eat their prey are at risk of developing lung worm infection due to *Aelurostrongylus abstrusus* infection.

### 3. Neoplasia:

Pulmonary neoplasia may be primary or metastatic. While primary neoplasia is rare in cats it can include adenoma, bronchoalveolar adenocarcinoma, and bronchial gland carcinoma. Affected cats are usually older (average age 10-14 years), with clinical signs consisting of coughing, wheezing and/or dyspnoea, depending on the location and extent of the tumour (Figure 7). Interestingly, lameness may be seen in ~25% of cats with malignant lung tumours because some of these tumours may metastasise to the digits. Since metastatic lung tumours are seen more typically within the lung parenchyma, rather than the bronchial tree, they rarely result in coughing.

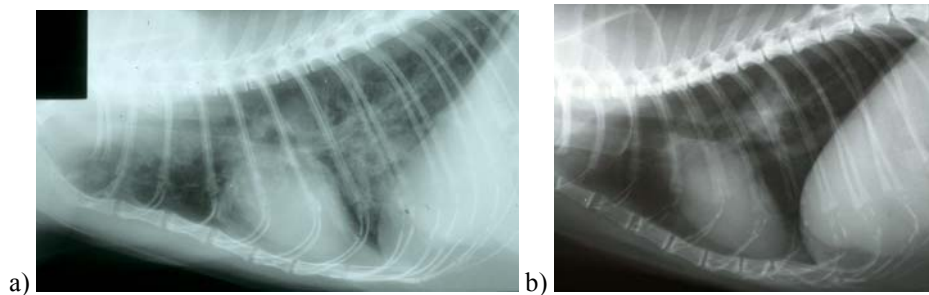


Figure 7. Lateral radiographs a) Pulmonary lymphosarcoma in a 5 year old DSH cat. b) Bronchial wall adenocarcinoma in the right main-stem bronchi of a 14 year old DSH cat that presented with acute onset coughing.

#### 4. Foreign bodies:

Foreign bodies within the trachea or bronchial tree will initially cause acute coughing (Figure 8). However, if the foreign body is not removed chronic coughing and dyspnoea can result. This is often accompanied by halitosis as secondary infection develops.

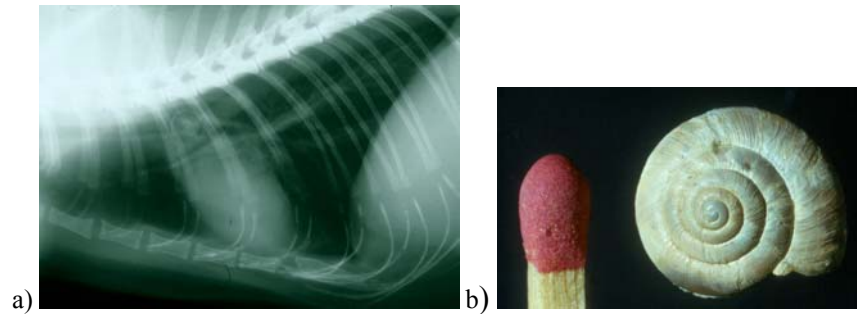


Figure 8. Lateral radiograph of a foreign body (snail shell) in situ at the tracheal bifurcation of an 11 year old DSH cat and following removal (the match is used as a size marker).

#### 5. Pulmonary oedema:

In cats, most cases of pulmonary oedema result from congestive heart failure. Occasional cases of non-cardiogenic pulmonary oedema may result from severe uraemia, pancreatitis, shock, sepsis, near-strangling, near-drowning, electrocution, smoke-inhalation, or cranial trauma. The history and other clinical findings are likely to indicate the cause of the disease. Uncomplicated pulmonary oedema, because it is located within the lung parenchyma, rarely causes coughing.

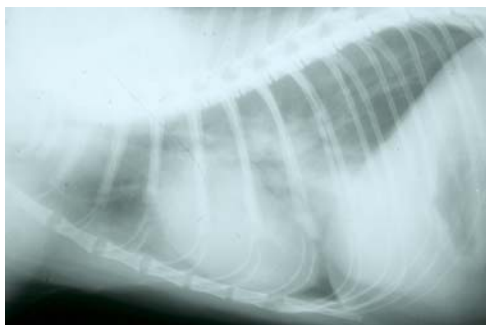


Figure 9. Lateral radiograph of an 8 year old Persian cat with pulmonary oedema and cardiomegally due to hypertrophic cardiomyopathy and congestive heart failure. This cat was dyspnoeic, but not coughing.

#### 6. Pulmonary contusion (trauma):

Blunt trauma to the chest (road traffic accidents, 'high-rise' falls) can result in pulmonary contusion, haemorrhage, oedema, atelectasis, and gas-filled cyst formation. Other injuries may include fractures of ribs, sternbrae, mandible or fore-limbs, pneumothorax or pneumomediastinum. Pulmonary contusions rarely cause coughing unless the trauma results in tracheal damage or significant haemorrhage within the bronchi.

References for further reading are listed at the end of the third article in this series.