

The Use of Bronchoscopy and Bronchoalveolar Lavage in Dogs with a Chronic Cough



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Introduction

Chronic cough in dogs is defined as coughing on most days for a period of greater than eight weeks. Common differential diagnoses for a chronic cough include airway collapse, infectious disease (bacterial, fungal, and parasitic), neoplasia, interstitial lung disease, eosinophilic bronchopneumopathy, and chronic bronchitis. Bronchoscopy is an underutilized but beneficial tool in diagnosing and developing a treatment plan for dogs with a chronic cough.

When should bronchoscopy be considered?

The typical workup for chronic cough begins with a minimum database and thoracic radiographs. CBC and chemistry values are often not specific to a particular diagnosis but may show signs of inflammation or elucidate other comorbidities that could be important for the treatment plan. Thoracic radiographs aid in the exclusion of neoplasia, pleural effusion, and cardiac disease. For dogs that do not have a clear radiographic diagnosis, bronchoscopy is often the next step. Almost all dogs with more than two months of cough will have abnormalities on bronchoscopic examination. Bronchoalveolar lavage, performed as part of a standard bronchoscopy, also allows for cytology and culture of the lower airways.

Bronchoscopy

Bronchoscopy includes evaluating the lower airways for collapse, hyperemia, thickened or irregular mucosa, and mucus. Below are examples of bronchoscopic images obtained in common lower airway diseases.



Figures 1 and 2: Images from a 10-year-old Labrador retriever with chronic bronchitis. Note the increased mucus, hyperemic and thickened bronchial mucosa, and slightly nodular appearance. Chronic bronchitis is diagnosed by exclusion of other chronic lower airway disease. Almost all dogs with chronic bronchitis will have abnormalities on

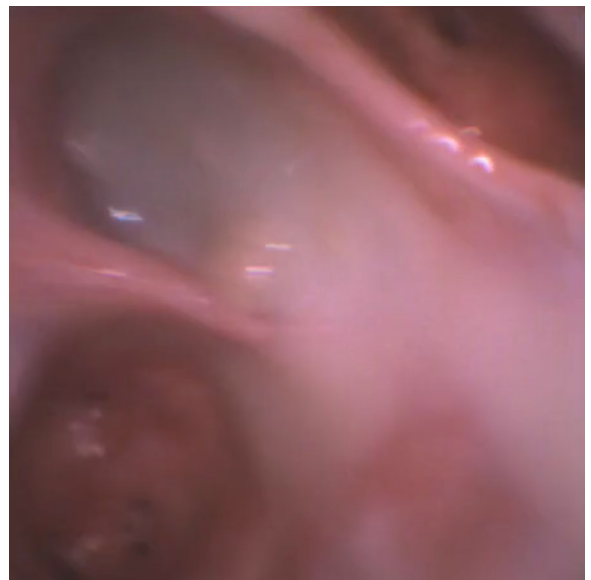


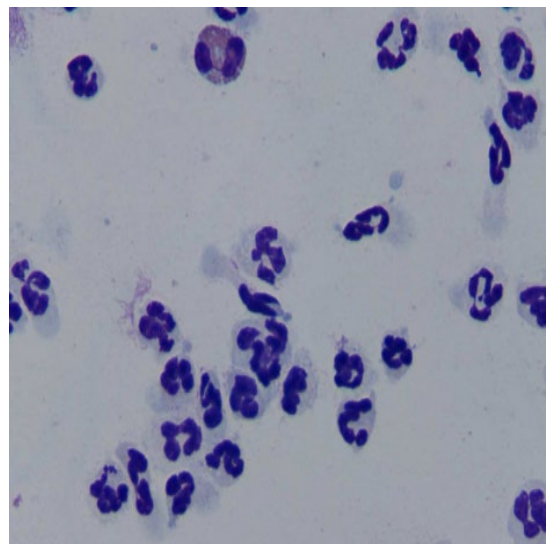
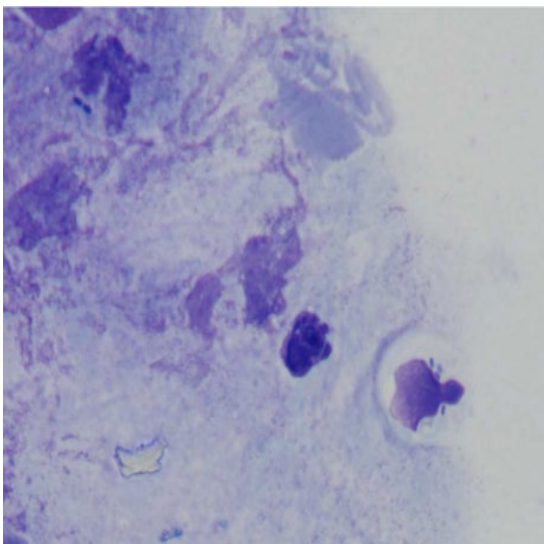
Figure 3 (left): Image from an 8-year-old mixed breed dog demonstrating bronchiectasis. Bronchiectasis occurs secondary to an inflammatory or infectious insult. Studies have shown bronchoscopy to be a highly effective means of identifying cases of bronchiectasis and will often also diagnosis the primary underlying pathology leading to bronchiectasis. **Figure 4 (right):** Image from a 6-year-old mixed breed dog with chronic bronchitis that has progressed to saccular bronchiectasis and secondary bacterial pneumonia. Note the purulent material pooled in the bronchi.



Figures 5 and 6: Image from a 13-year-old Miniature Poodle demonstrating lower airway collapse. The image on left is the airway during inspiration and the image on the right demonstrates dynamic collapse during expiration. Approximately half of all dogs presenting with a chronic cough will have tracheobronchomalacia and secondary airway collapse which may occur with other concurrent bronchial

Bronchoalveolar lavage

Bronchoalveolar lavage (BAL) involves instilling small aliquots (typically 3 to 10 ml, depending on the size of the patient) of sterile saline through the bronchoscope and retrieving the majority of the sample into a sterile container using suction. Bronchoscopy-guided BAL allows a distinct advantage over a blind technique in that the saline can be directed to affected areas, and retrieval of the saline can be observed. BAL fluid is immediately submitted for cytology, culture, and infectious disease testing as appropriate to the individual case.



Figures 7 and 8: Cytology images from a 13-year-old Pug with chronic bronchitis and bacterial bronchopneumonia. Note the phagocytized bacteria within the neutrophils. Bacterial infection is a common cause of acute worsening of chronic cough in dogs with chronic bronchitis. The chronic inflammation and secondary mucosal changes associated with chronic bronchitis may predispose to bacterial infection. Photo credit - Patty Ewing.

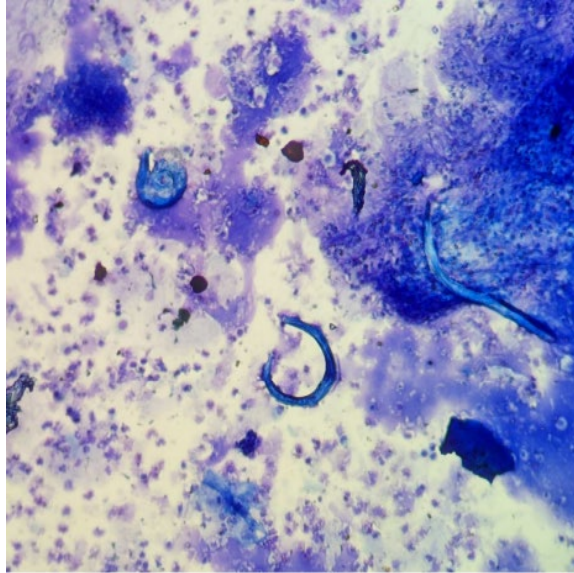


Figure 9: Cytology from a 10-year old-mixed breed dog with chronic cough. Note the lungworm larvae present in this sample. Eosinophilic inflammation may be seen with parasitic infection, allergic disease, or eosinophilic bronchopneumopathy, among others.

Conclusion

Many dogs with chronic cough have more than one underlying cause (i.e., airway collapse and chronic bronchitis or chronic bronchitis and bacterial bronchopneumonia), and it can be difficult to treat these patients with only a presumptive diagnosis appropriately. Bronchoscopy and bronchoalveolar lavage are useful tools that can often provide a definitive diagnosis. After the diagnosis has been made, therapy can be tailored appropriately. This often means treating an acute and chronic component of the patient's disease.

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