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Coughing in Dogs: Is it Heart Failure?

When a mature dog presents with cough, the biggest challenge can be to determine whether the cough is due to congestive heart failure, left main-stem bronchus compression, chronic bronchitis or another bronchopulmonary disorder, such as pneumonia or lung cancer.

Although there are many differentials for cough, the highest possibilities are pretty apparent by the time you finish a history, physical exam and thoracic radiography. But the diagnosis of chronic bronchitis is tricky, especially in a small, older dog with chronic mitral valve regurgitation.



The question in these patients is often: Is the cough due to tracheal collapse, chronic bronchitis, compression of the left main-stem bronchus, congestive heart failure (CHF) or a combination of factors?

In some cases, it can be a difficult puzzle to solve.

Even though a dog in CHF is likely to have radiographic evidence of heart disease and pulmonary edema, the radiographic lung pattern might simply signal interstitial change due to aging or be related to other factors such as underexposure or expiration.

There is a misconception that most dogs with chronic bronchitis will have dramatic bronchial patterns or other radiographic changes, or that the complete blood count (CBC) will be abnormal.

Unfortunately, the CBC is within normal limits in most cases, and there are no specific radiographic features other than bronchiectasis that point to chronic bronchitis. Thus, the diagnosis is generally one of exclusion.

Determining the Cause

The most efficient diagnostic approach to chronic cough involves history and physical exam, chest radiographs and a heartworm test if the dog is not on heartworm preventative.

JUST AS YOU WOULD ANY DIAGNOSIS, YOU BEGIN WITH THE HISTORY OF THE COUGH.

- ▶ When was the onset?
- ▶ What were the circumstances? For example, was the dog recently boarded or spending time in a dog park, raising concerns of an infectious cause?
- ▶ What is the cough progression and duration? If a dog has been coughing for 6 months to a year, and there has been little significant progression, it is unlikely to be congestive heart failure.
- ▶ Response to previous treatments can also be instructive, especially if single treatments have been administered at appropriate dosages and durations of therapy. Conversely, nonspecific combination antibiotic/steroid/diuretic therapy may improve the cough but provides little information about etiology.

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Other considerations are patient age, breed and geographic location. You would not expect a 2-year-old dog without a heart murmur to be in CHF unless it is a larger dog with cardiomyopathy. Certain breeds are prone to cardiac disease and others

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to respiratory conditions. However, many of these, such as the Cocker Spaniel and Cavalier King Charles Spaniel, are prone to both. Toy breeds are predisposed to tracheal collapse and may have a classic goose honk cough that is easy to illicit on tracheal palpation. However, these dogs also have a high prevalence of heart failure related to chronic valvular disease.

Geographic location can be an important clue if you live in a heartworm-affected area or in a region endemic for infectious disorders, such as fungal or parasitic disease. And today, when so many owners travel with their dogs, you must ask about recent travel and determine what is endemic in the area the dog has visited.

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It is difficult to characterize the CHF cough, as there is overlap with other problems. You can have a dry cough associated with heart failure if it is due to left main-stem bronchus compression; you can have a moist cough with a little productive activity if there is edema. A classic chronic bronchitis cough starts dry, and then at the end there is a wretch as the patient tries to expectorate secretions. Dogs with CHF also can expectorate edema fluid.

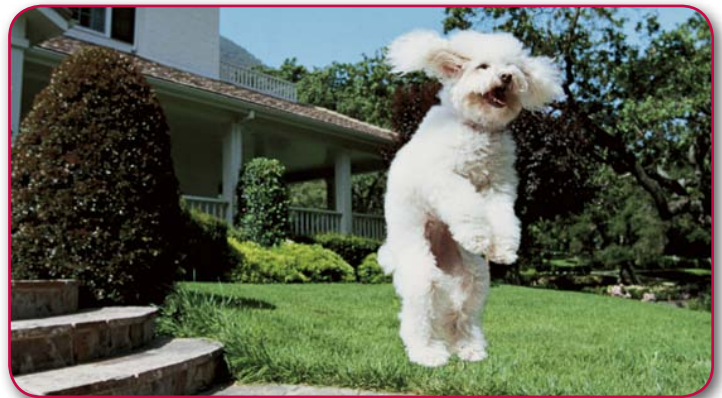
There are subtle characteristics of the cough that might provide insight, but clients often have difficulty characterizing the cough. One tool that I think is over-emphasized is making the dog cough in the office. Instead, you could ask owners to record the sound of the cough on their cell phones or with a video recorder, so that you can hear and see the cough that is worrying the client.

It might be helpful to take the patient for a brief walk, which can help to accentuate obstructive airway sounds.

The chest radiograph is probably the most important diagnostic test following thoracic auscultation. If you carefully interpret radiographs you can probably exclude a significant number of the differentials for chronic coughing.

But you need a good radiograph that includes the entire thorax. The patient should be well positioned and it must be an inspiratory exposure. The gray scale should be such that you can still see the ribs, the edges of the film are nearly black, and

the radiographs are not marred by motion artifact. Make sure the technician includes as much of the trachea as possible in the lateral views, especially in older smaller breeds, while still including the caudal portions of the lungs.



In a dog that has clear evidence of heart disease, such as a heart murmur or arrhythmia, or in a breed that could be at risk for cardiomyopathy, an echocardiogram may be helpful to include or exclude heart disease.

Many veterinarians are going to perform a CBC and a biochemical profile on an older dog that is exhibiting any clinical signs. Thyroid levels and urinalysis may also be appropriate. But the information garnered from these tests may be more useful for monitoring the dog after diagnosis and treatment, rather than contributing information for distinguishing cough as respiratory or cardiac in origin. Again, in most dogs with primary airway disease the blood count will be normal.

While recognizing that there are significant technical concerns about non-invasive blood pressure in terms of reliability, I think that blood pressure is a valuable test in an older dog. We look at a systolic blood value of 160 and higher as concerning in most dogs. In some breeds, however, such as the sight hounds, the normal values can be as high as 180.

Blood pressure is not a vital part of the cough work up. But if there is evidence of cardiovascular or renal disease, blood pressure becomes more relevant. For example, some clinicians will not treat a dog with early mitral valve disease that is not showing symptoms, but if their blood pressure is high, they may initiate an ACE-inhibitor.

Therapeutic Trials

Response to treatment can be instructive, although the results are not always clear-cut.

Giving a patient with left bronchial compression a low dose of furosemide and an ACE-inhibitor will often improve the cough, presumably because the heart gets smaller. But a similar clinical response may be observed in the dog with early congestive heart failure. Unless you have a radiograph confirmation of pulmonary edema, it is going to be difficult to distinguish left-sided CHF from coughing due to left main-stem bronchus compression, or an unrelated, noncardiac cause of cough. If we believe the cough stems from bronchitis, and if the owner won't approve further evaluation such as bronchoscopy and bronchial lavage, we typically treat empirically for airway disease. Initially we prescribe a 14-day course of doxycycline, which is then followed by a 10-day course of prednisone. Airway infection is considered strongly in dogs with a marked improvement on doxycycline (when steroids are not dispensed). However, most owners report little improvement with antibiotic therapy, but often a 75% to 95% improvement after prednisone. In these cases, chronic bronchitis is likely.

But that treatment is not appropriate if the cough is due to CHF or to left mainstem bronchus compression. Symptom relief may be minimal, and the quality of life may deteriorate more rapidly if inappropriate treatment is continued. Furthermore, the dog may experience adverse effects from drugs that are not indicated for its condition, and its survival times may be shortened. Accordingly, our goals should be accurate diagnosis and direction of appropriate therapy and follow-up.

Diagnostic Pointers

Failure to consider the signalment, presence or absence of a heart murmur and the etiology of heart failure leads to the most common diagnostic error I see in dogs referred to my practice. If you have a middle-aged to older dog, and you are considering treatment for CHF, you first have to ask: What is its heart disease?

A small breed, older dog nearly always has chronic mitral valve disease as the etiology of CHF. If there is no murmur detected, it is very unlikely that heart failure is the cause of the cough, even when radiographs suggest cardiomegaly.

When you see a larger breed dog with cough, you also have to consider cardiomyopathy. Murmurs can be faint or absent in dogs with dilated cardiomyopathy, but these patients typically have radiographic changes consistent with congestive heart failure, and they respond to therapy for that condition when present.

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In our own group, the biggest issue we have is trying to decide radiographically whether the patient is in CHF or not. This typically involves dogs with very early CHF or dogs that continue to cough following initial response to heart failure treatment. I assume that if we are having that much trouble, it makes sense that our colleagues in practice are having similar difficulties. One suggestion: if you are unsure, get a second opinion on the radiographs and exposure films both before and after initial diuretic treatment.

The dog with a gradual onset of coughing that becomes worse over time is more difficult to diagnose. But remember, chronic bronchitis is the most common cause of chronic coughing in mature dogs, and you may not see any obvious reason for the cough on lab tests or chest radiographs. A small breed dog with mitral valve disease will usually develop a murmur long before it develops a cardiac cough.

Some canine patients with a chronic cough are simply difficult to sort out. In these situations, it is often helpful to obtain a second opinion. This may be as simple as having a radiologist or a cardiologist offer his or her perspective about the radiographs. In other cases, and especially when heart disease or CHF is suspected, a cardiologist should be consulted for additional evaluations such as echocardiography.

As a final note, I want to emphasize that the dog with only a cough should be managed differently from one presenting with cough and shortness of breath. A dog in respiratory distress needs to be hospitalized and fully evaluated! ■

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