

The Murmur

Differentiating Congestive Heart Failure vs. Primary Pulmonary Disease

A common diagnostic challenge faced by small animal practitioners is determining if a patient's clinical signs are due to heart disease, lung disease, or both. In many of these cases, advanced diagnostics such as echocardiography and /or bronchoscopy are required for definitive diagnosis. However, there are clues based on history, physical exam, chest radiographs, and blood work that can help prioritize further testing and/or therapy.

Animals with primary lung disease typically have a longer history of clinical signs. A several month history of coughing is much more likely related to primary lung/airway disease. Animals with untreated congestive heart failure will progress from tachypnea to dyspnea to death within days to possibly weeks.

Animals with clinical signs from heart disease typically have an elevated heart rate. Finding a low resting heart rate or a respiratory sinus arrhythmia strongly suggests that the patient does not have significant heart disease. For canine patients, the most common heart disease we see is degenerative valve disease. Affected patients will have a moderate to loud murmur over the mitral valve. A small breed dog with no heart murmur is likely not in congestive heart failure. For cats, cardiac auscultation is less useful. Cats with severe hypertrophic cardiomyopathy may not have a murmur and not all cats with murmurs have significant heart disease. The presence of a gallop sound is more important, as most cats with a gallop on auscultation will have advanced heart disease.

	Heart	Lung
Long standing cough		More likely
Slow HR/Sinus arrhythmia		More likely
Left atrial enlargement on x-rays	More likely	
Pulmonary venous distension	More likely	
Crackles on auscultation	Either	Either
High NT ProBNP	More likely	

Lung sounds are variable in congestive heart failure. The most common finding in patients with pulmonary edema is simply increased bronchovesicular sounds from increased breathing effort. With severe edema, flooding of the alveoli will lead to inspiratory crackles. increased breathing effort. With severe edema, flooding of the alveoli will lead to inspiratory crackles. Crackles can also be heard with primary lung/airway disease. The bottom line is that the presence or absence of crackles does not help rule in or rule out heart failure. Cats with decreased lung sounds should be checked for pleural effusion by radiographs or ultrasound as soon as possible. If you auscult crackles in a patient with normal respiratory

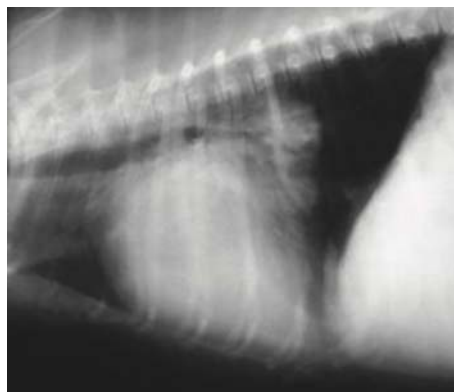
effort, pulmonary disease is a more likely diagnosis as most patients with crackles secondary to pulmonary edema/CHF will have some component of dyspnea.

One of the keys to diagnosing left sided heart disease on radiographs in dogs and cats is looking for left atrial enlargement. Many technical factors can contribute to the cardiac silhouette looking big on radiographs including chest shape, phase of respiration, pericardial fat deposits, and rotational artifacts. If left heart enlargement is truly present, it will be visible in both the lateral and V/D views of the left atrium. The vertebral heart score (VHS) should also be elevated if left heart enlargement is present. More information regarding this tool can be found on our website (www.cvcavets.com).

The pulmonary infiltrates seen with congestive heart failure in dogs are seen first in the R>L caudodorsal lung fields. In more severe cases of heart failure, all lung fields may be affected. The distribution of heart failure in cats is quite variable, although the accessory lung lobe directly caudal to the heart is a fairly common location. For both dogs and cats, finding pulmonary venous distension on chest radiographs is supportive of congestive heart failure. Evidence of venous congestion may quickly disappear even after a single dosage of Lasix.

Recently, the cardiac biomarker, NT-Pro-BNP has become available for both dogs and cats. Finding an extremely elevated NT-Pro-BNP level suggests that a patient is in congestive heart failure. However, both false positives and false negatives do occur, so this test should be used in combination with other diagnostic findings and not as a stand-alone test. Renal failure and pulmonary hypertension can falsely elevate NT-proBNP results. Thus, patients with lower airway disease and pulmonary hypertension may have elevated levels.

In some cases, even after reviewing all initial diagnostic testing, it is still not clear if a patient has primary lung/airway disease, heart disease, or both. The doctors of CVCA are happy to review your case history, exam findings, and chest radiographs to determine the best course of action. If needed, we can coordinate with the internal medicine departments in our locations to set up a referral with both services.



Left atrial enlargement is seen on the lateral as a distinct caudodorsal bulge from the cardiac silhouette.



Left atrial enlargement is seen on the V/D as an increased density in center of the cardiac silhouette that causes the mainstem bronchi to bow outwards, and also as a bulge at 2-3 o'clock which is the left auricle.

Did you know that we offer:

- Echocardiograms performed and immediately interpreted by the doctor
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- The latest human pediatric imaging equipment for immediate, accurate diagnosis
- A detailed summary of our diagnosis, recommendations, and treatment plan provided to you and to your client the same day
- Reminders to the client sent when it is time to follow up with you for rechecks and follow up diagnostics
- Excellence in client service - >99% of our clients would recommend us to friends or family
- Multi-doctor practice gives your patients access to extensive and diverse experience and allows collaboration on the most complicated cases
- Opportunities to participate in cutting edge cardiac drug trials and research
- Surgical intervention for correction of some congenital cardiac defects as well as pacemaker implantation
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