AS SEEN IN THE JULY 2008 ISSUE

Veterinary Practice News
THE INFORMATION LEADER FOR VETERINARY PRACTICE AND BUSINESS

What's Your Diagnosis? Evaluating Vasculature

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For Veterinary Practice News

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Signalment: 11-year-old, male castrated Chinese crested dog.

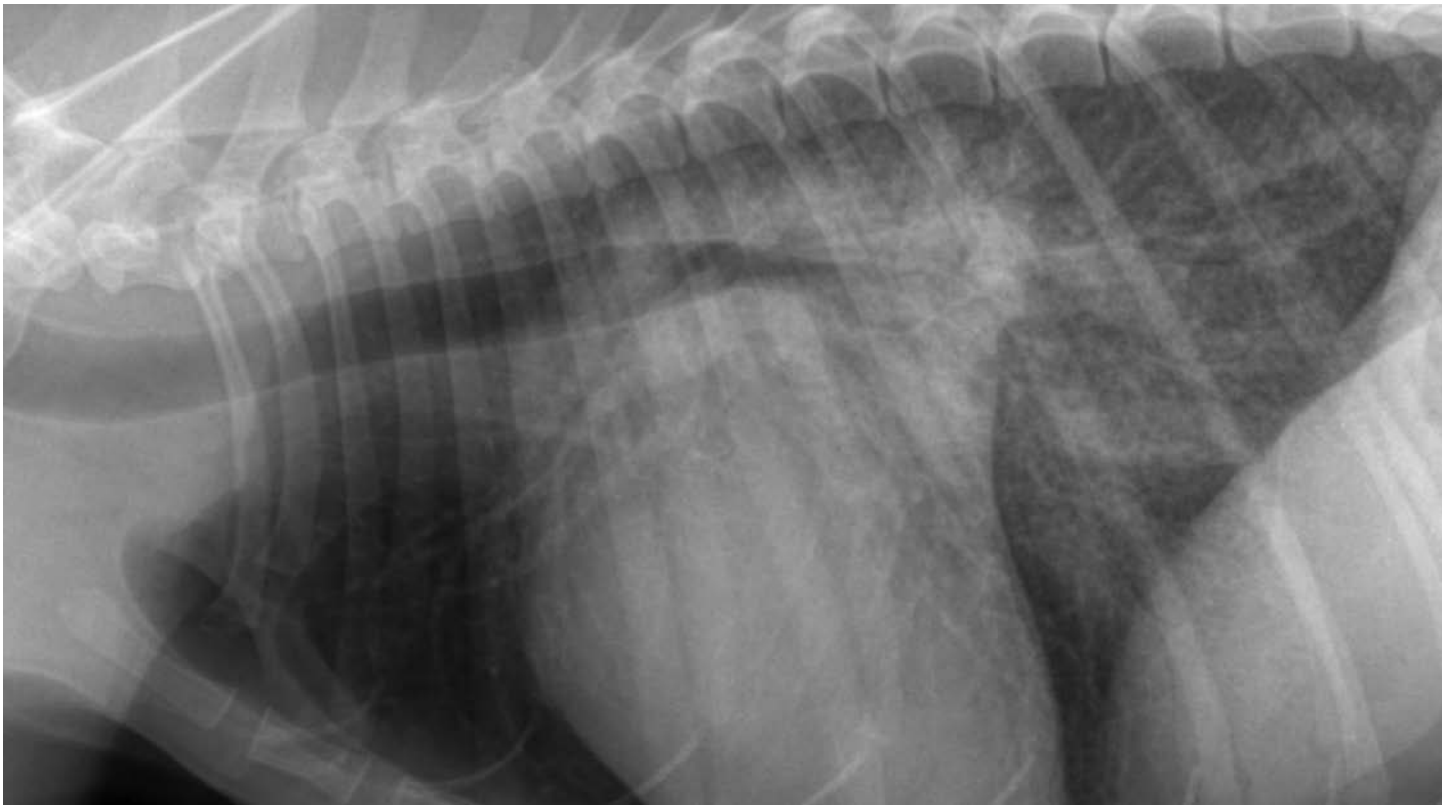
History: Patient presented on emergency for labored breathing and a wet cough. He had been coughing for about a week. Thoracic radiographs were obtained.

Questions:

1. **What are the primary findings?**
2. **What do you think is the primary reason for the clinical signs?**

Radiographic Findings: The heart is enlarged and measures just over three intercostal spaces wide. The vertebral heart score is approximately 11.5. There is dorsal displacement of the entire trachea, suggestive of ventricular lomegaly. There is straightening of the caudal cardiac waist, consistent with left atrial enlargement. The pulmonary vein to the cranial lung lobe is larger than the corresponding artery. A diffuse interstitial pattern is noted in the caudal dorsal lung fields.

Interpretation: Enlarged heart, particularly the left side, consistent with chronic valvular disease. Enlarged pulmonary veins and an interstitial pattern in the caudal lungs are most consistent with pulmonary edema from congestive left-sided heart failure. The first step in evaluating the heart on thoracic radiographs is to determine if it is enlarged. There are two main methods of doing this.



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Semi-quantitative heart size assessment: On the lateral radiograph, the heart should be less than three intercostal spaces wide in the dog and two ICS in the cat. There are some breeds of dog, such as the chondrodystrophic breeds, where the ICS can reach 3.5 normally. Deep chested-breeds such as Dobermans and boxers should have an ICS of less than two. The trachea should angle from the thoracic inlet to the carina at approximately 20 to 30 degrees. In addition, 3/5 of the heart will be cranial to the apicobasilar line (draw line from carina to apex).

Vertebral heart score: This is a method to try to quantitate overall heart size. The height of the heart is measured from the level of the carina to the apex. The maximal width of the heart from the cranial to caudal margin along a line perpendicular to the first line is also obtained.

These lengths are then compared with the thoracic vertebra beginning at T4. Count the corresponding numbers of vertebrae that occupy the lengths measured. These two numbers are summed to create the vertebral heart score. Normal size for the dog is less than 10.5 and less than eight in the cat.

Pulmonary Vasculature: The arteries and veins follow the major bronchi into each lung lobe. In normal animals the vessels should be approximately of similar size. On the DV view, the caudal pulmonary artery and vein should be approximately the same size as the width of the ninth rib. On the lateral view, the cranial lobar vessels are arranged artery, bronchus and vein in a dorsal to ventral orientation. On the DV view, they are arranged in a lateral to medial orientation.

Pulmonary vs. cardiac disease: The primary method of differentiating these two problems is to determine if there are cardiac changes with corresponding pulmonary changes.

For instance, an animal with an enlarged heart, enlarged left atrium, enlarged pulmonary veins and an interstitial infiltrate in the caudal dorsal lung field obviously has cardiac disease and does not have pneumonia. Alternatively, an animal with an alveolar infiltrate in the ventral lung fields and no cardiac changes more likely has pneumonia.

In some instances distribution of the infiltrate may be different. This often occurs in cats with congestive heart failure; they can have an infiltrate other places besides the perihilar region. Also, Dobermans and boxers can manifest failure in odd distributions. Furthermore, once an animal has been on medical management for cardiac disease, the distribution of infiltrate is often altered.

In summary, one of the best differentiating signs is the size of the pulmonary veins. If they are enlarged, congestive failure with pulmonary edema is at least partially responsible for the pulmonary infiltrate.

Summary: Evaluation for heart failure requires evaluation of the heart, vasculature and the lungs. It is not typical to see pulmonary edema without enlargement of the left atrium and at the same time, enlargement of the left atrium does not indicate that congestive failure is present. Careful evaluation of the vasculature is the key to making an initial accurate diagnosis. ●

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