

Why Can't My Patient Breathe?

A review of canine and feline thoracic radiographs

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January 26, 2025

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Outline

1. Systematic approach to reading thoracic radiographs
2. Case examples of common causes of respiratory clinical signs in dogs and cats



Systematic Approach to Radiographic Interpretation

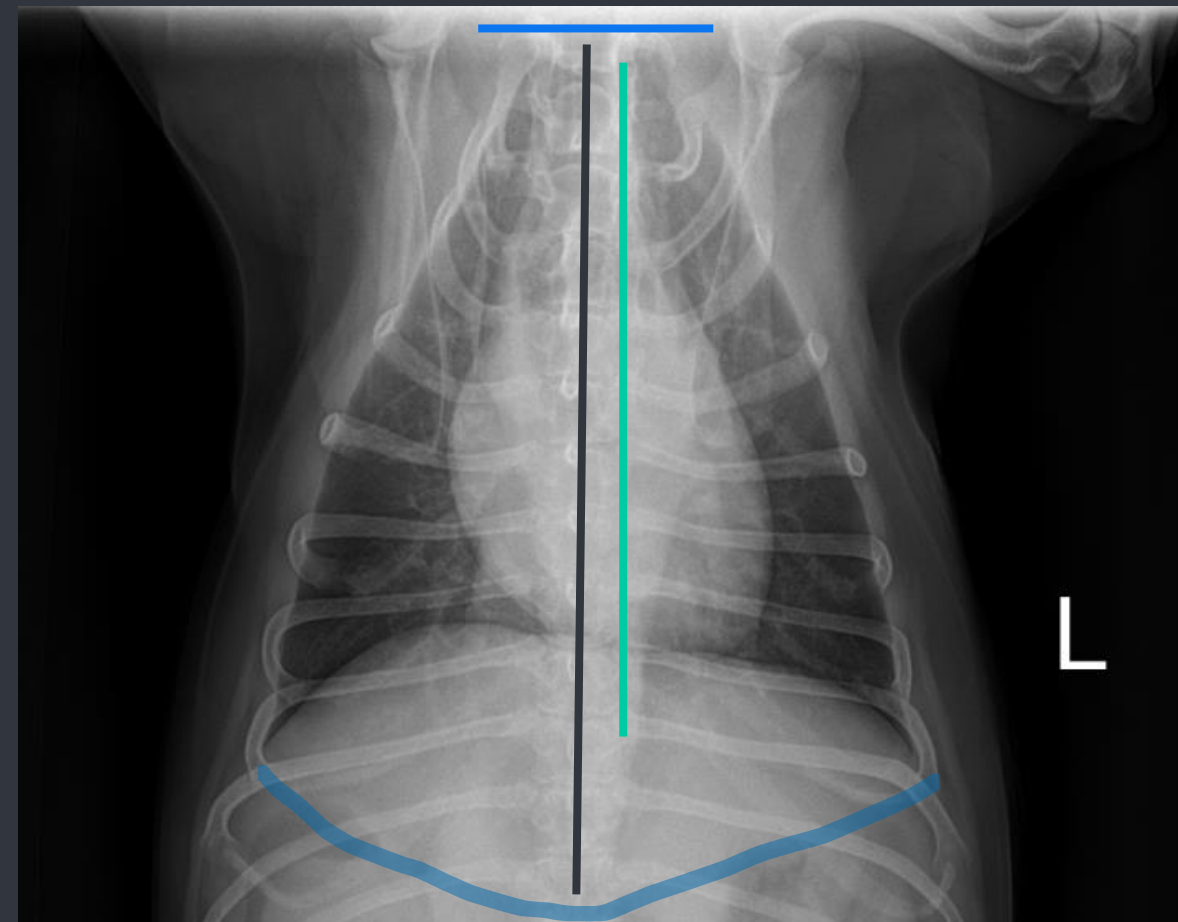
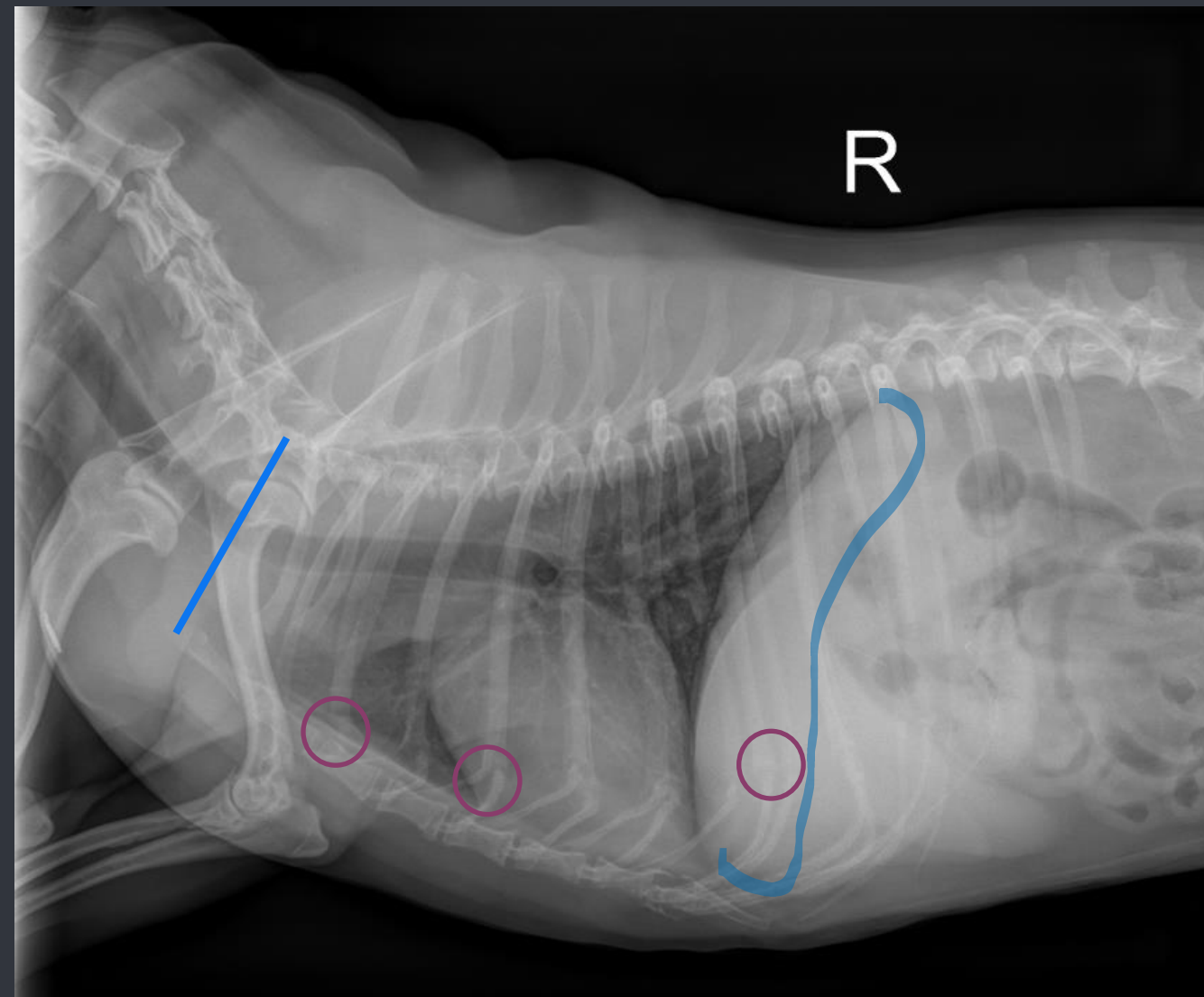


Systematic approach to evaluating thoracic radiographs

- + Technique and Positioning
- + Cardiovascular structures
 - + Cardiac silhouette
 - + Great vessels
 - + Pulmonary vessels
- + Pulmonary parenchyma
- + Mediastinum
 - + Trachea (and major bronchi)
 - + Esophagus
 - + Intrathoracic lymph nodes
- + Pleural space
- + Thoracic borders
 - + Diaphragm
 - + Extra-thoracic structures

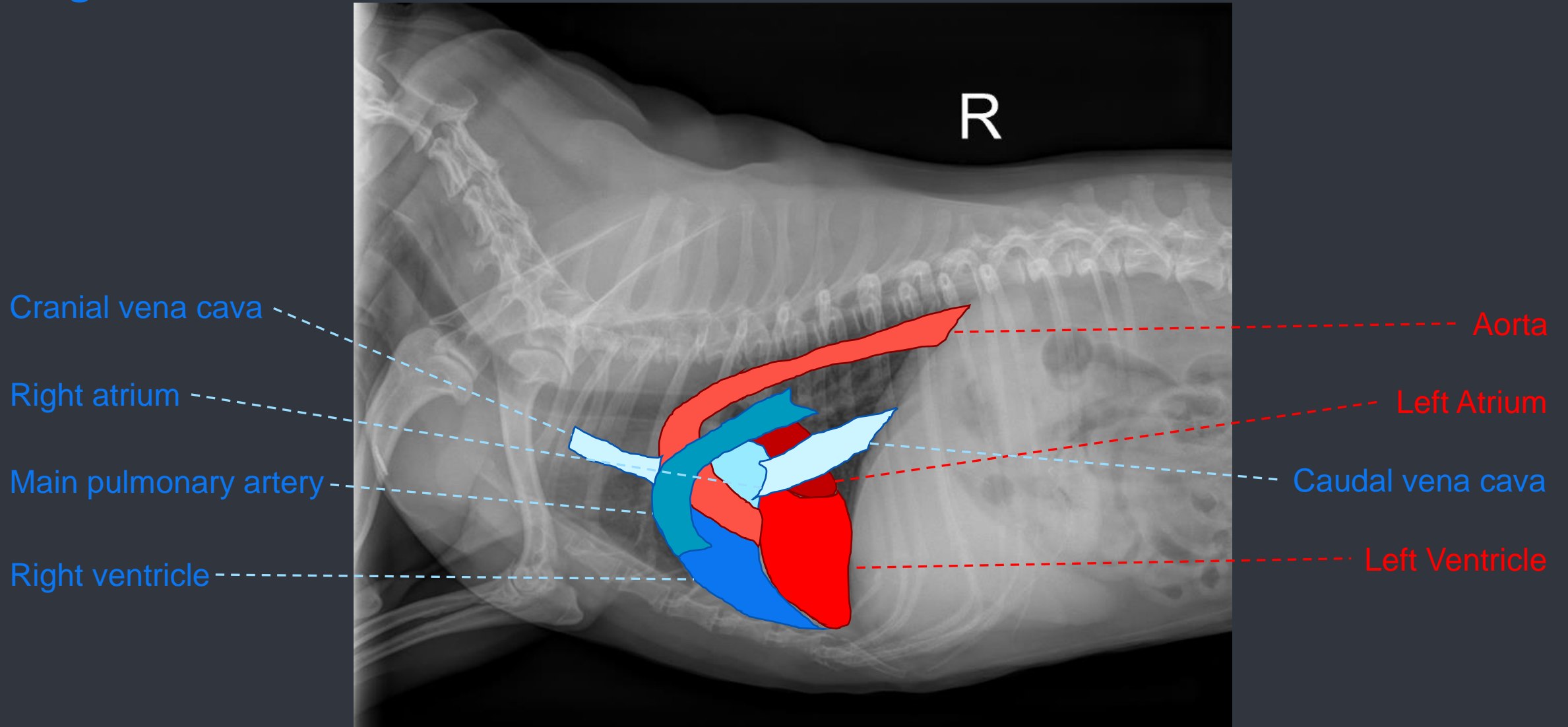


Technique and Positioning



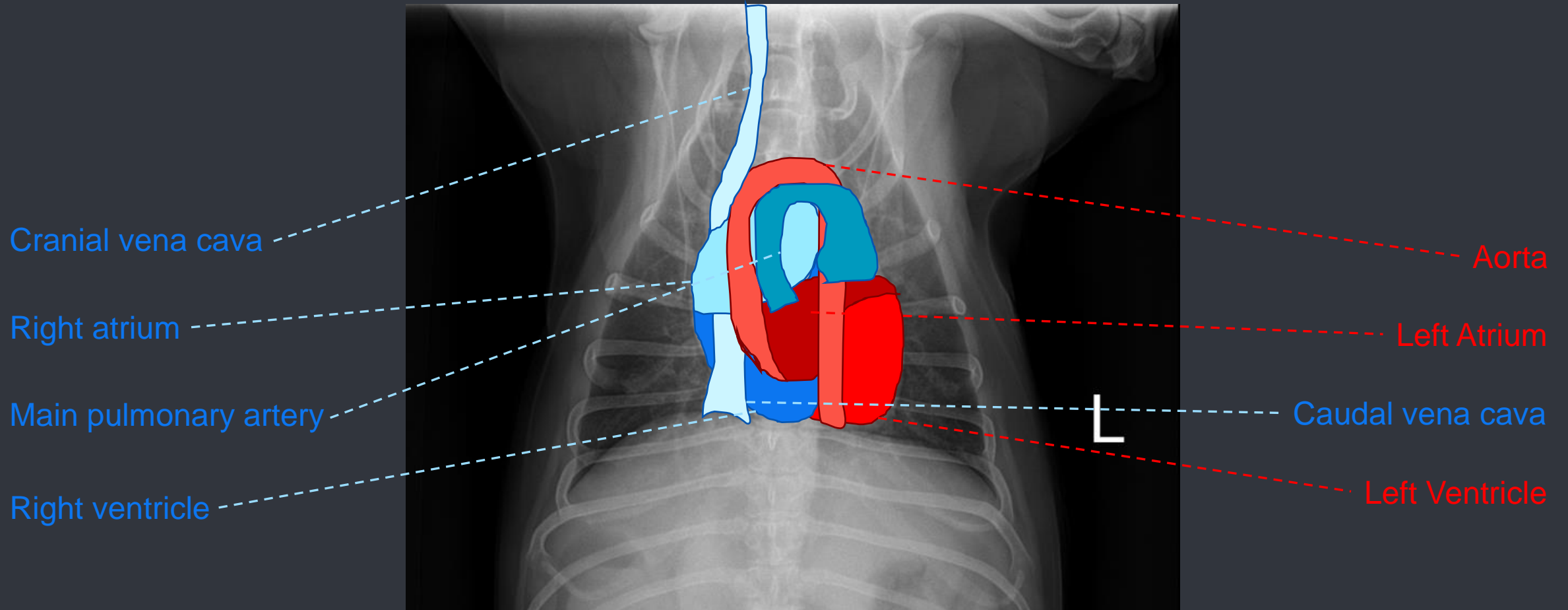
Cardiac Silhouette and Great Vessels

Right lateral view



Cardiac Silhouette and Great Vessels

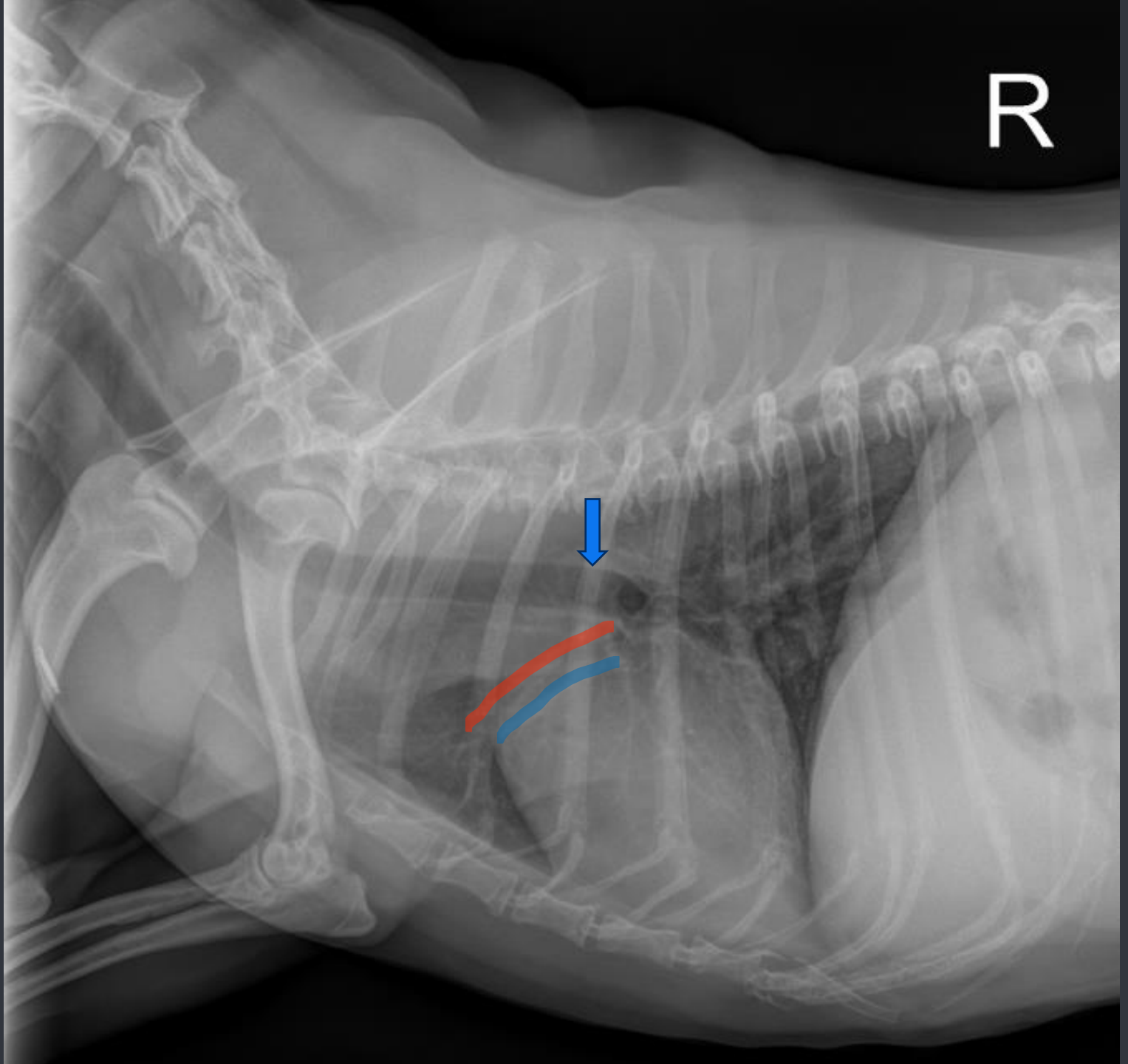
Ventrodorsal view



Pulmonary Vessels

Right lateral view

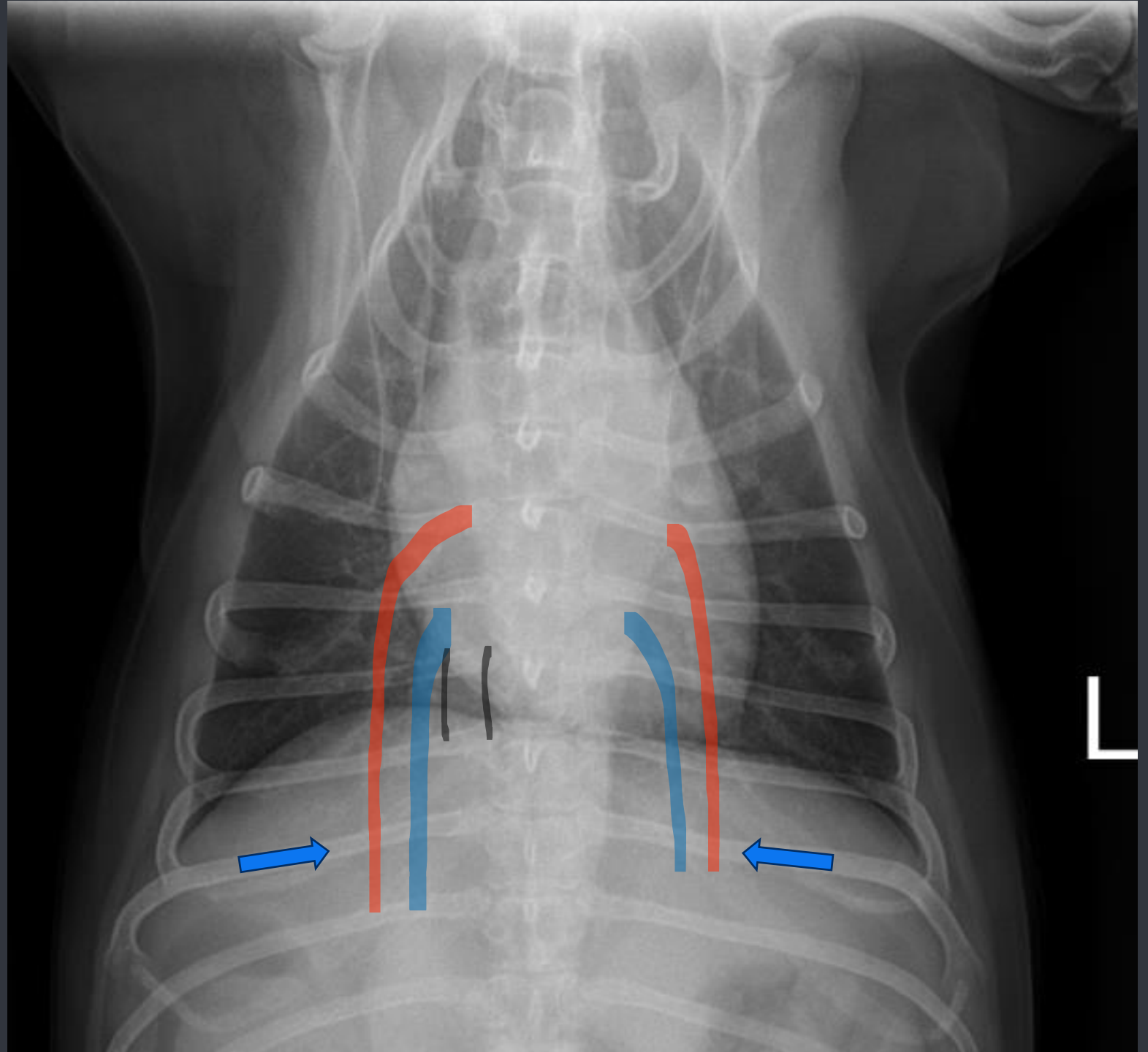
Veins are **ventral** and central



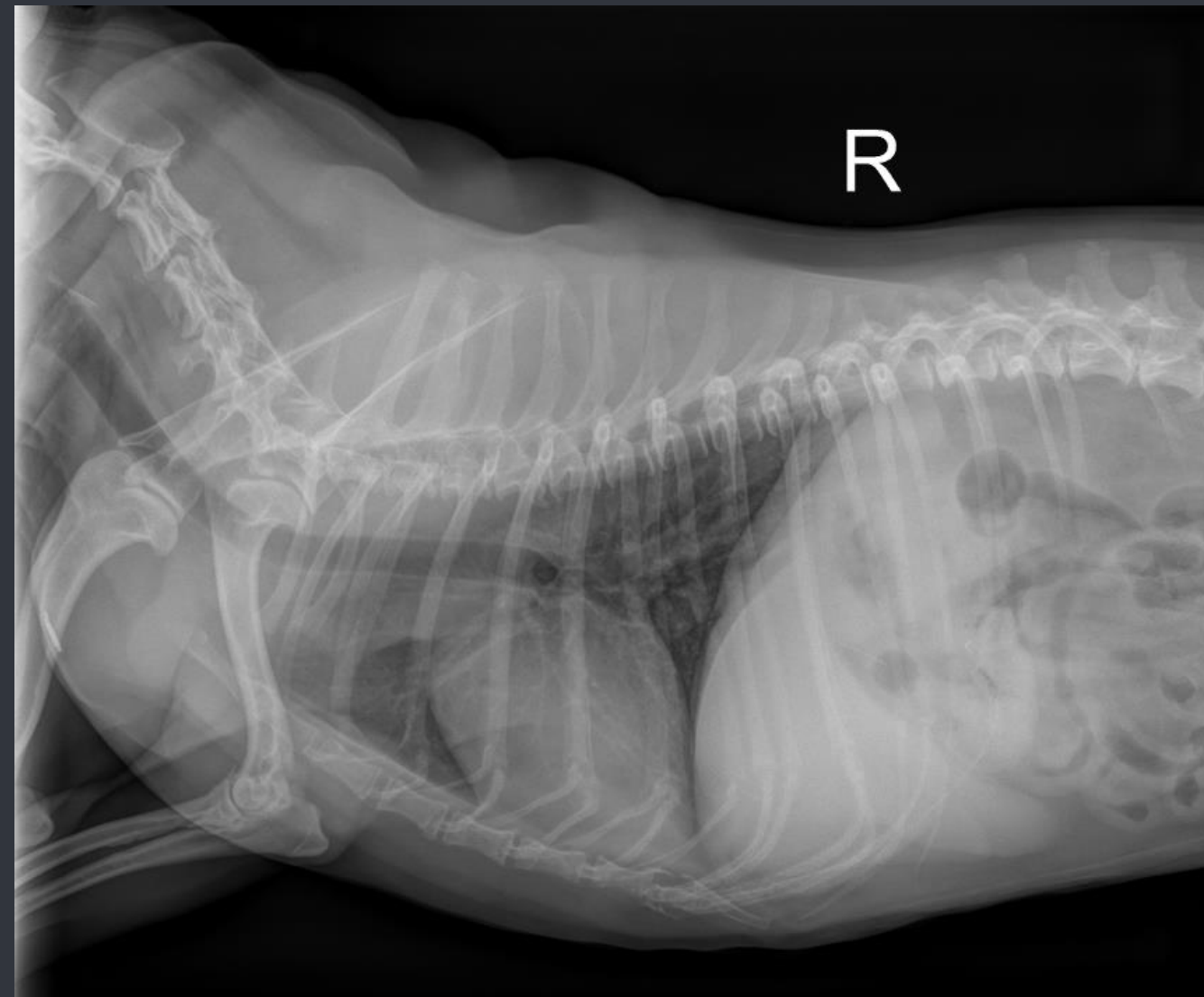
Pulmonary Vessels

Ventrodorsal view

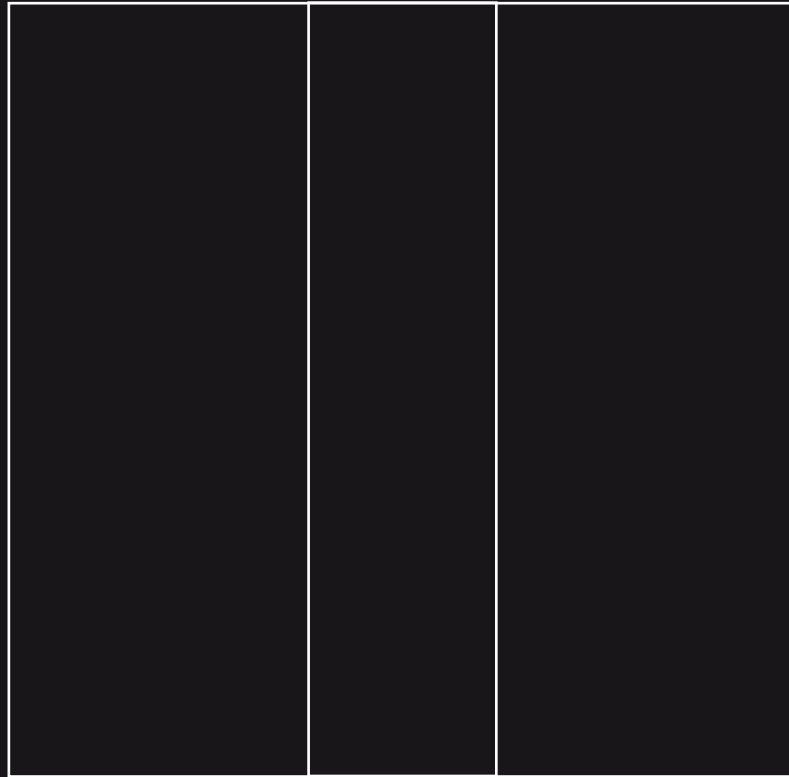
Veins are ventral and **central**



Pulmonary Parenchyma



Super Basic and Overly Simplified Explanation of Pulmonary Patterns

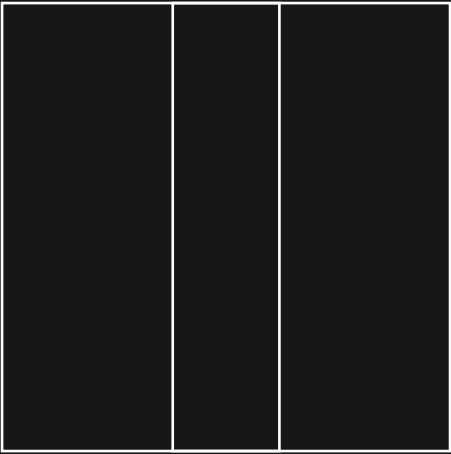


Normal

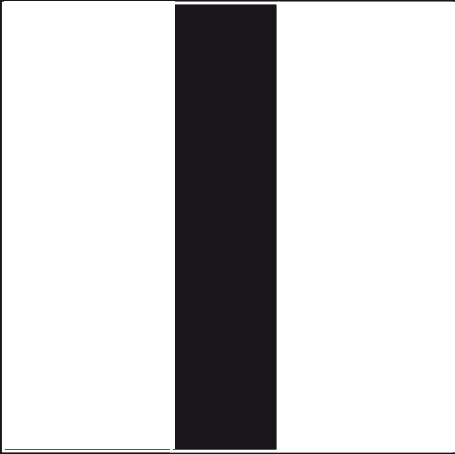
Super Basic and Overly Simplified Explanation of Pulmonary Patterns



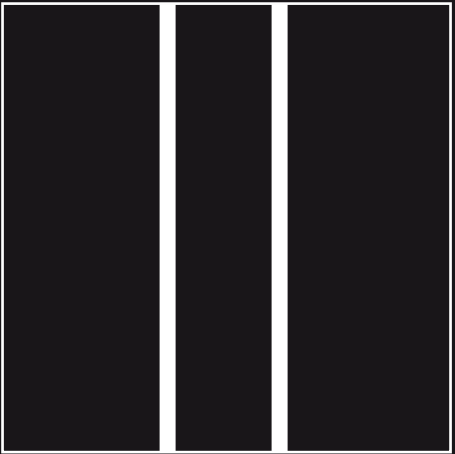
Normal



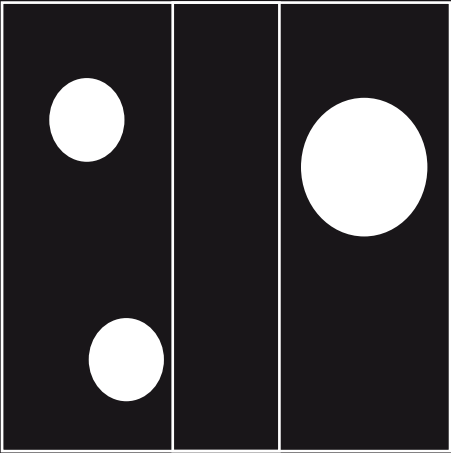
Alveolar



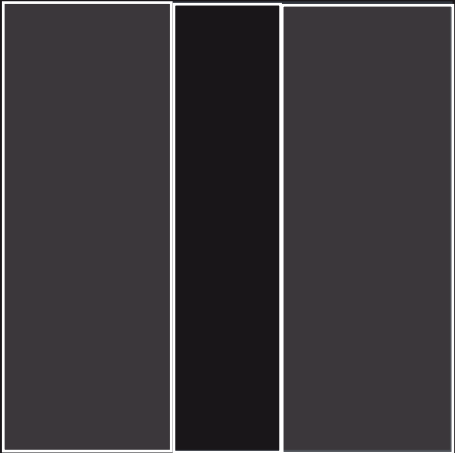
Bronchial



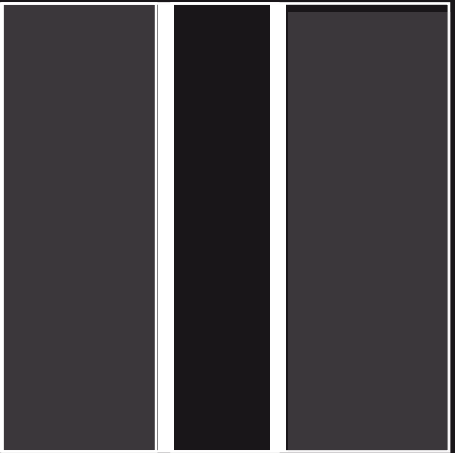
Structured Interstitial/Nodular



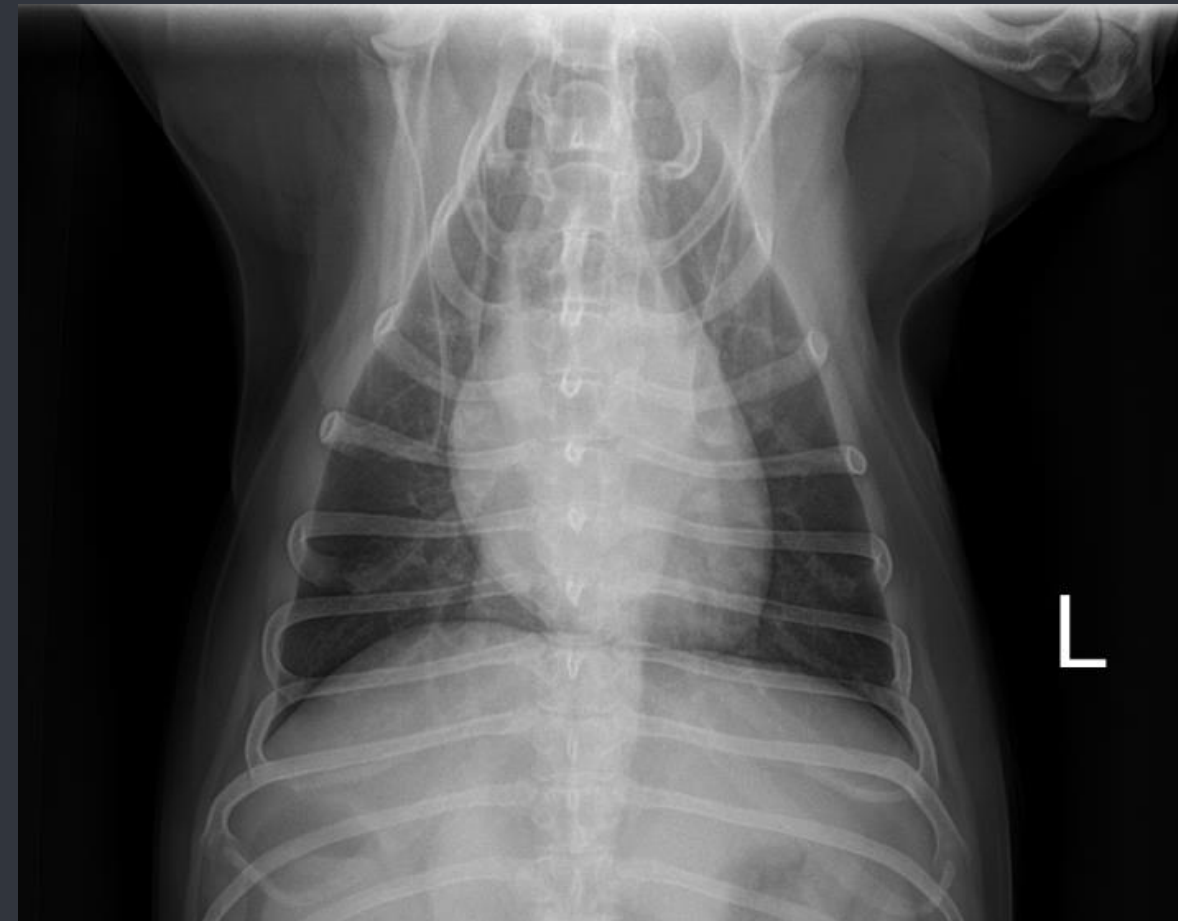
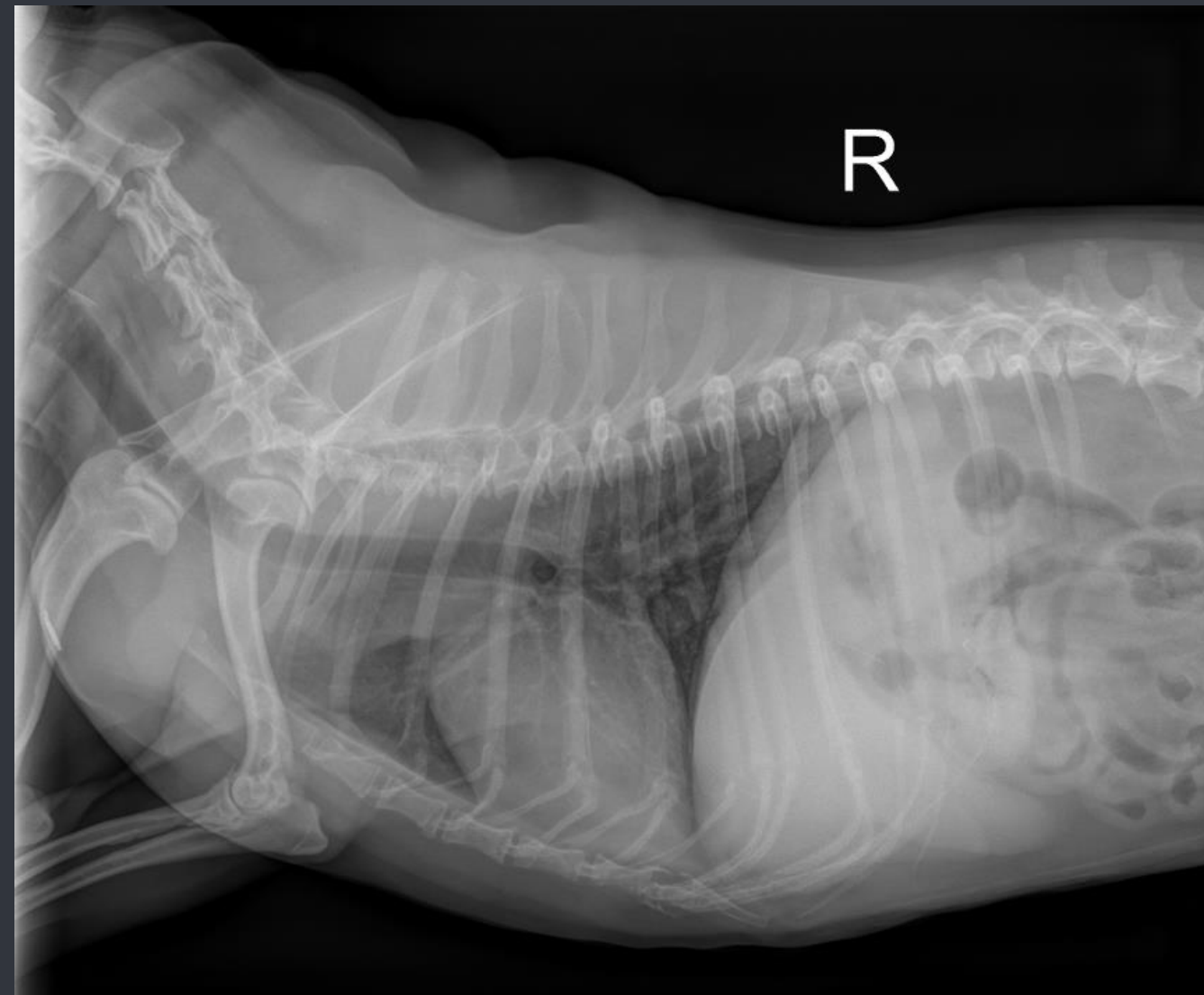
Unstructured Interstitial



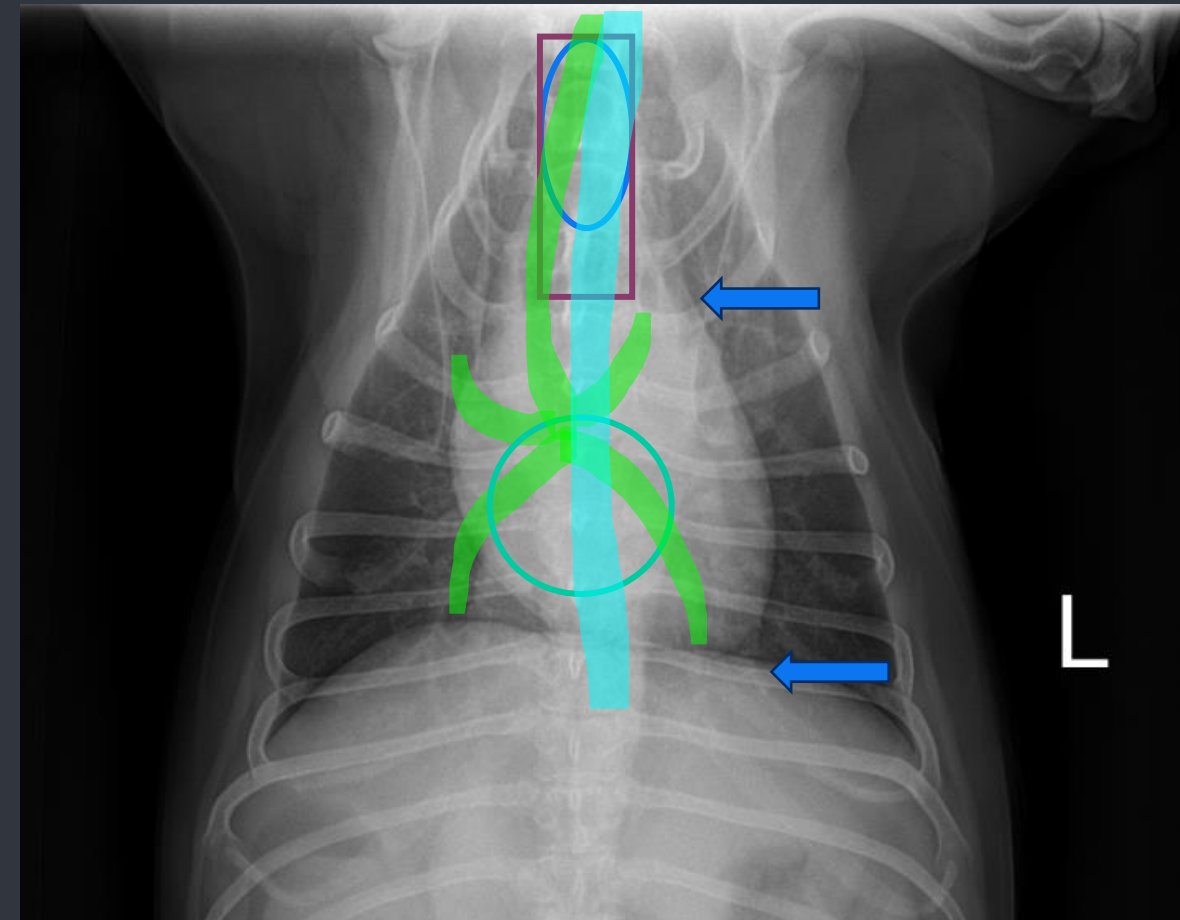
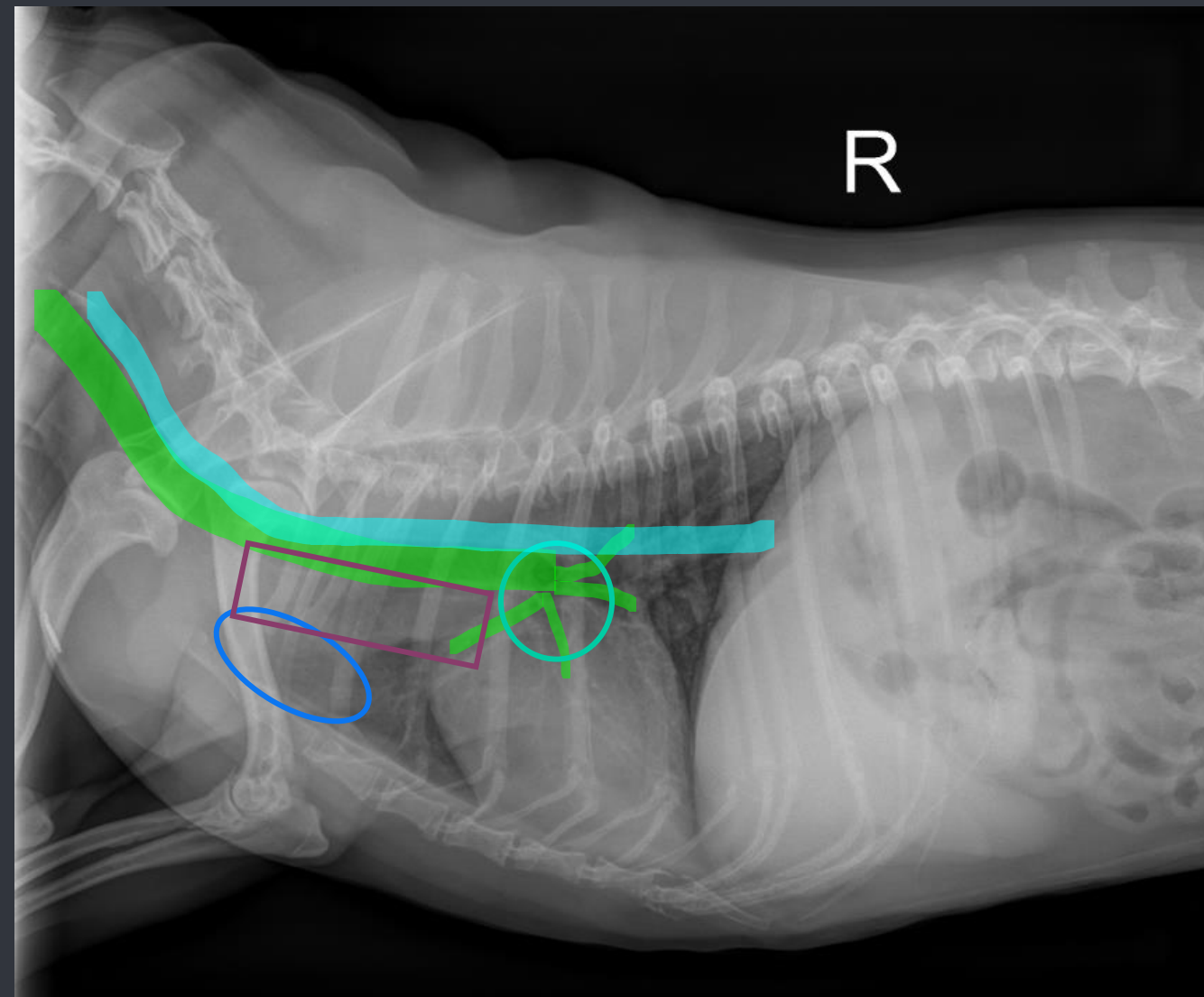
Bronchointerstitial



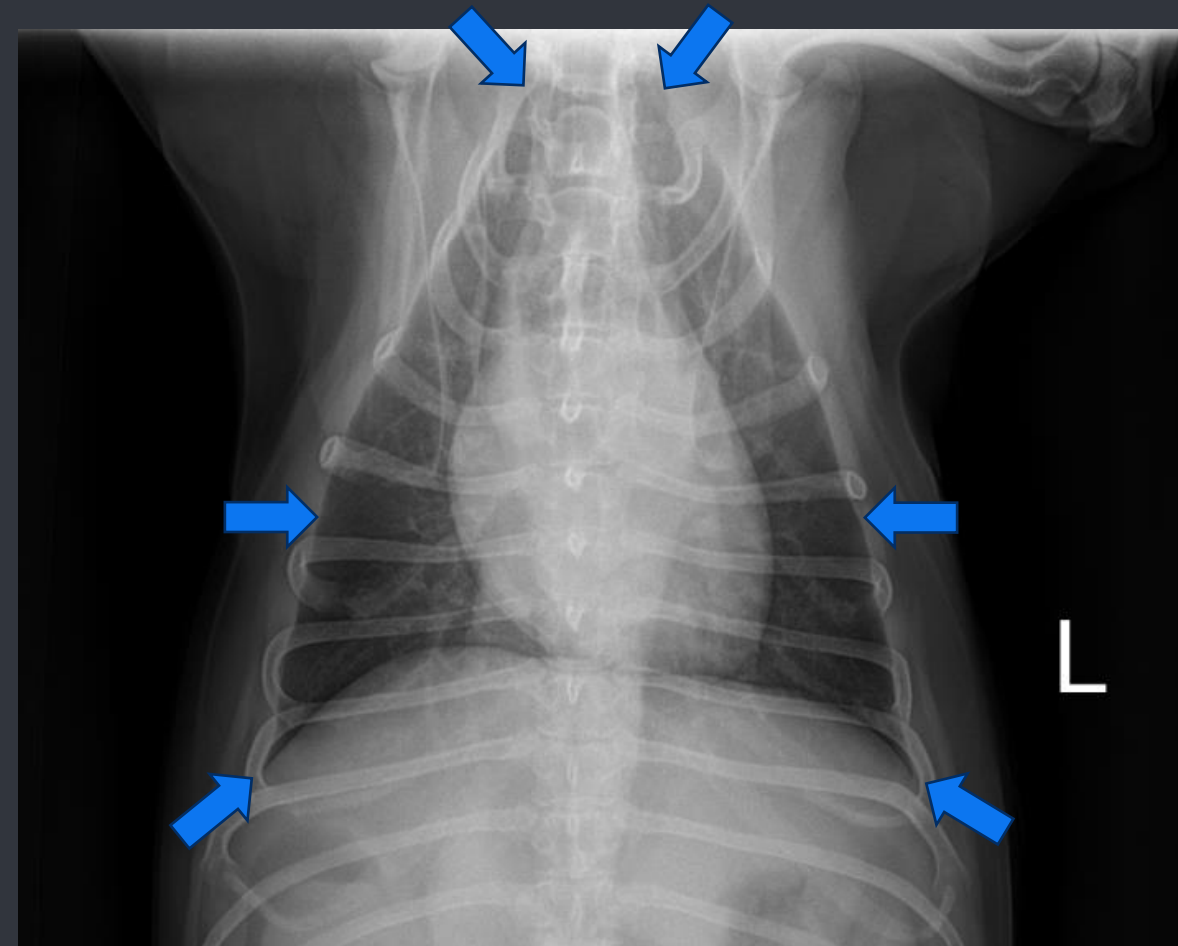
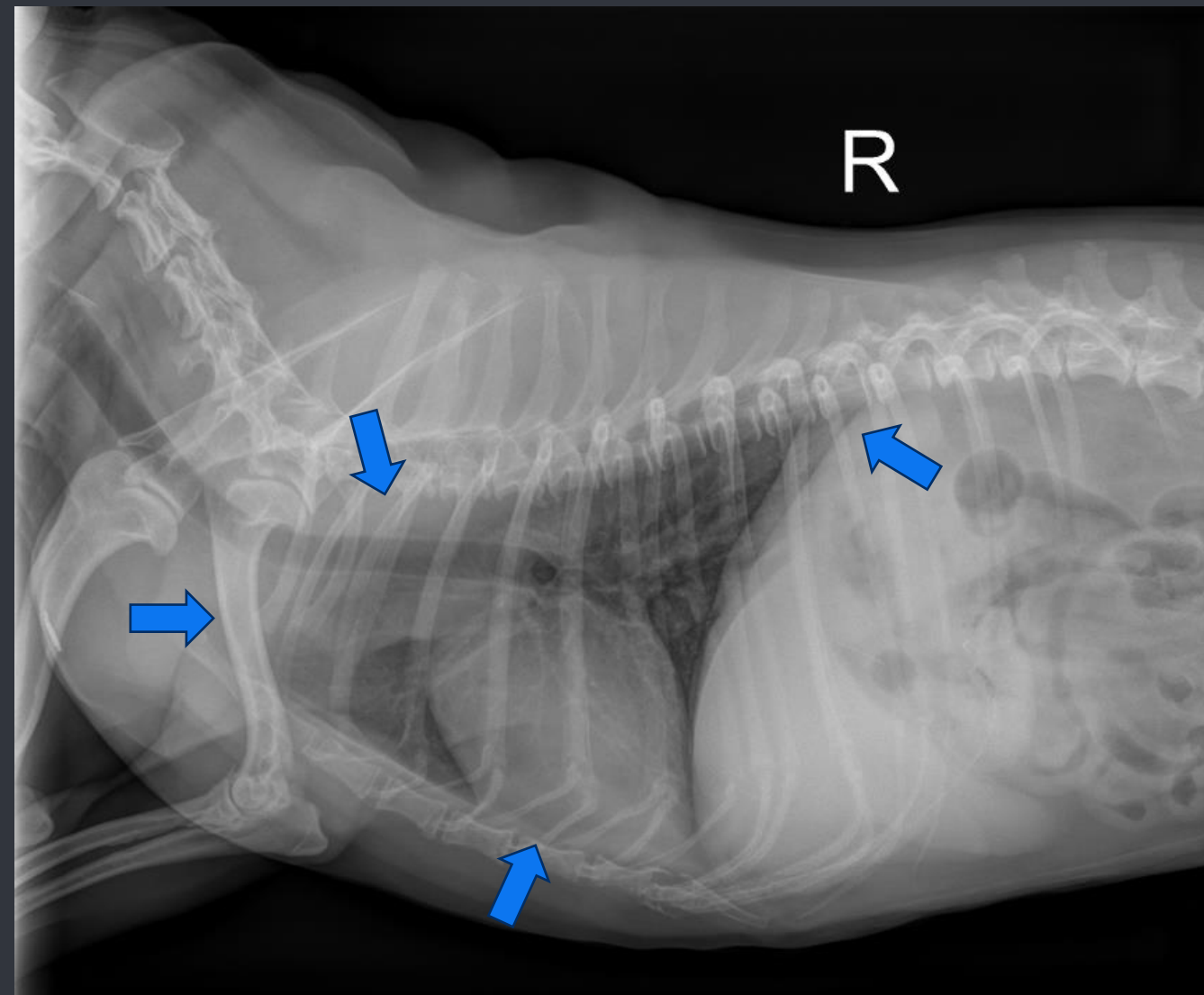
Pulmonary Parenchyma



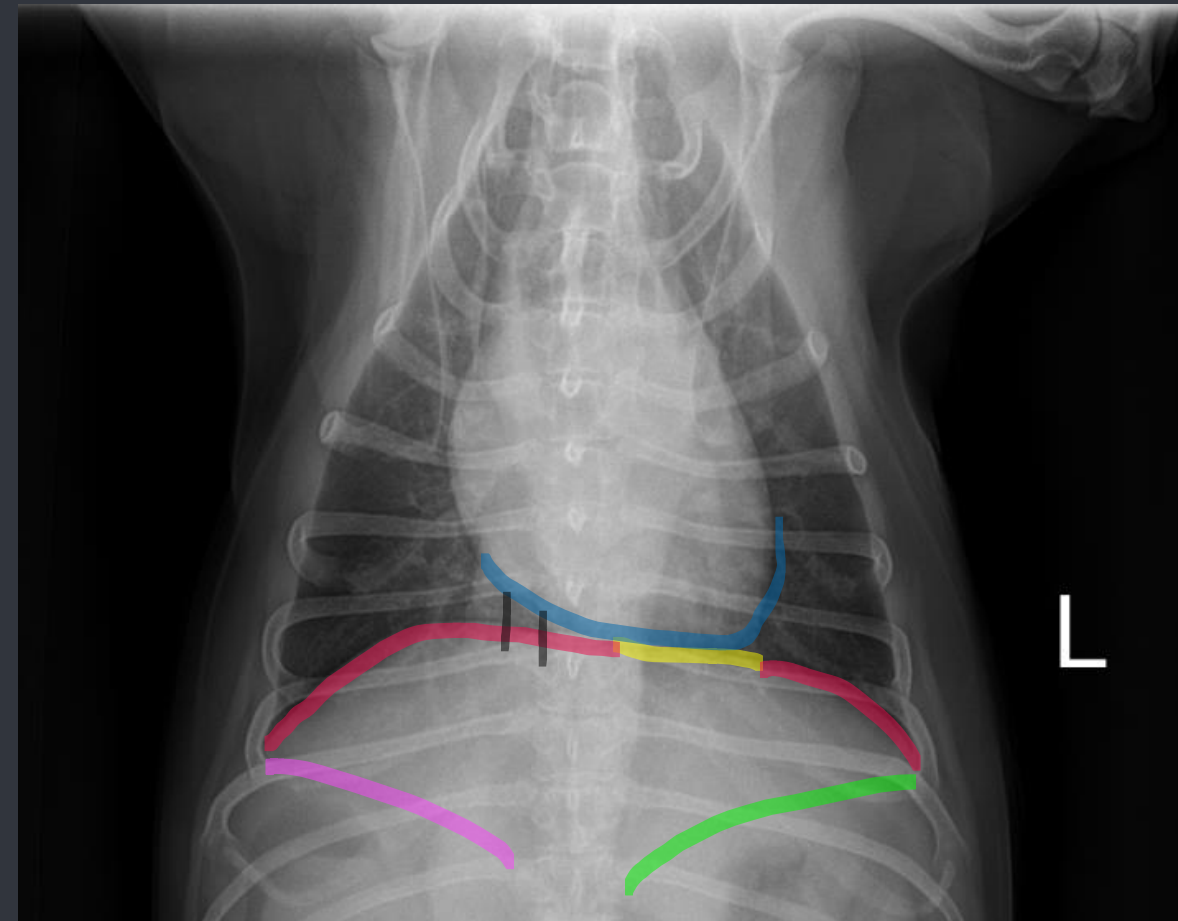
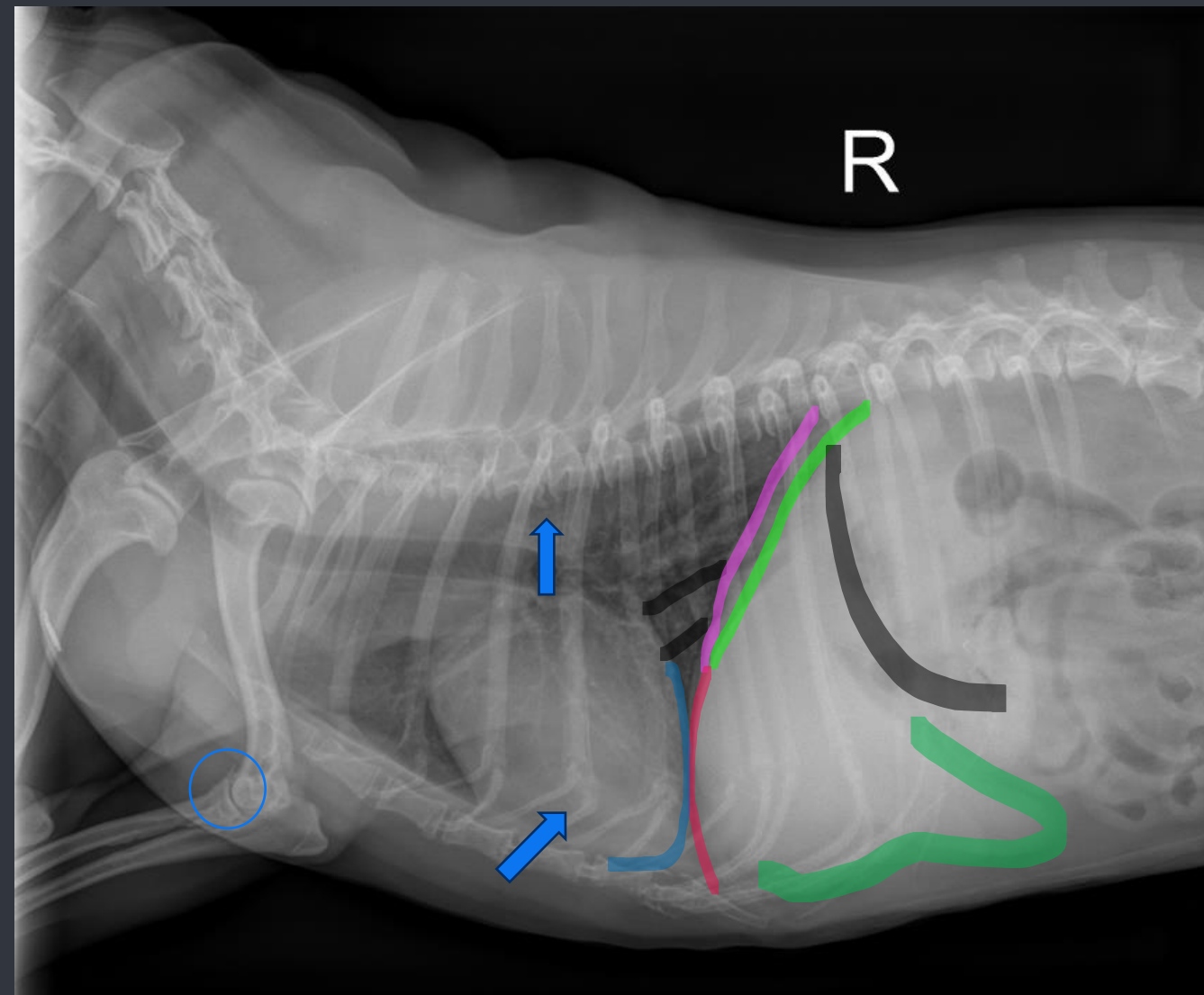
Mediastinum



Pleural Space



Thoracic Borders



Systematic approach and Interpretation

- + After thorough review of each image
 - + Summarize radiographic findings
 - + Consider patient signalment and history, including physical exam findings
 - + Rank differentials and determine next steps



Case Examples



slido

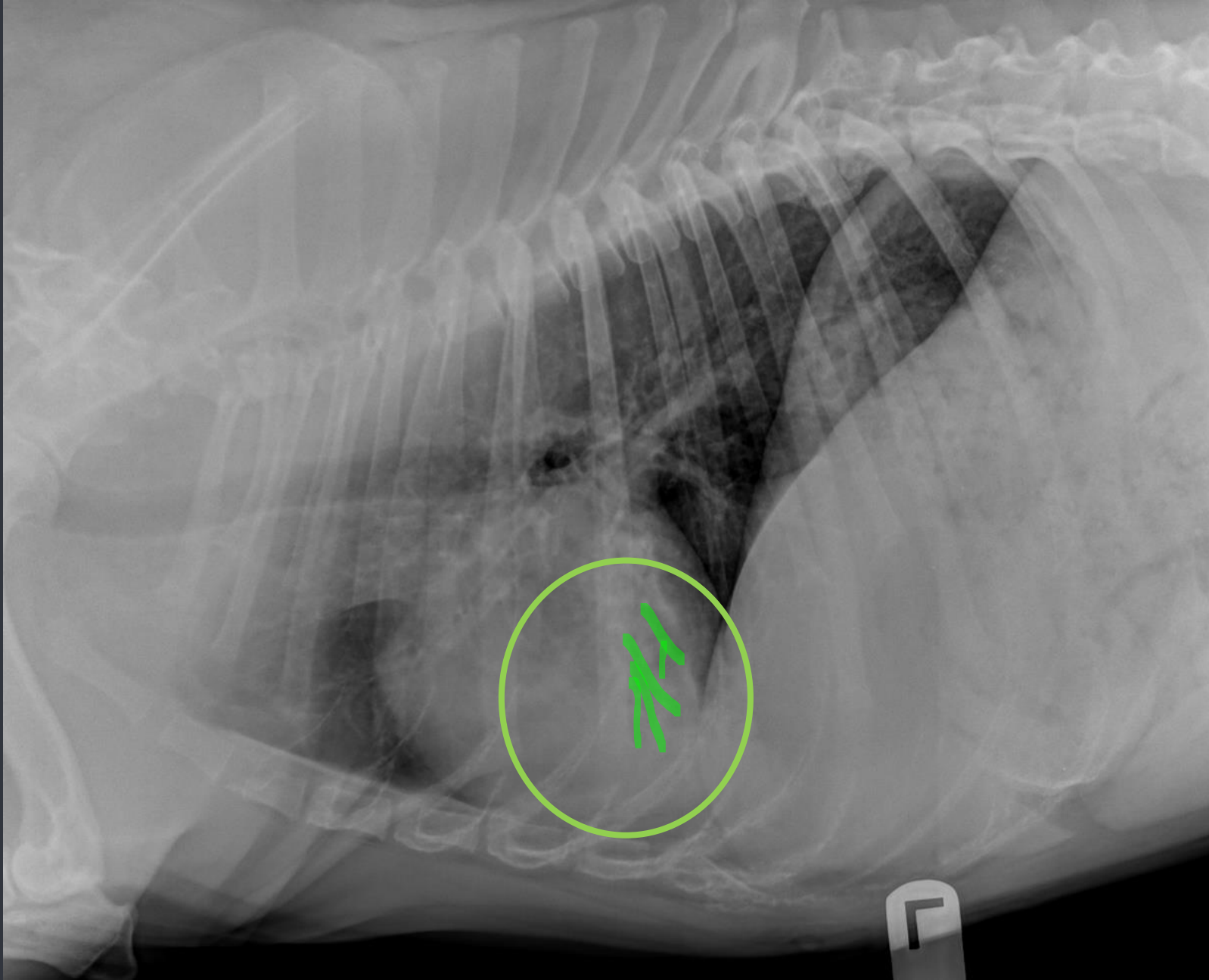
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Slido app on all computers you use



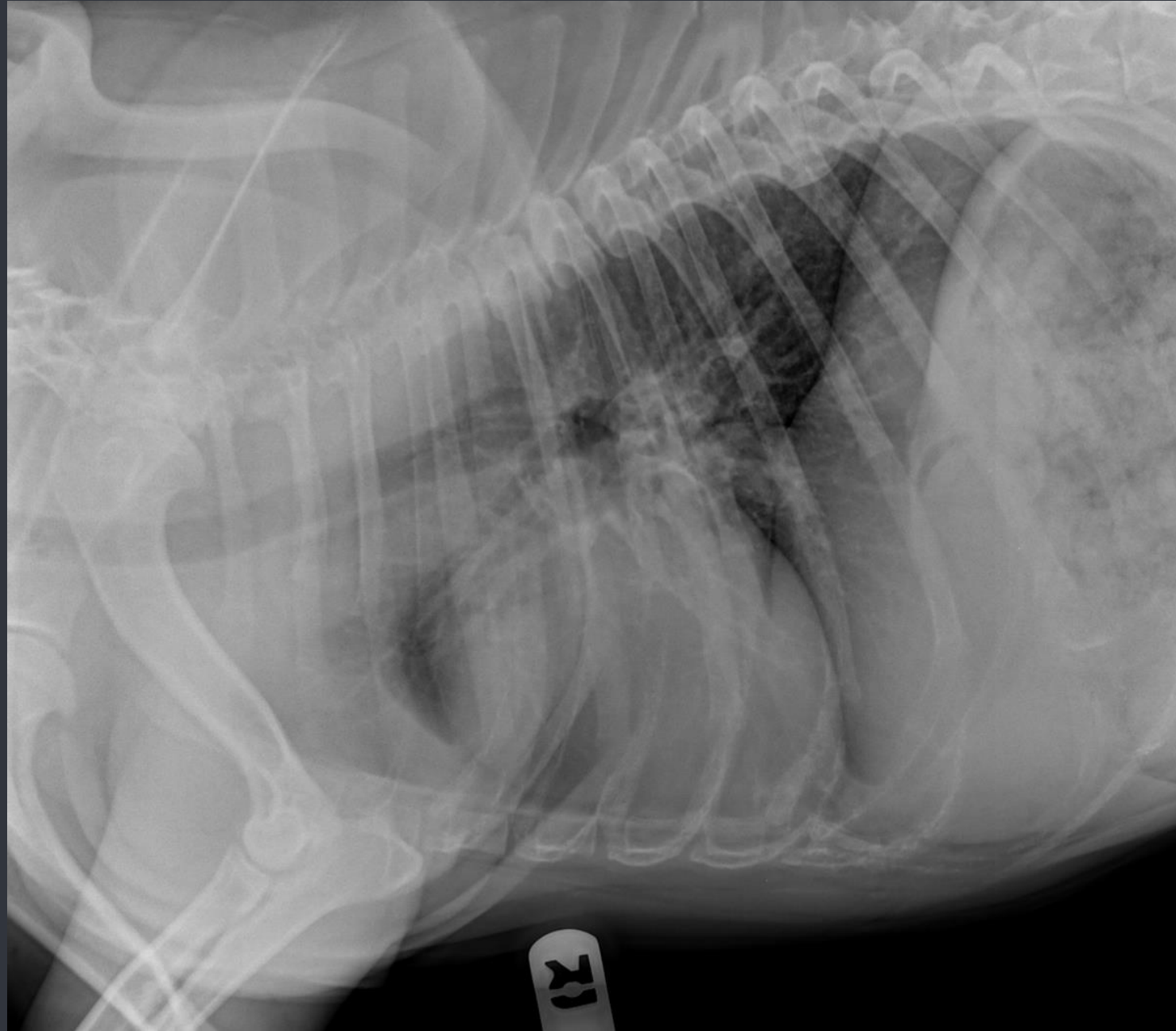
**Join at slido.com
#2878620**

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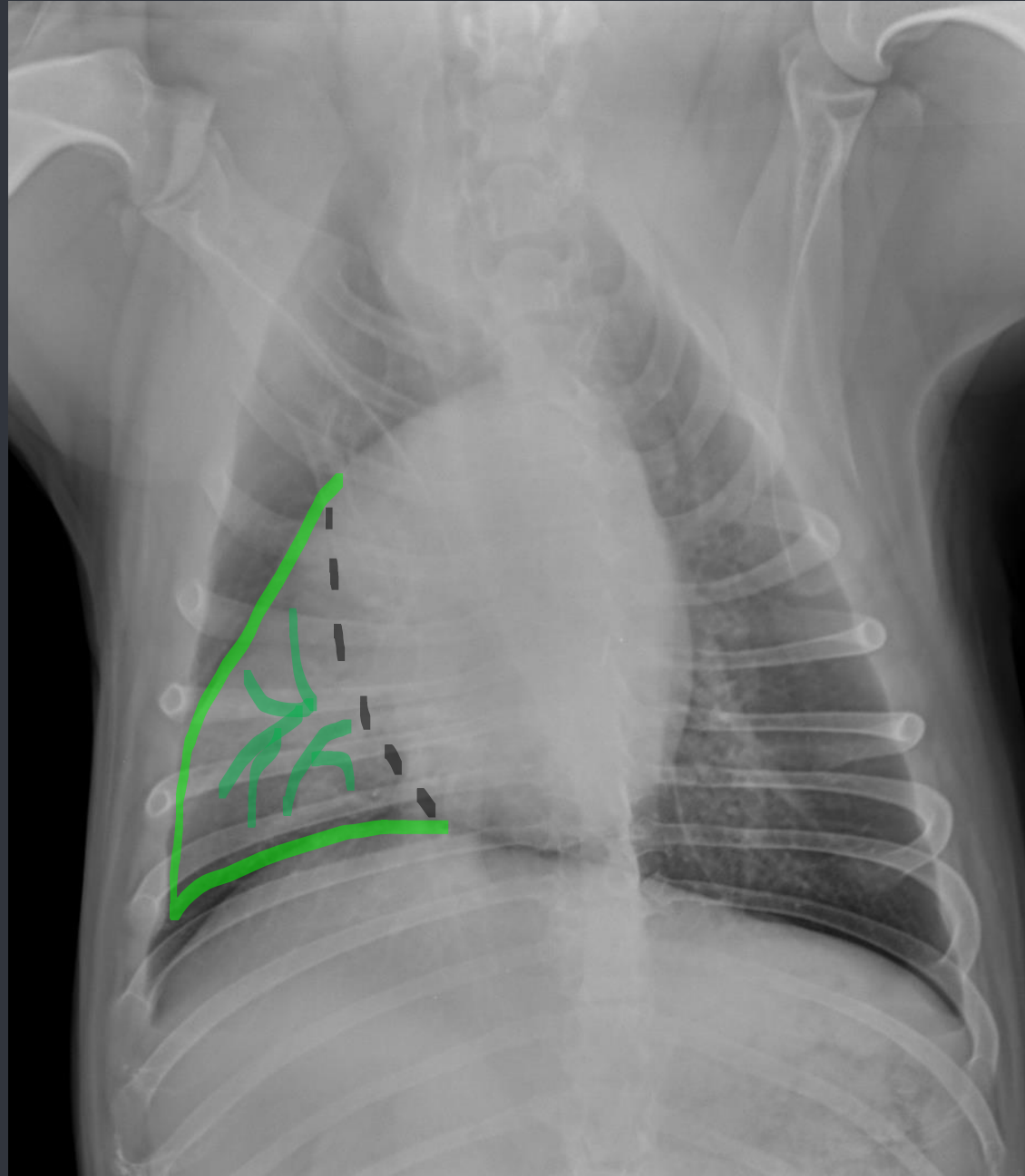
1 year old neutered male English Bulldog; Coughing



1 year old neutered male English Bulldog; Coughing



1 year old neutered male English Bulldog; Coughing

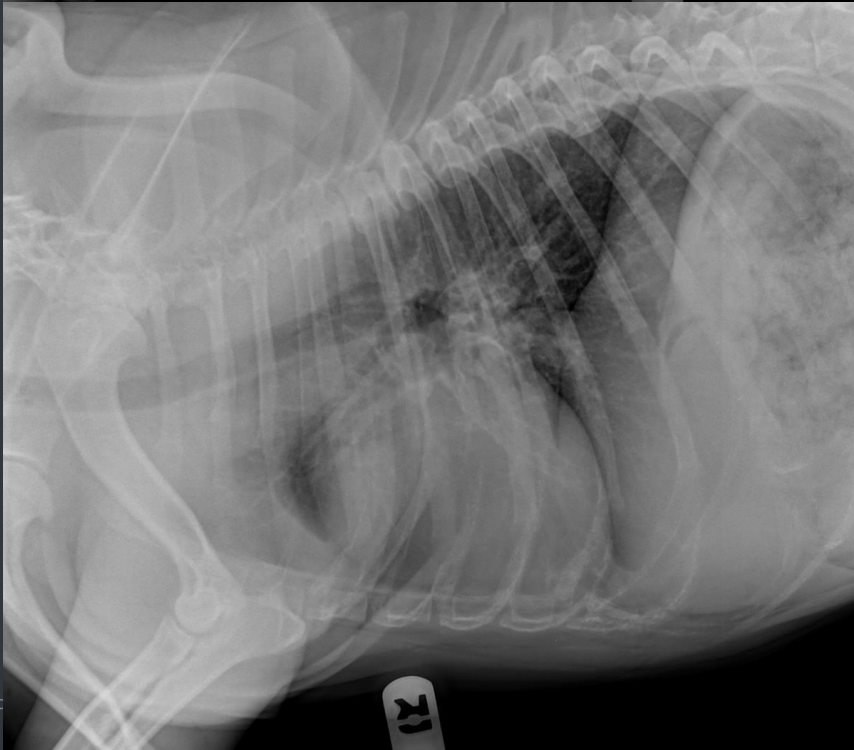




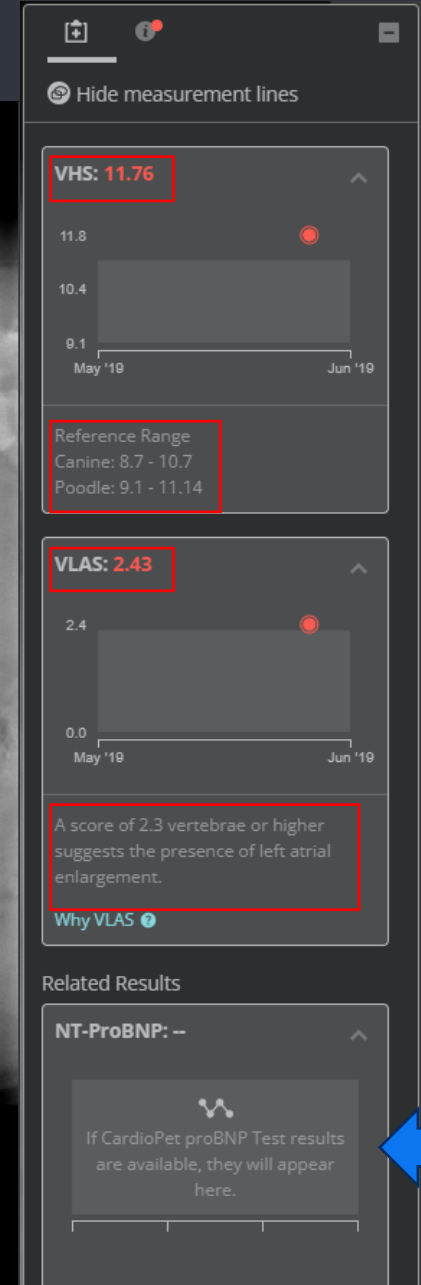
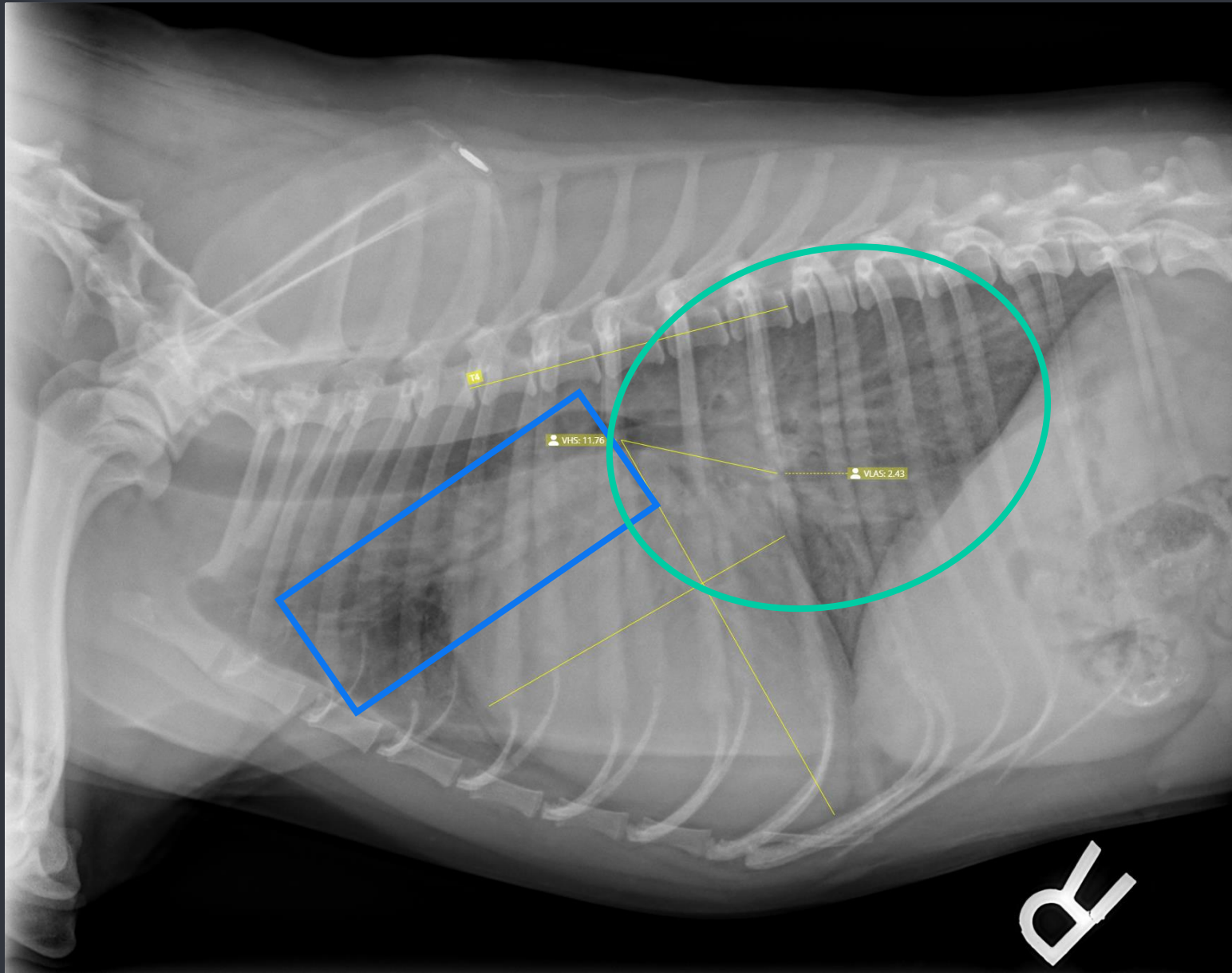
**What is your top differential for this coughing
bulldog with ventral alveolar pattern in the right
middle lung lobe?**

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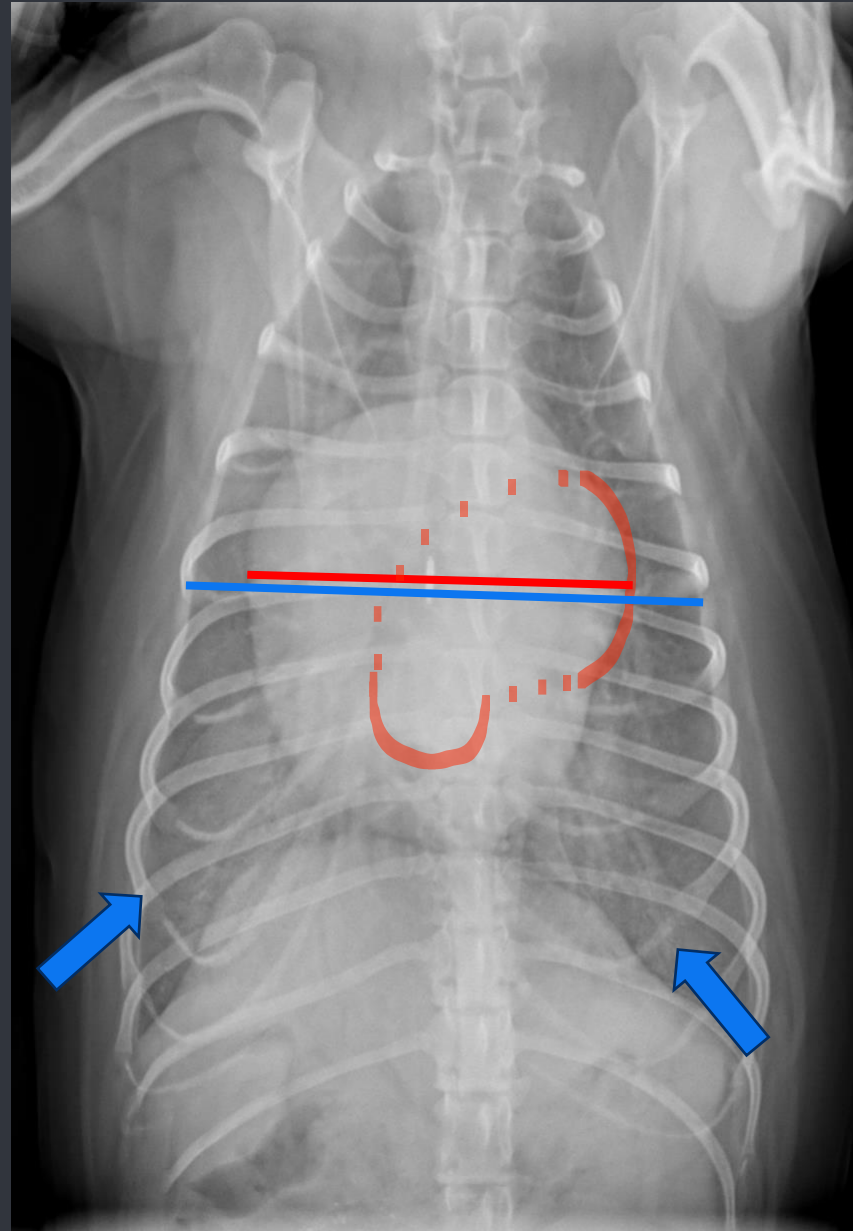
Pneumonia



6 year old spayed female Miniature Poodle; Respiratory distress



6 year old spayed female Miniature Poodle; Respiratory distress





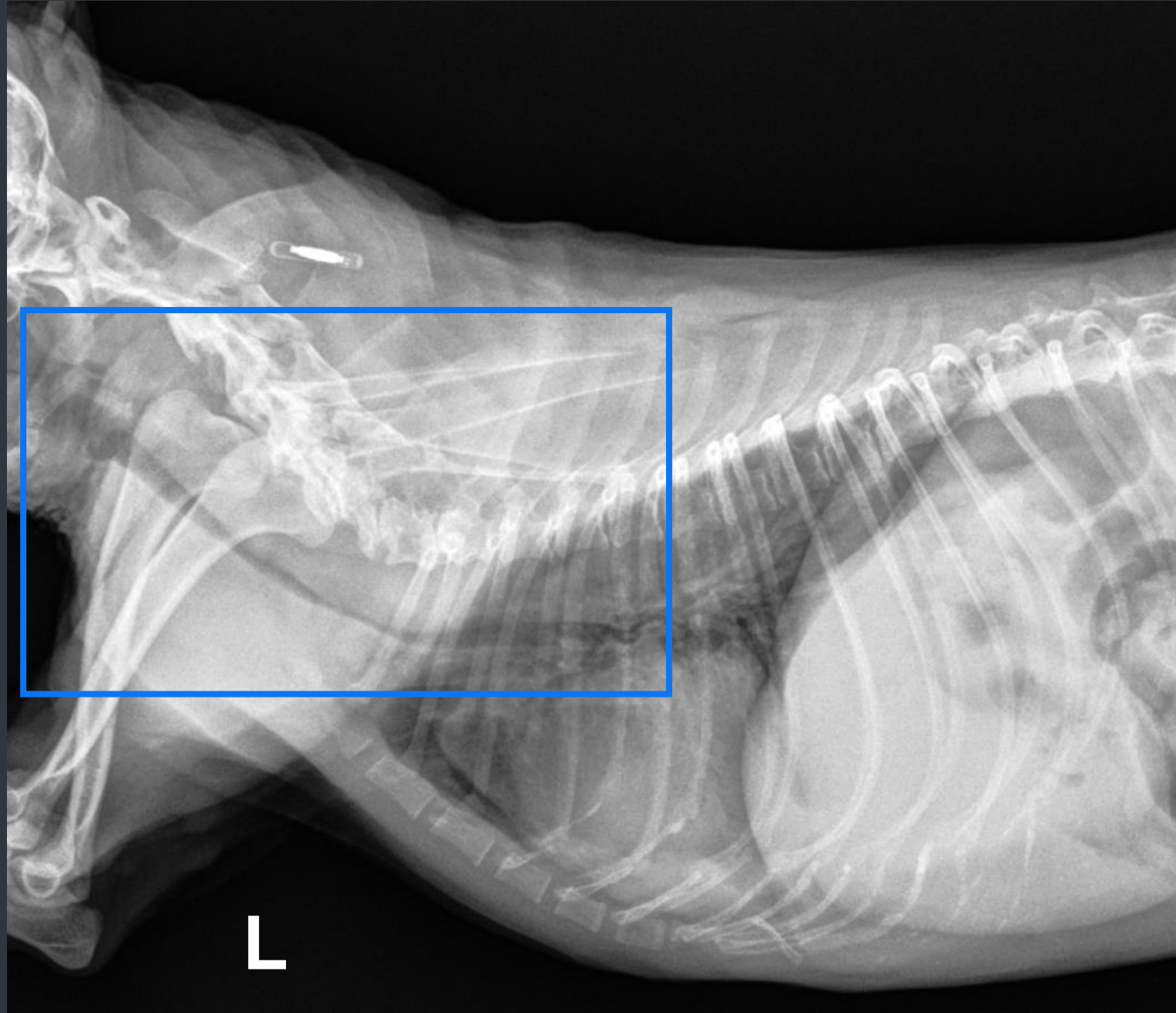
What is your top differential diagnosis for this 6 year old mini poodle in respiratory distress with cardiomegaly, left atrial enlargement, left auricular enlargement, cranial pulmonary vessel enlargement, and caudodorsal unstructured interstitial pattern?

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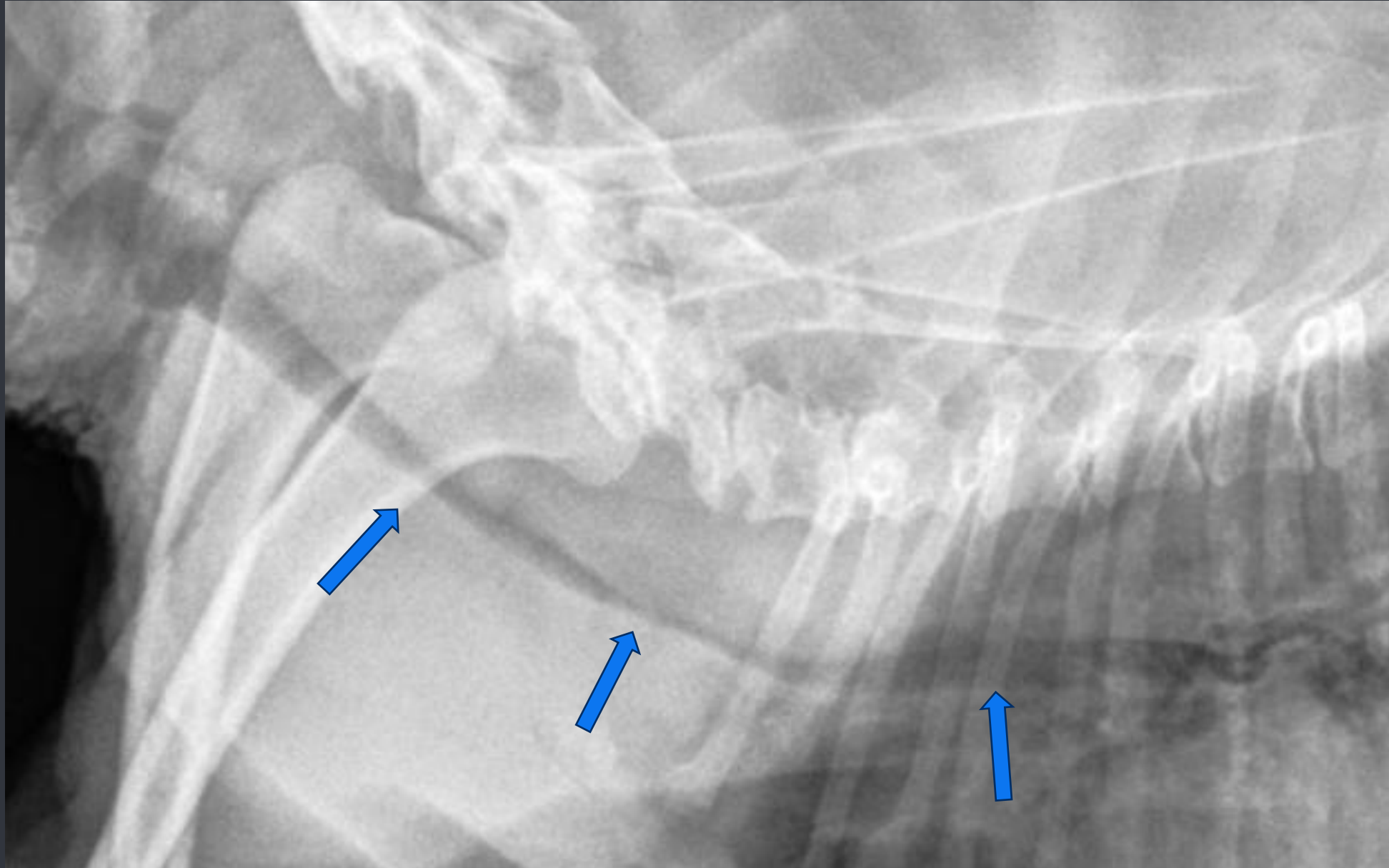
Left Sided Congestive Heart Failure



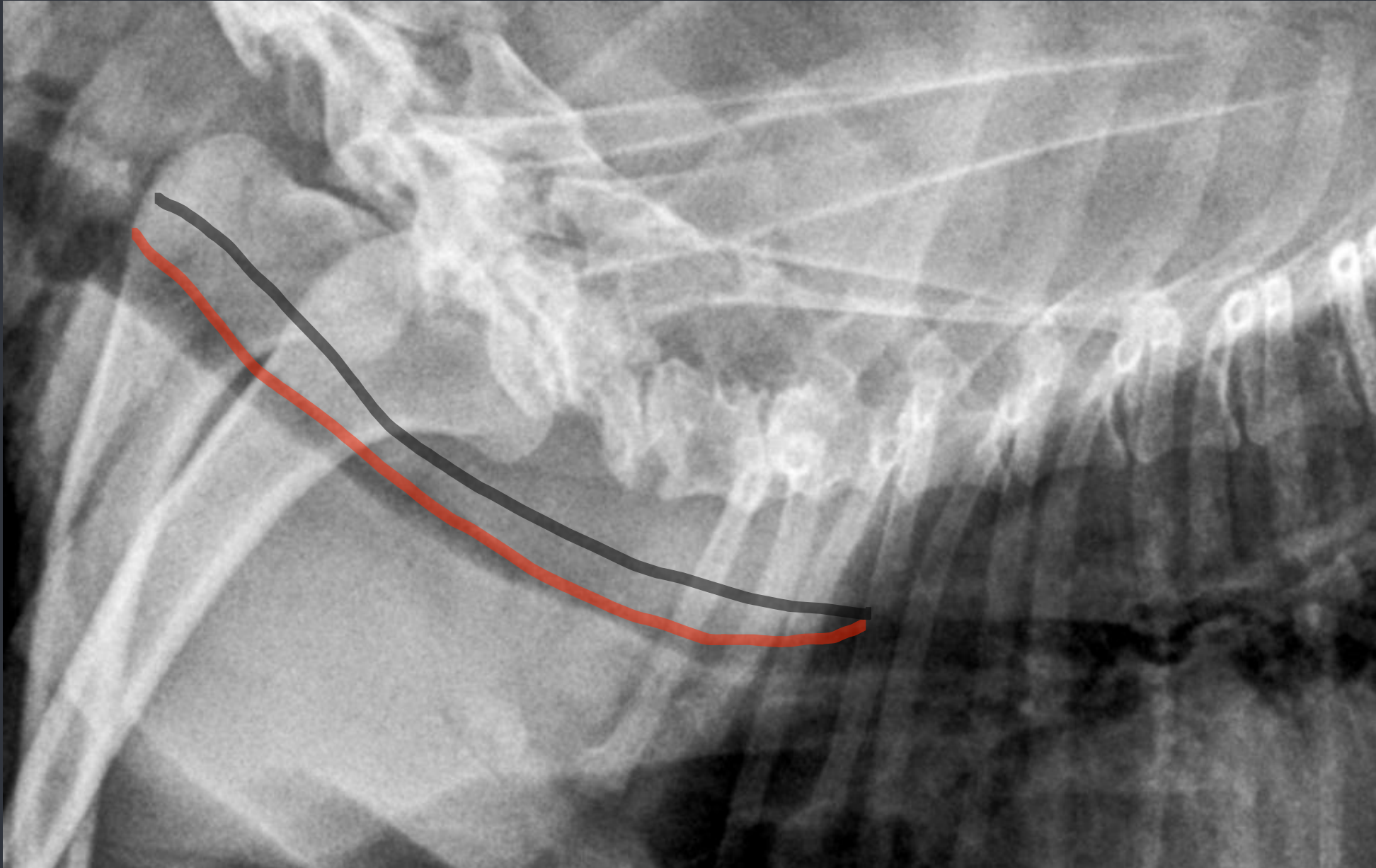
14 year old spayed female Pomeranian; Honking cough



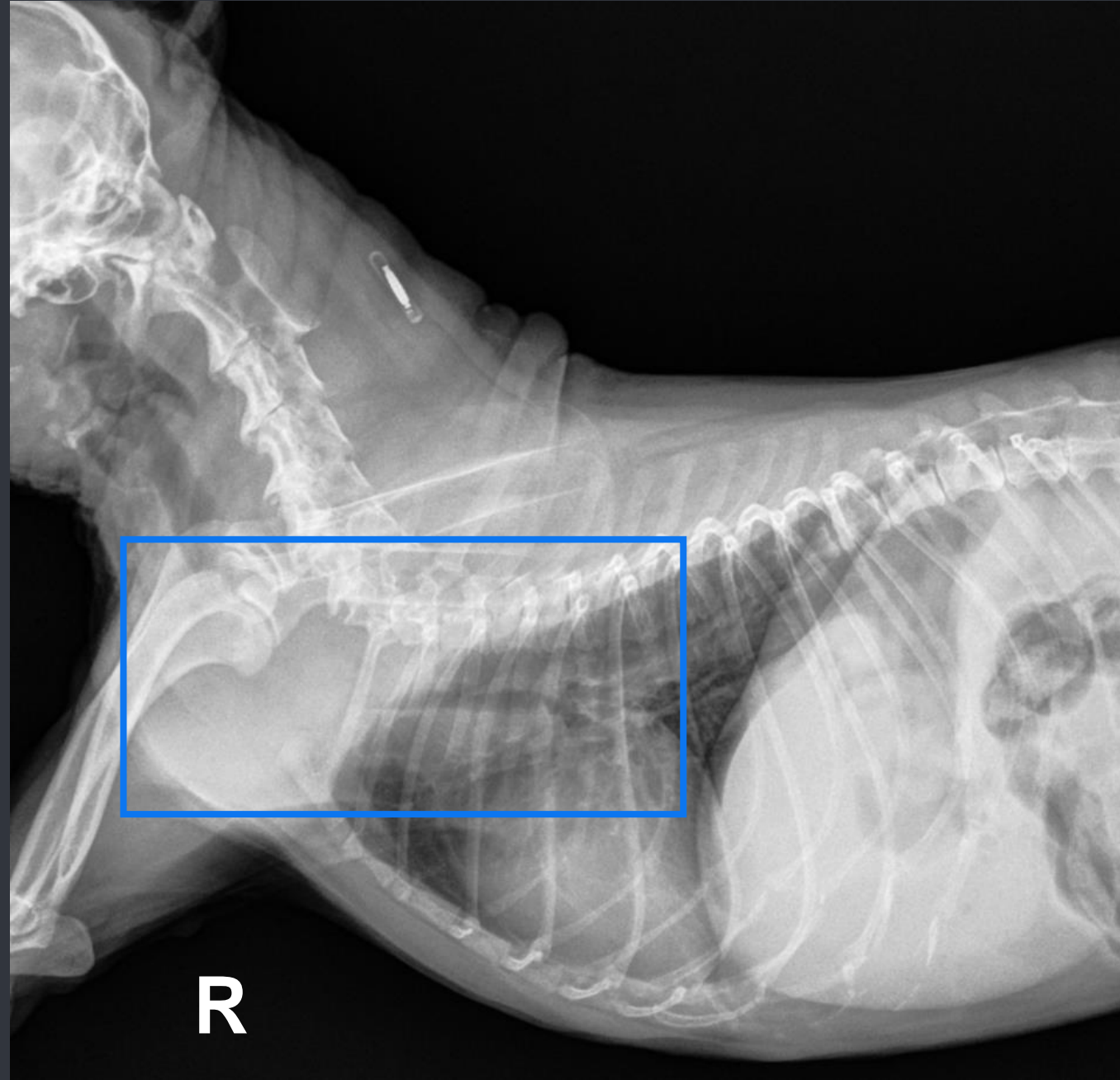
14 year old spayed female Pomeranian; Honking cough



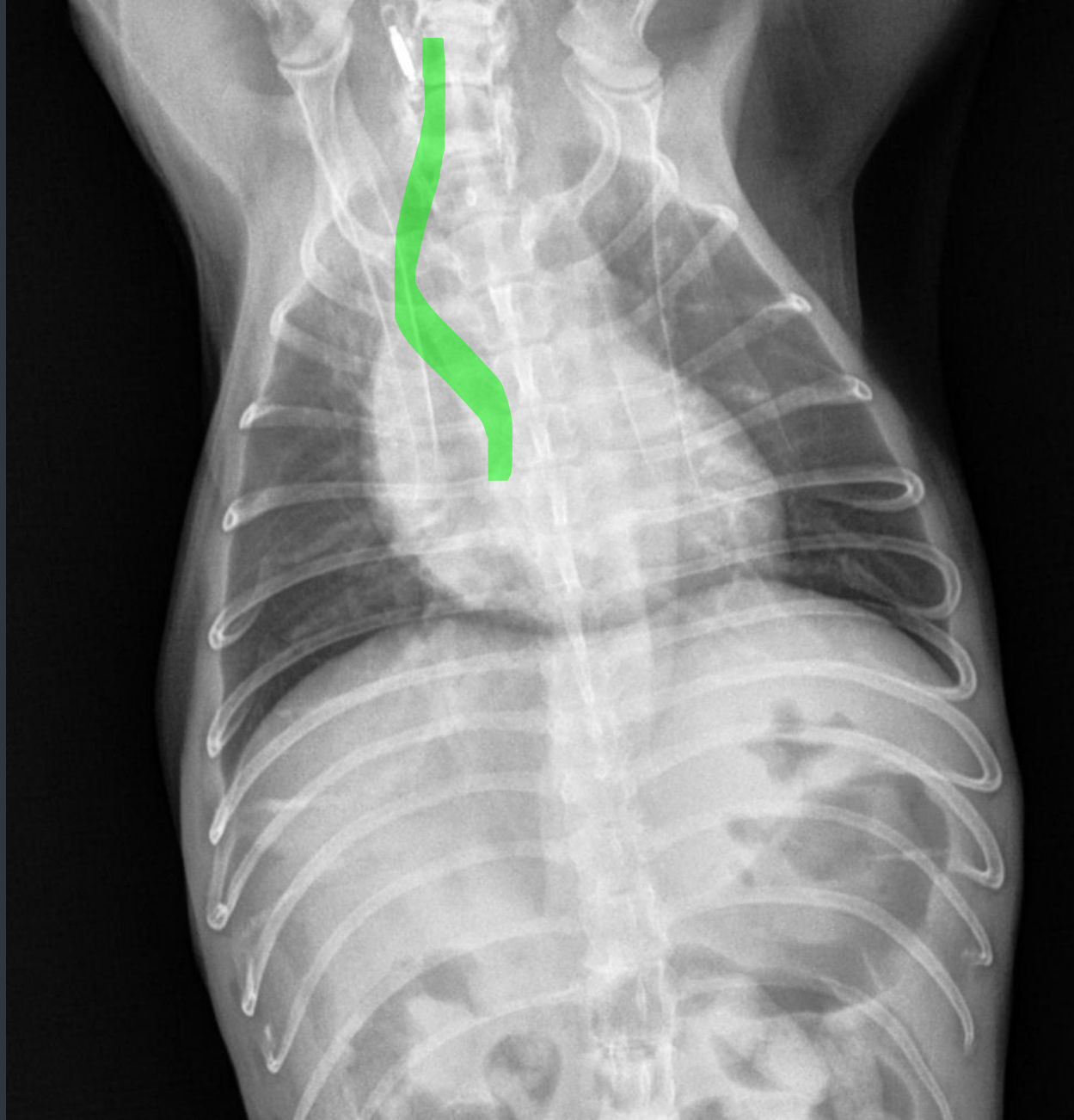
14 year old spayed female Pomeranian; Honking cough



14 year old spayed female Pomeranian; Honking cough



14 year old spayed female Pomeranian; Honking cough





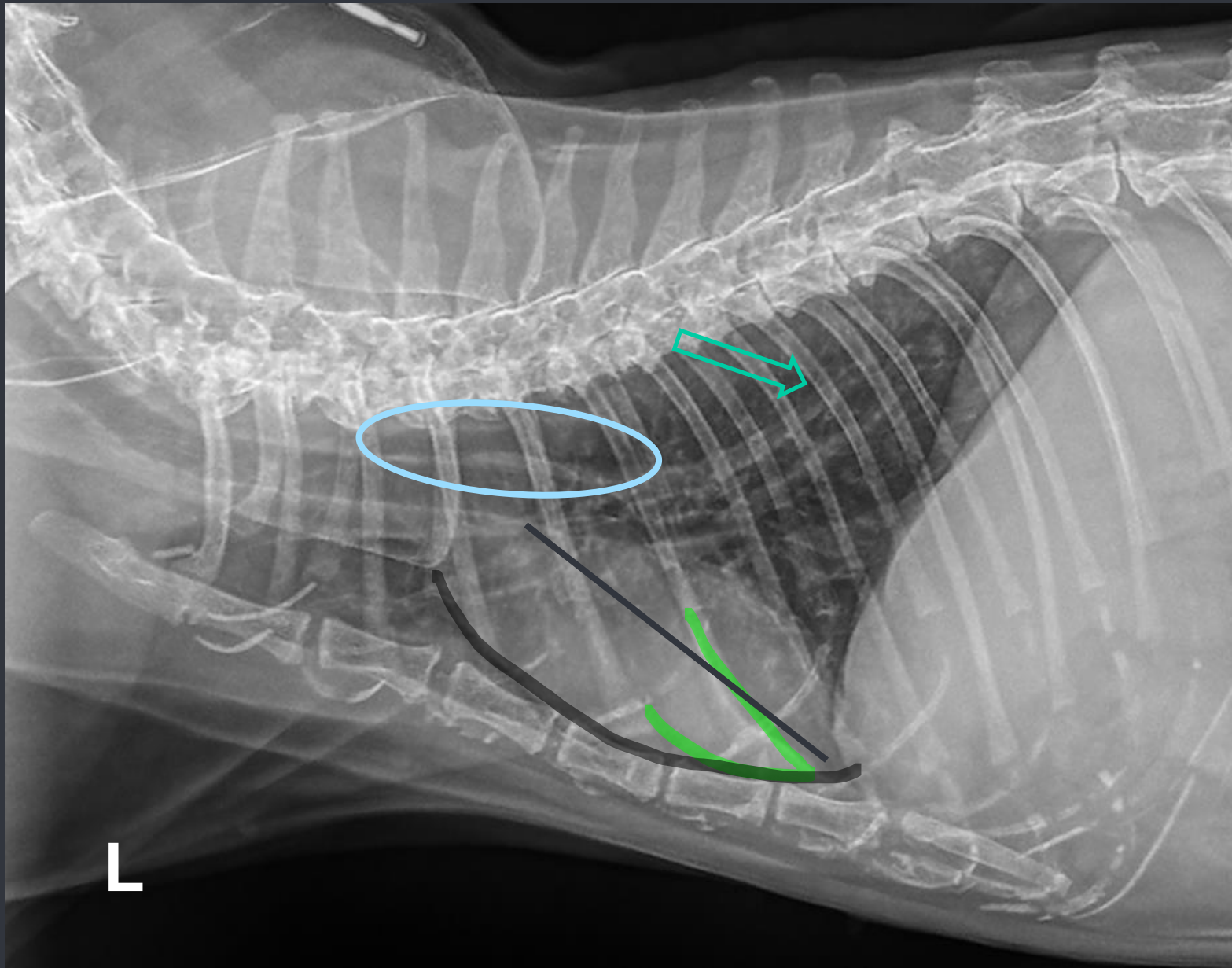
**What is your top differential for this coughing
Pomeranian with a redundant tracheal
membrane and varying degrees of tracheal
narrowing?**

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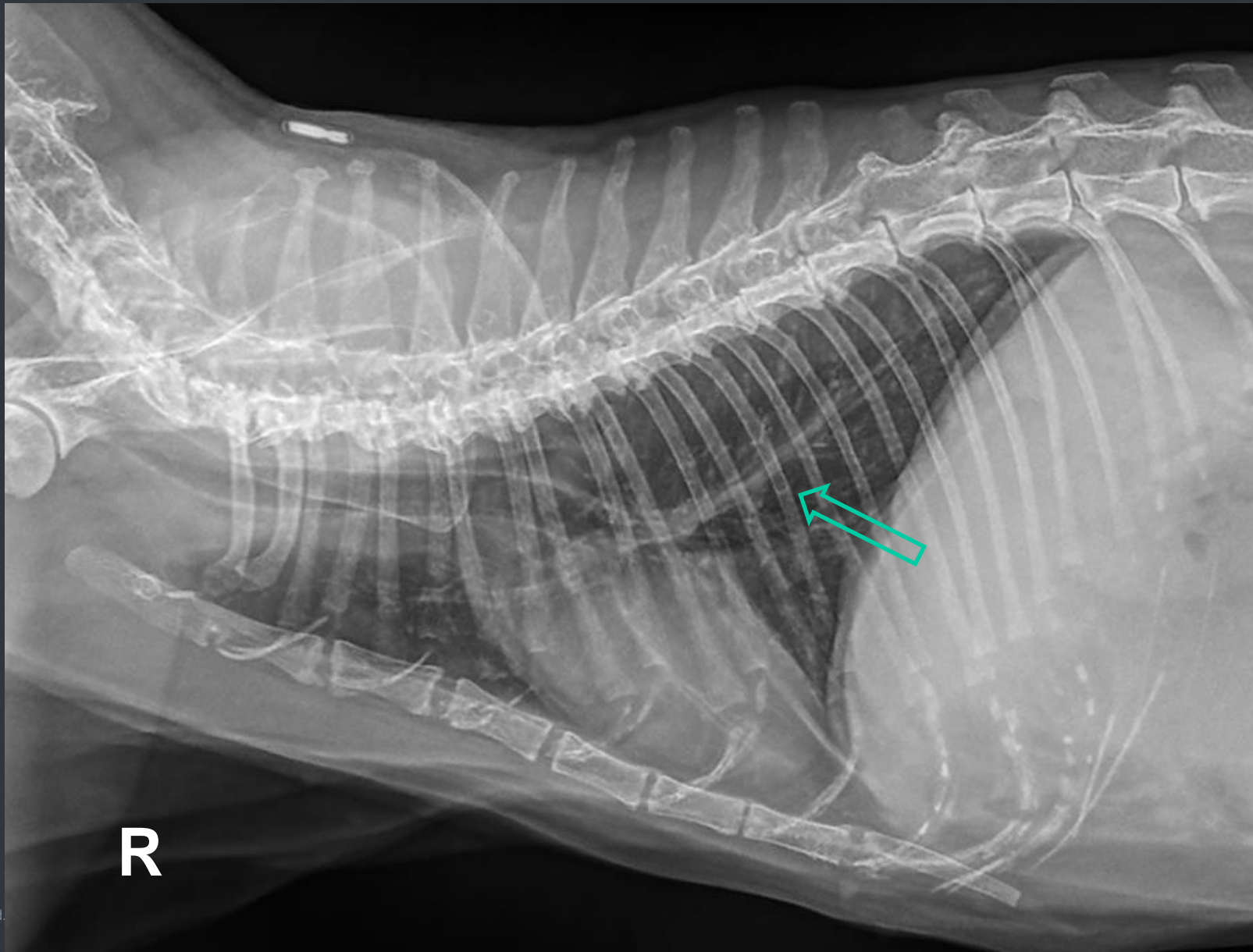
Tracheal Collapse



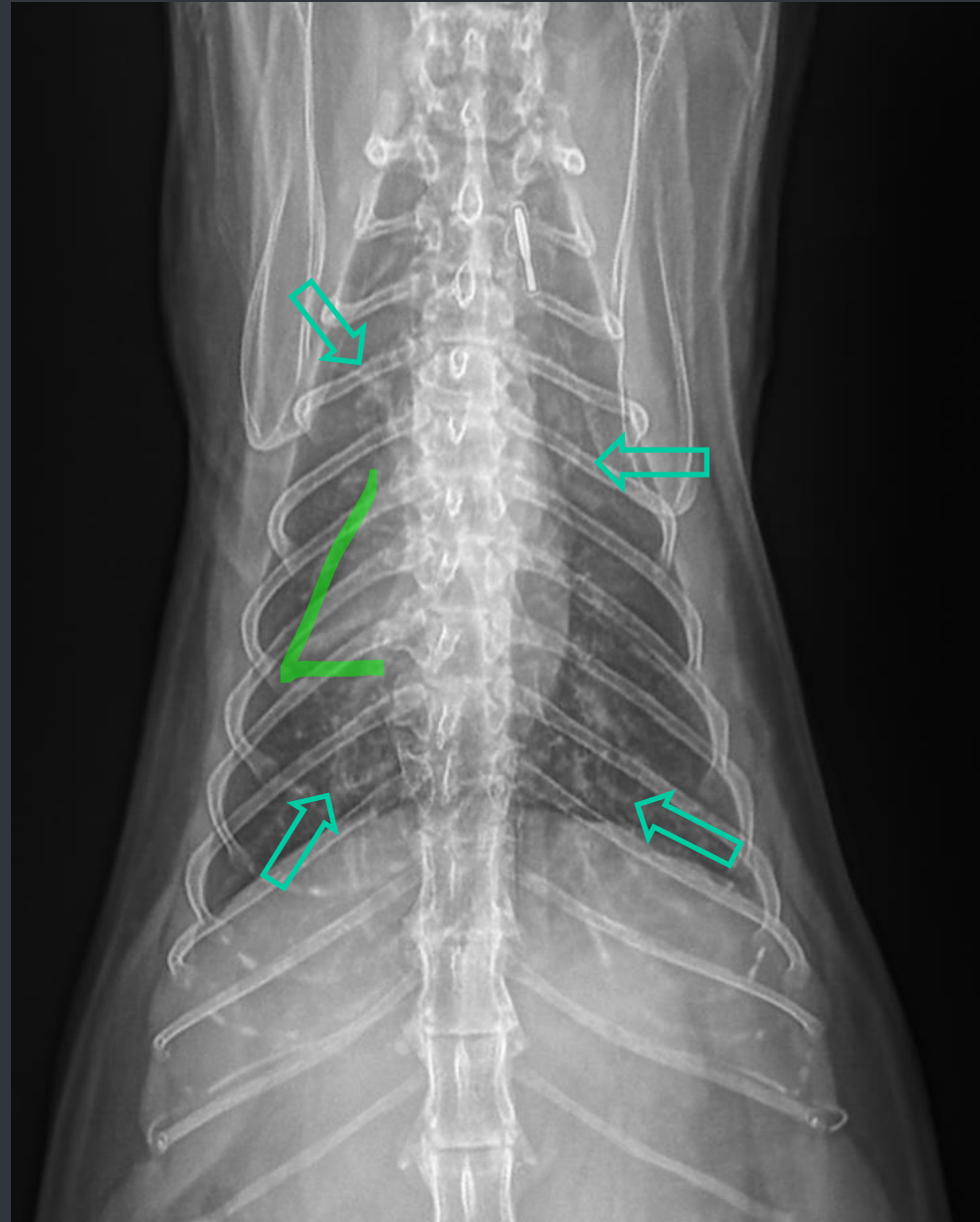
12 year old spayed female domestic shorthair cat; Coughing & wheezing



12 year old spayed female domestic shorthair cat; Coughing & wheezing



12 year old spayed female domestic shorthair cat; Coughing & wheezing

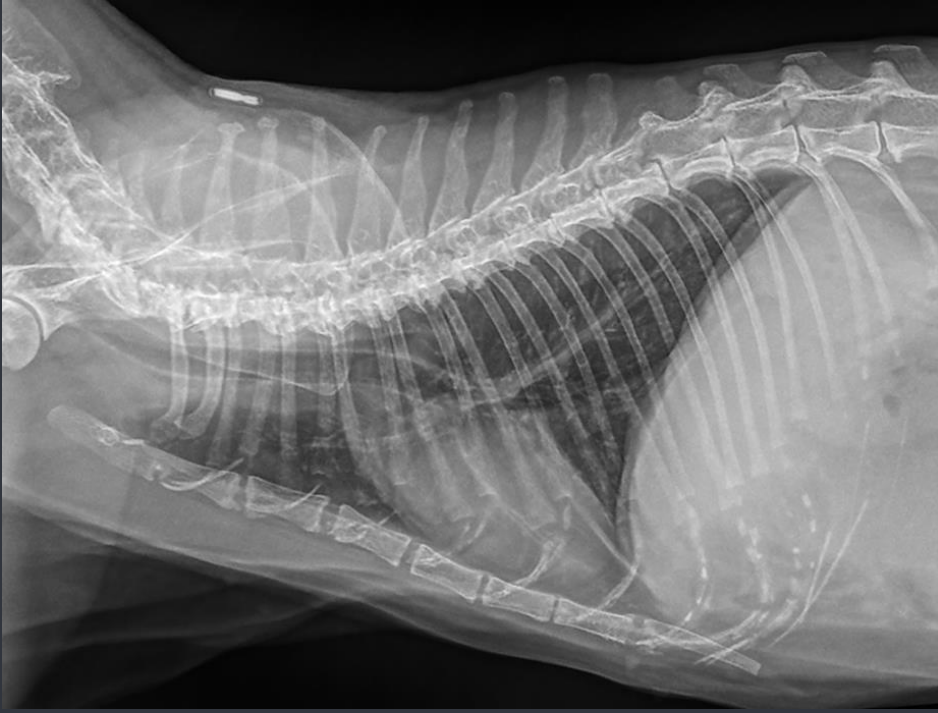




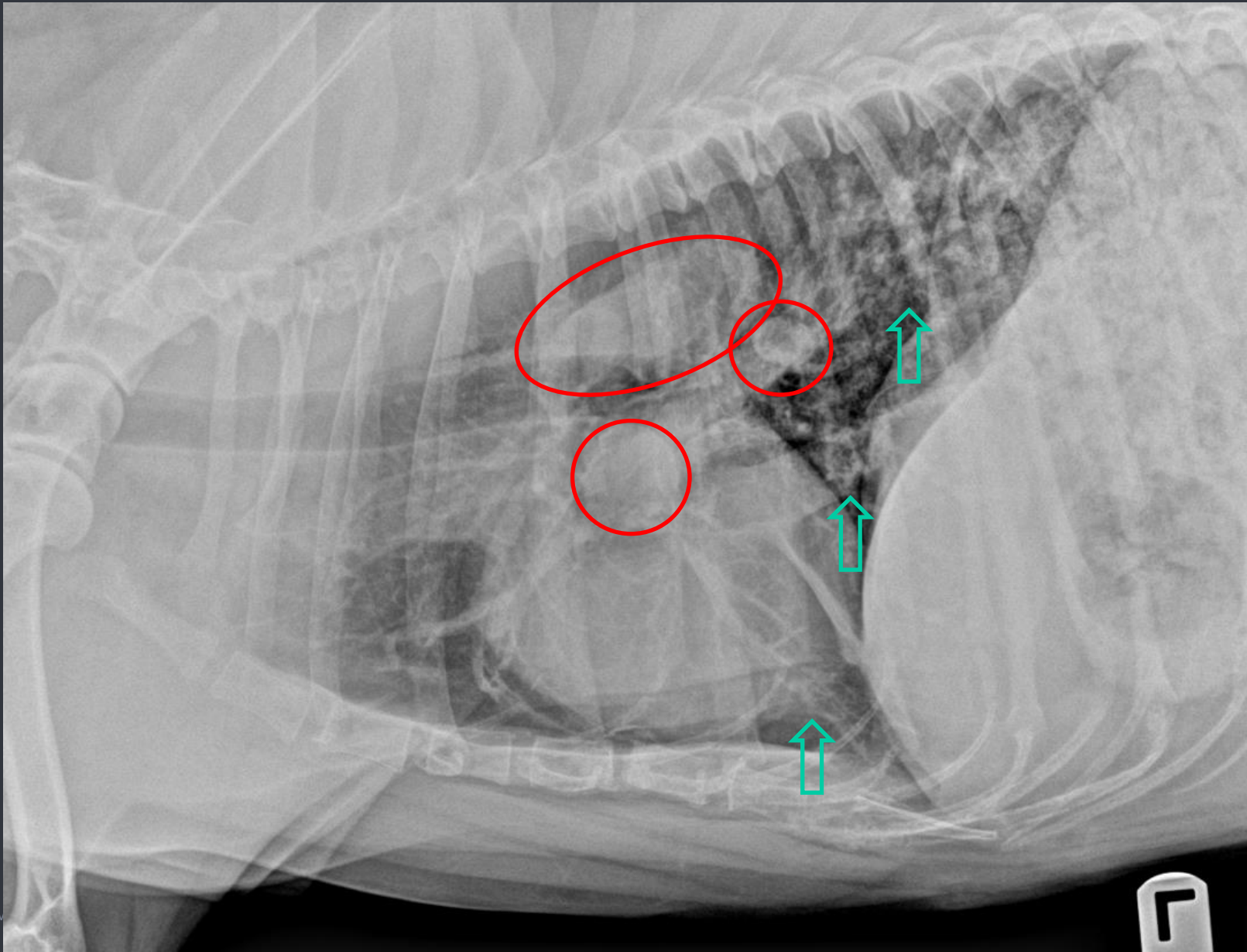
What is your top differential diagnosis for this coughing/wheezing cat with a generalized bronchial pattern and atelectasis of the right middle lung lobe?

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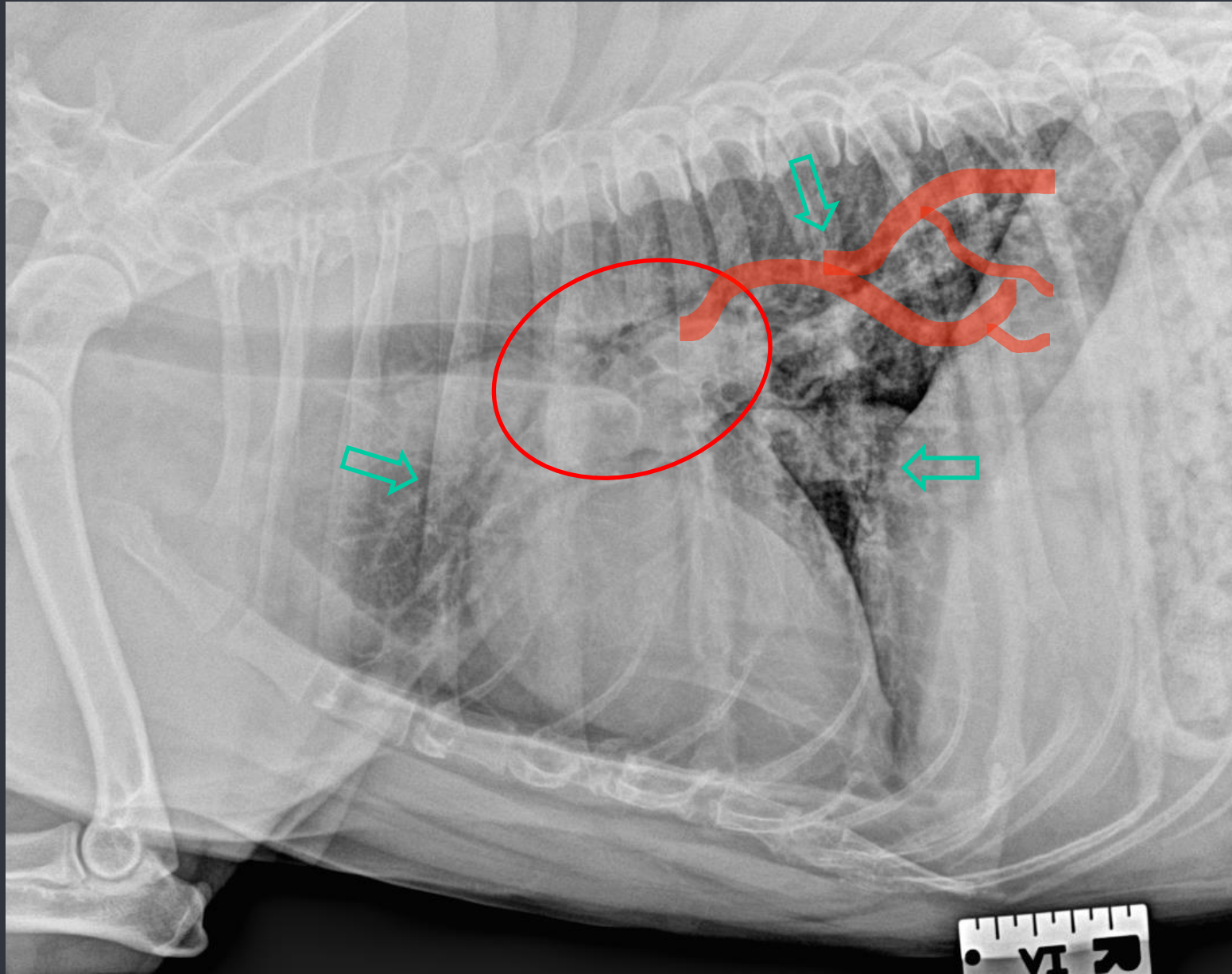
Feline Asthma



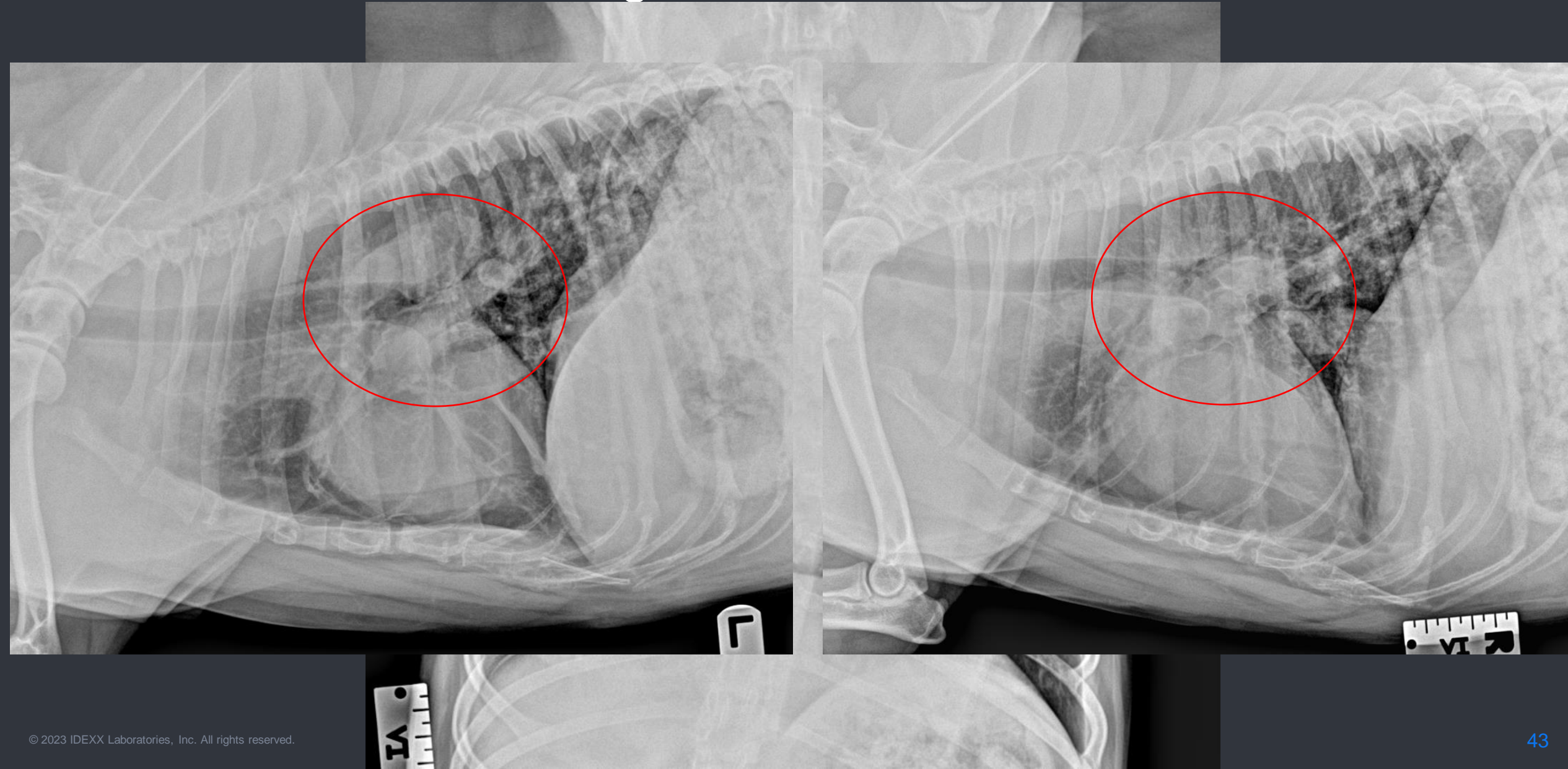
Adult neutered male mixed breed dog; Wheezing/mild cough during and after exercise



Adult neutered male mixed breed dog; Wheezing/mild cough during and after exercise



Adult neutered male mixed breed dog; Wheezing/mild cough during and after exercise



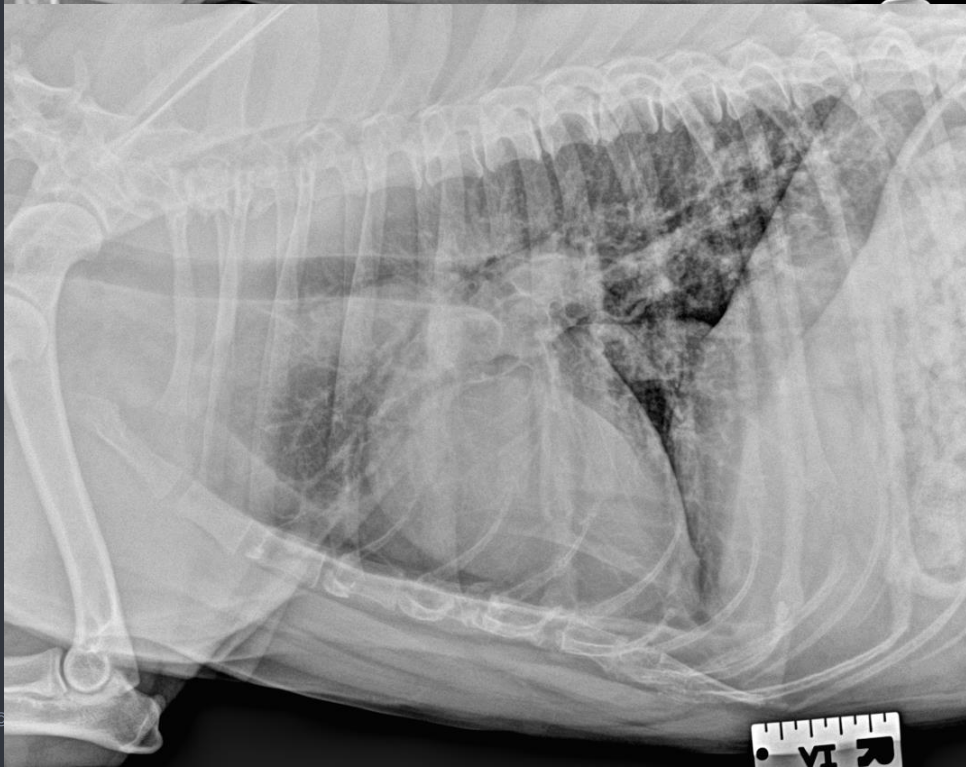
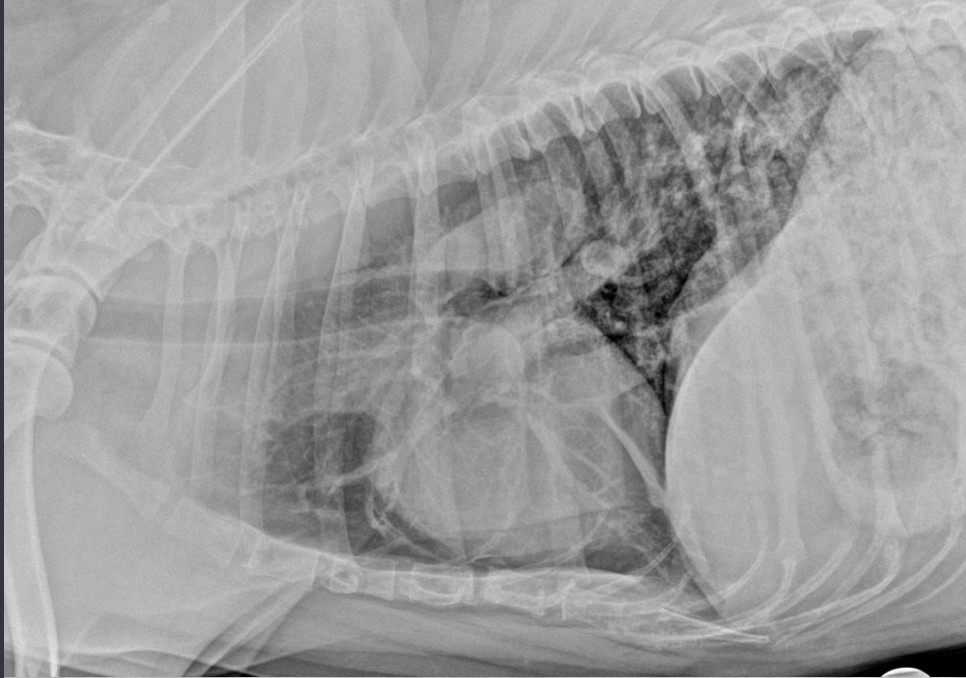


What is your top differential diagnosis for this wheezing/coughing dog with main pulmonary artery enlargement; dilated/enlarged, tortuous, and blunted caudal lobar pulmonary arteries, and a generalized broncho-interstitial pattern?

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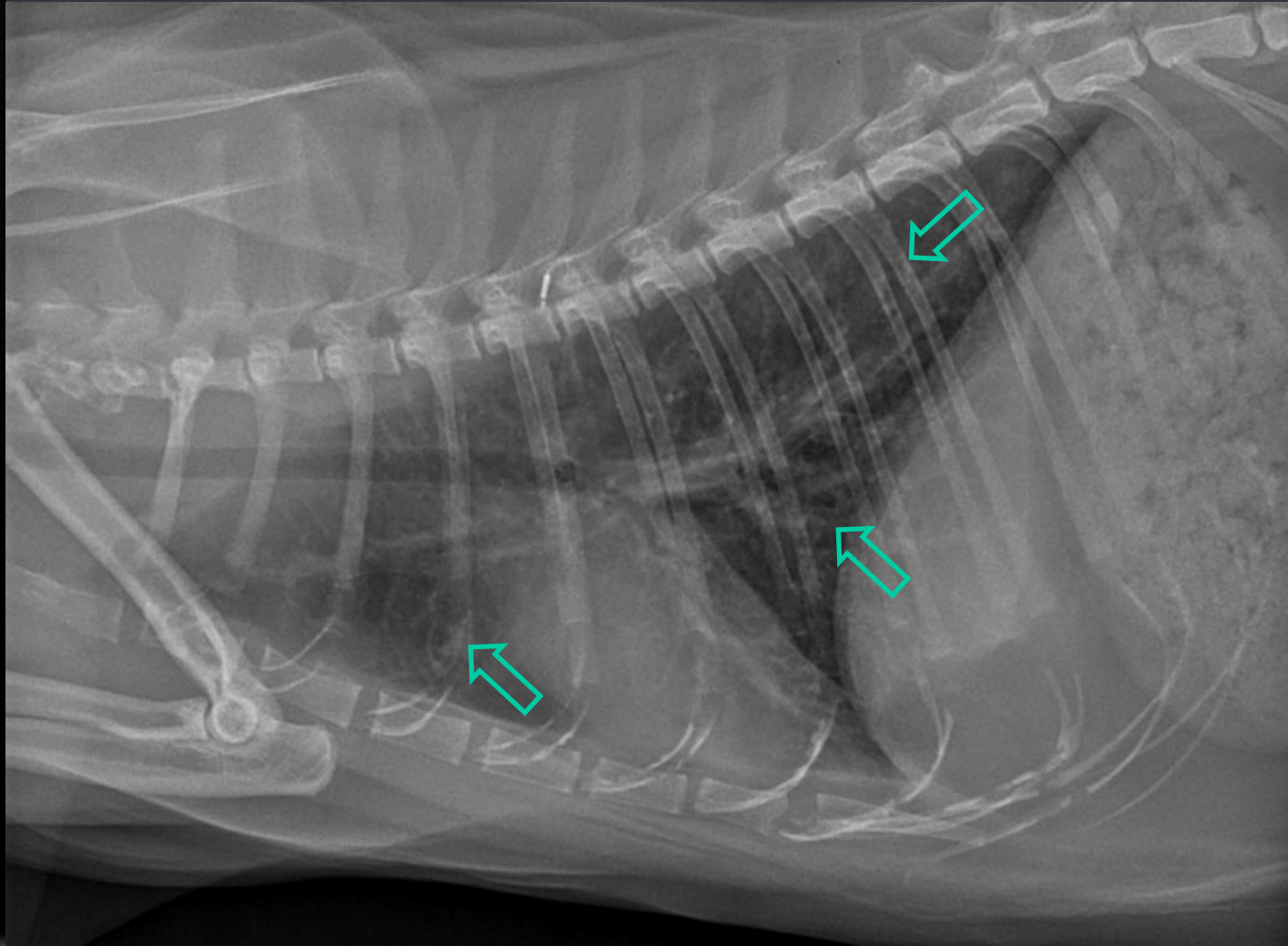
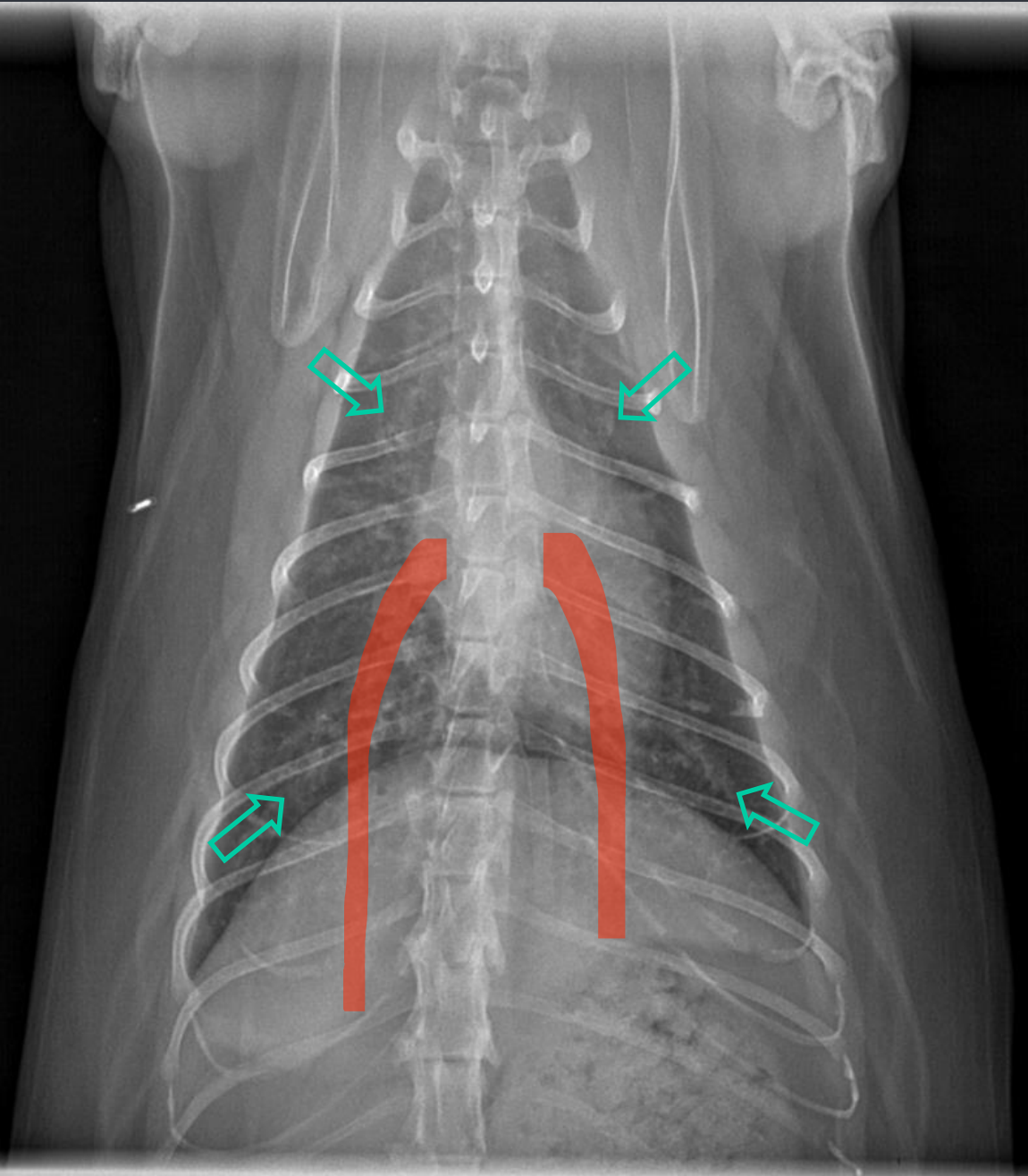
Heartworm Disease

(*Dirofilaria Immitis*)



Cats get heartworm too!!

9 year old neutered male domestic shorthair cat; Coughing



Global Distribution of Heartworm (*Dirofilaria immitis*)

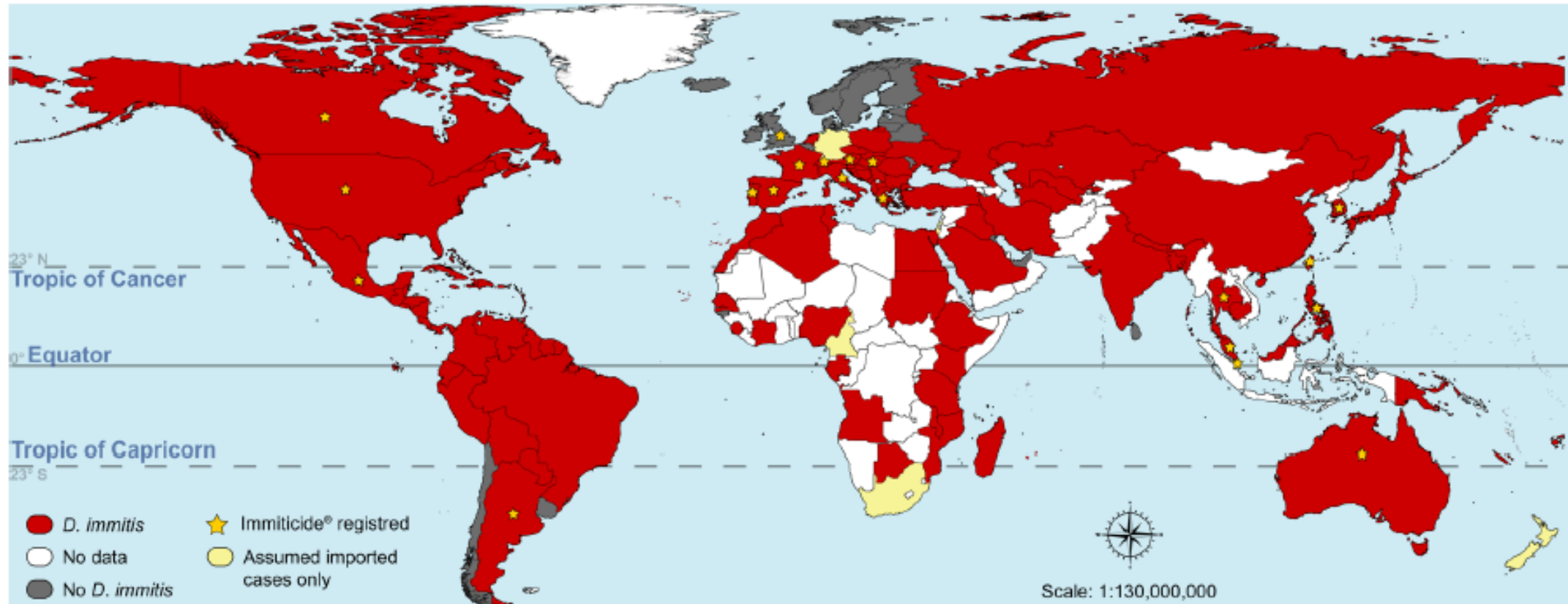



Fig. 1 World distribution of *Dirofilaria immitis*. This map was built using QGIS and publicly available shapefiles [84]. Sources of information include several review and research papers [1, 6, 8–27, 31, 32, 34, 35]. The red colour does not mean that *D. immitis* is present in the whole country, particularly for countries lying outside the tropics. Countries where Immiticide® (Boehringer Ingelheim) is currently registered are indicated with a yellow star. In some countries (e.g. United States), melarsomine may also be available as Diroban™ (Zoetis)

Brief Report

Diagnostic Accuracy of a Point-of-Care Immunoassay for Feline Immunodeficiency Virus Antibodies, Feline Leukemia Virus Antigen, and *Dirofilaria immitis* Antigen

Seema Singh *, Kristen A. Davenport , Elizabeth Schooley, Anthony Ruggiero, Salam Nassar, Jesse Buch and Ramaswamy Chandrashekar

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Feline Triple Test now available globally!

FIV, FeLV, and HW



Abstract: Feline immunodeficiency virus (FIV) and feline leukemia virus (FeLV) are retroviral infections of cats worldwide whose clinical manifestations range from mild to severe disease. In both cases, infected cats can live a long life with proper care and should be managed to prevent infection of other cats. *Dirofilaria immitis*, the nematode that causes heartworm disease, can infect cats in any region where dogs are infected. Though cats are more resistant to infection, clinical diseases in the form of heartworm-associated respiratory disease can cause death. Screening for these infectious diseases enables veterinarians to manage their cases and prevent the spread to other cats. We describe the diagnostic accuracy of a point-of-care immunoassay for FIV, FeLV, and heartworm, compared to reference methods commonly available through reference laboratories to the practicing veterinarian. For FIV, we report 100% sensitivity (95% confidence limits (CL): 96.2–100%) and 97.8% specificity (95% CL: 95.4–99.4%). For FeLV, we report 100% sensitivity (95% CL: 97.7–100%) and 99.2% specificity (95% CL: 97.1–99.9%). And for heartworm, we report 90.2% sensitivity (95% CL: 76.9–97.3%) and 100% specificity (95% CL: 98.3–100%). Veterinarians may expect this performance relative to the reference methods they use for confirmatory serological testing.

Keywords: feline immunodeficiency virus; feline leukemia virus; *Dirofilaria immitis*; heartworm; serology; diagnosis; screening

Summary



- + A systematic approach to interpreting thoracic radiographs is helpful in evaluating all intrathoracic structures and aids in the identification of abnormalities
- + There are many causes of respiratory abnormalities in canine and feline patients
- + Combining systematic evaluation of images with patient signalment and history is helpful in ranking differential diagnoses

A black and white photograph of three dogs running on a beach at sunset. The sun is low on the horizon, creating a strong silhouette effect on the dogs and a bright reflection on the wet sand. The dogs are running from left to right. The background shows the ocean and a distant shoreline.

Questions?

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