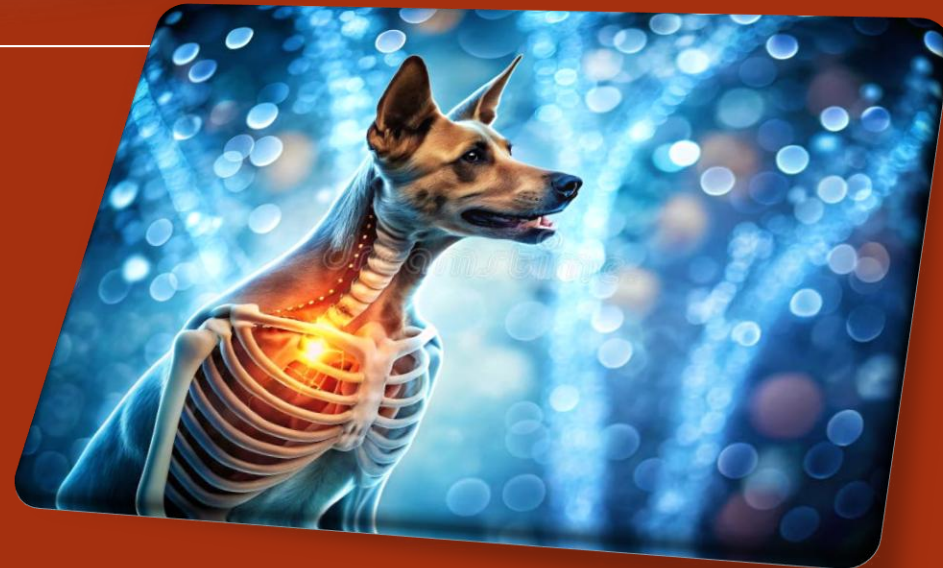
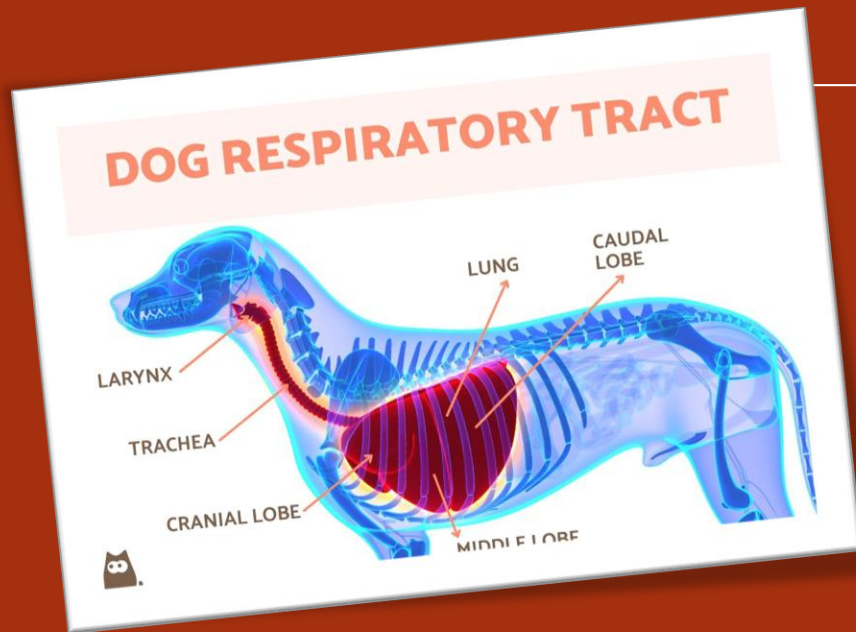
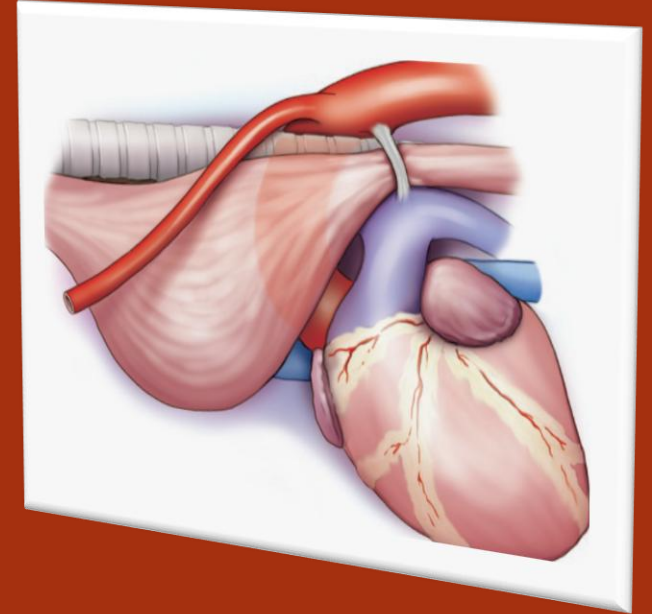
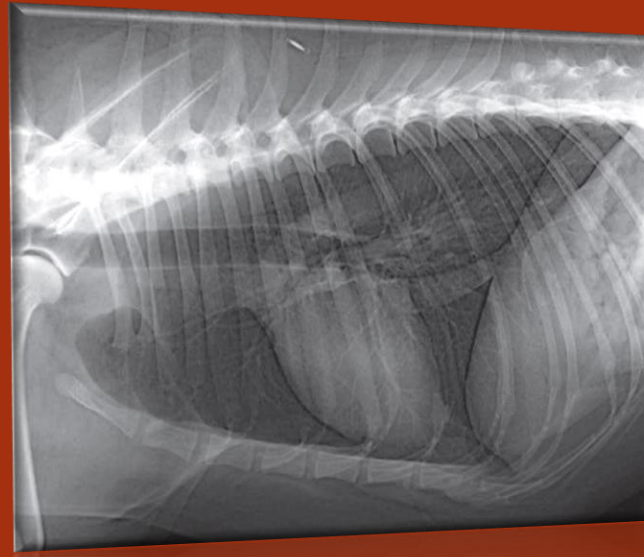


Carnivores

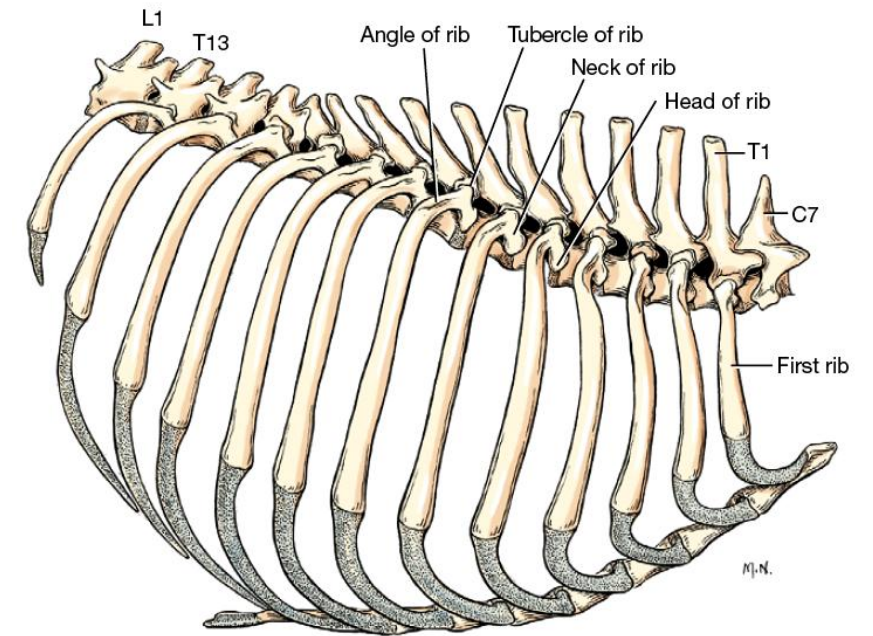
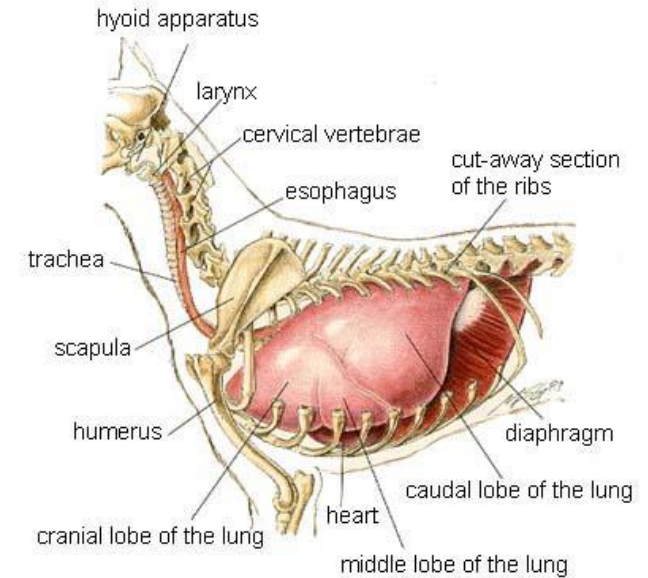
Thoracic



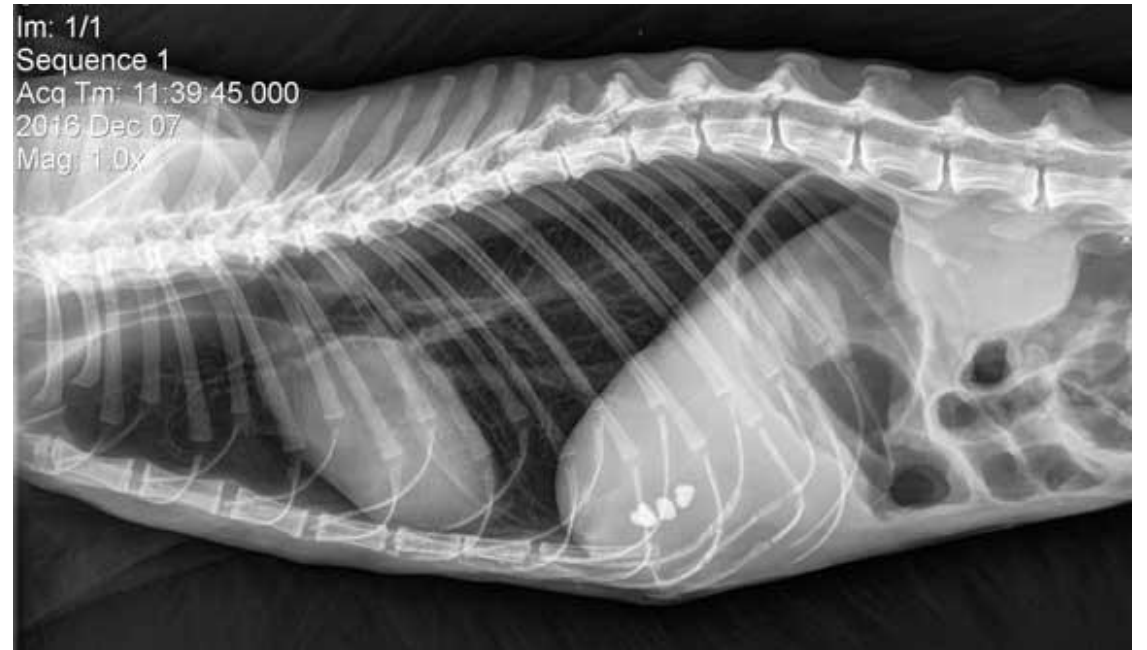
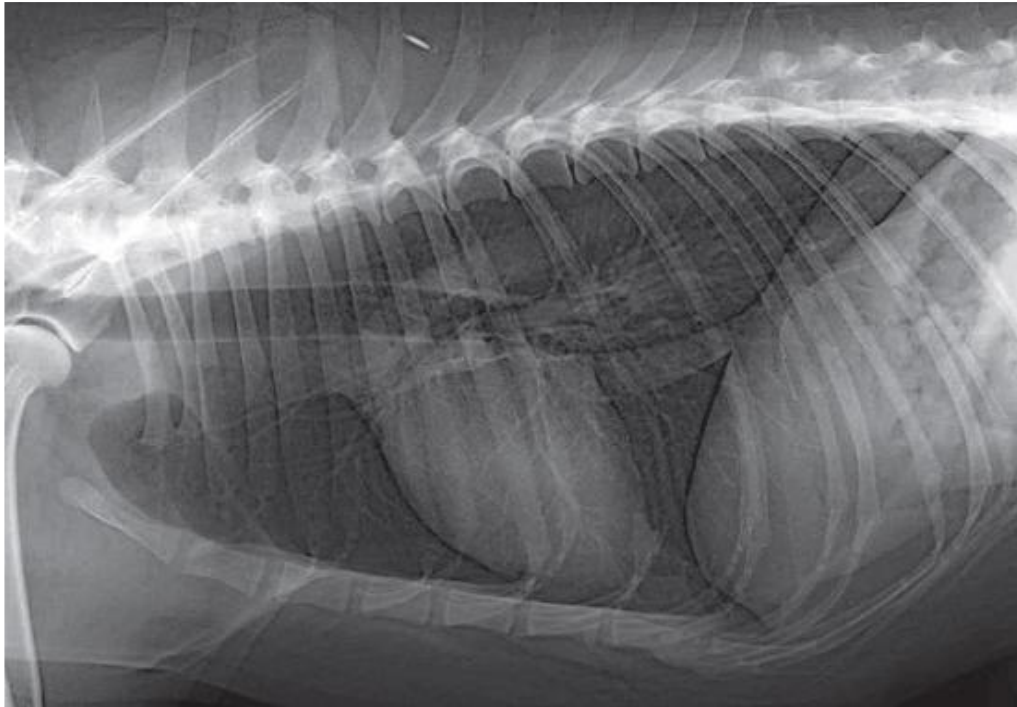
Both dogs and cats have 13 thoracic vertebrae, 13 pairs of ribs, and 9 sternebrae forming the thoracic wall.

Ribs 1 to 9 articulate with the sternebrae via cartilaginous costochondral junctions; the sternebrae are connected by fibrocartilage.

The cranial sternebra (manubrium) attaches to muscles like the sternocephalicus, and the caudal sternebra (xiphoid) is dorsal to the linea alba and ventral to the falciform ligament, with the diaphragm attached.



Cats have a narrower ventrodorsal and more elongated thorax compared to dogs, giving a more triangular shape.

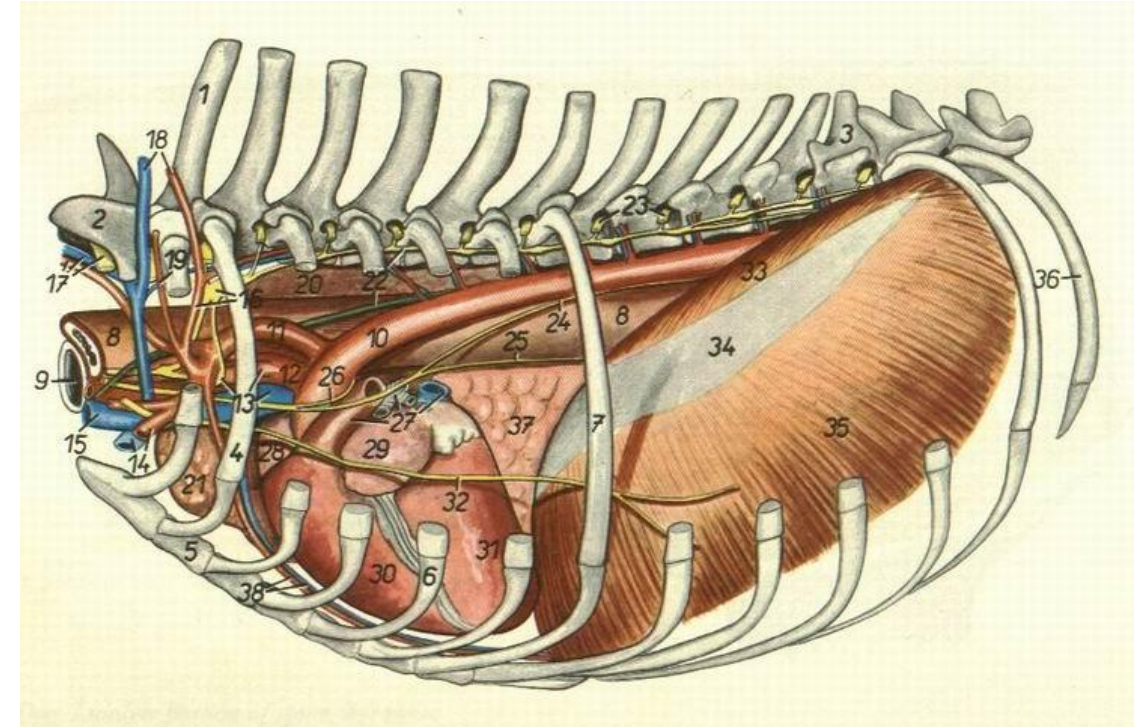


The thoracic cavity houses the heart, lungs, major blood vessels, esophagus, nerves, lymphatics, and the diaphragm marking its caudal boundary.

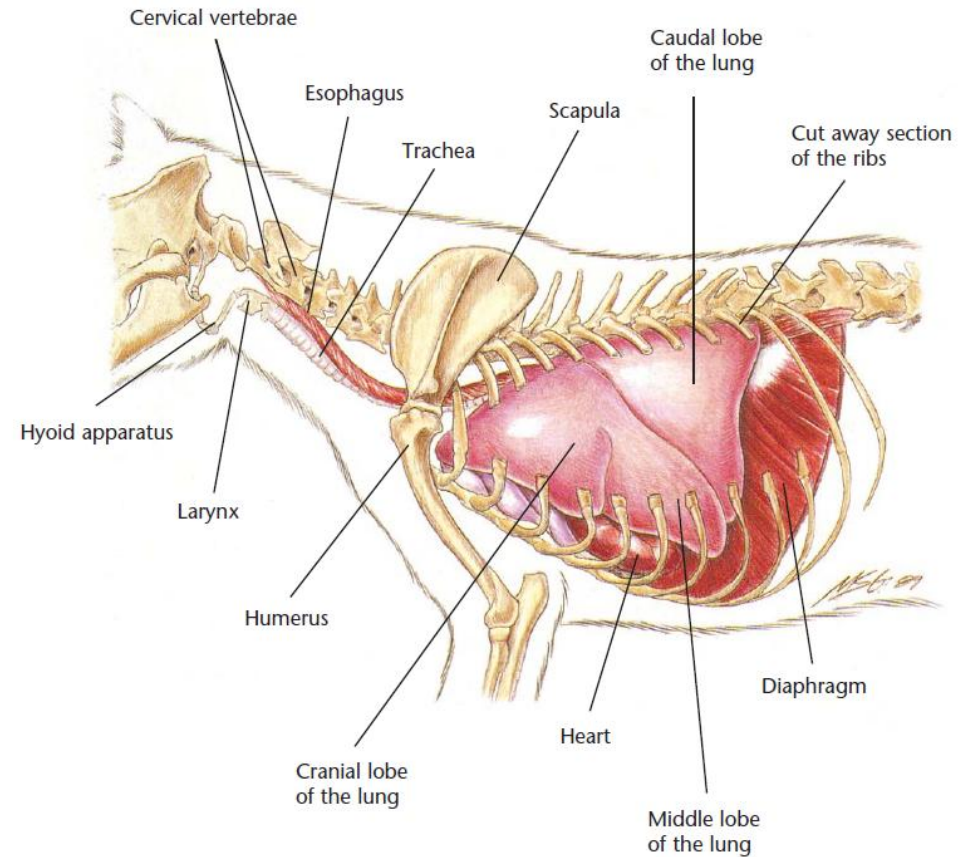
The thoracic duct, important for lymph drainage, runs dorsolateral to the aorta and terminates in the left external jugular.

The trachea extends from the cervical region into the thoracic cavity at the thoracic inlet, ending at the carina around the 5th or 6th intercostal space.

The cardiac silhouette in cats is more elongated and almond-shaped compared to dogs, located in the ventral middle mediastinum and occupying about 2 to 2.5 intercostal spaces on lateral radiographs.



The diaphragm in cats extends cranially to Ribs (8-10) and dorsally to T13-L1, attaching to lumbar vertebrae. The muscular part is weaker than the central tendon and is the most common site of rupture in traumatic injuries, especially in cats.



Normally, the “domed” cranial margin of the diaphragm is clearly delineated on both the lateral and ventrodorsal radiographic views, as the diaphragm is bordered cranially by aerated lung and caudally by the liver. Traumatic rupture usually occurs in the ventral portion of the diaphragm, and abdominal contents are maybe seen in the ventral part of the thoracic cavity. It is common for a rupture or tear to occur on only one side of the diaphragm, so only one hemithorax may contain abdominal organs, although their presence may displace the heart and compress the lung on the other side.

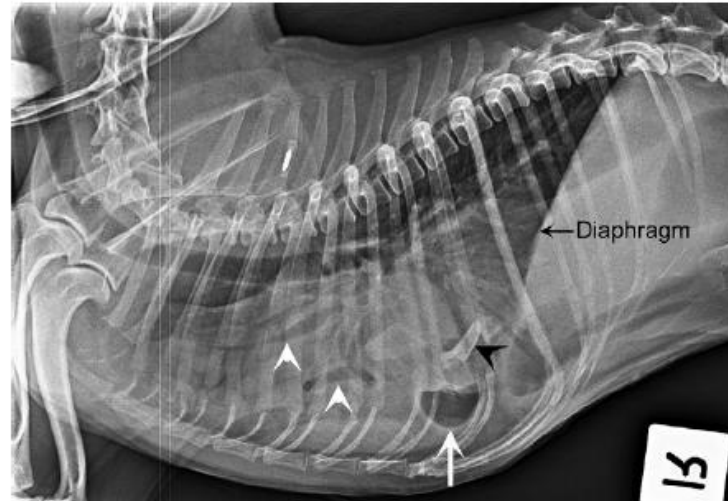


FIGURE 4.3-1 Lateral radiograph of the dog in this case. The diaphragm is intact dorsally, but its ventral margin is indistinct. (Compare this image with the normal dog in Fig. 4.3-3A.) Part of the stomach (*white arrow*) and loops of small intestine (*white arrowheads*) are located cranial to the diaphragm, making it difficult to see the heart. These findings are indicative of diaphragmatic rupture and displacement of abdominal contents into the thoracic cavity. The piece of bone in the dog's stomach (*black arrowhead*) is an incidental finding.

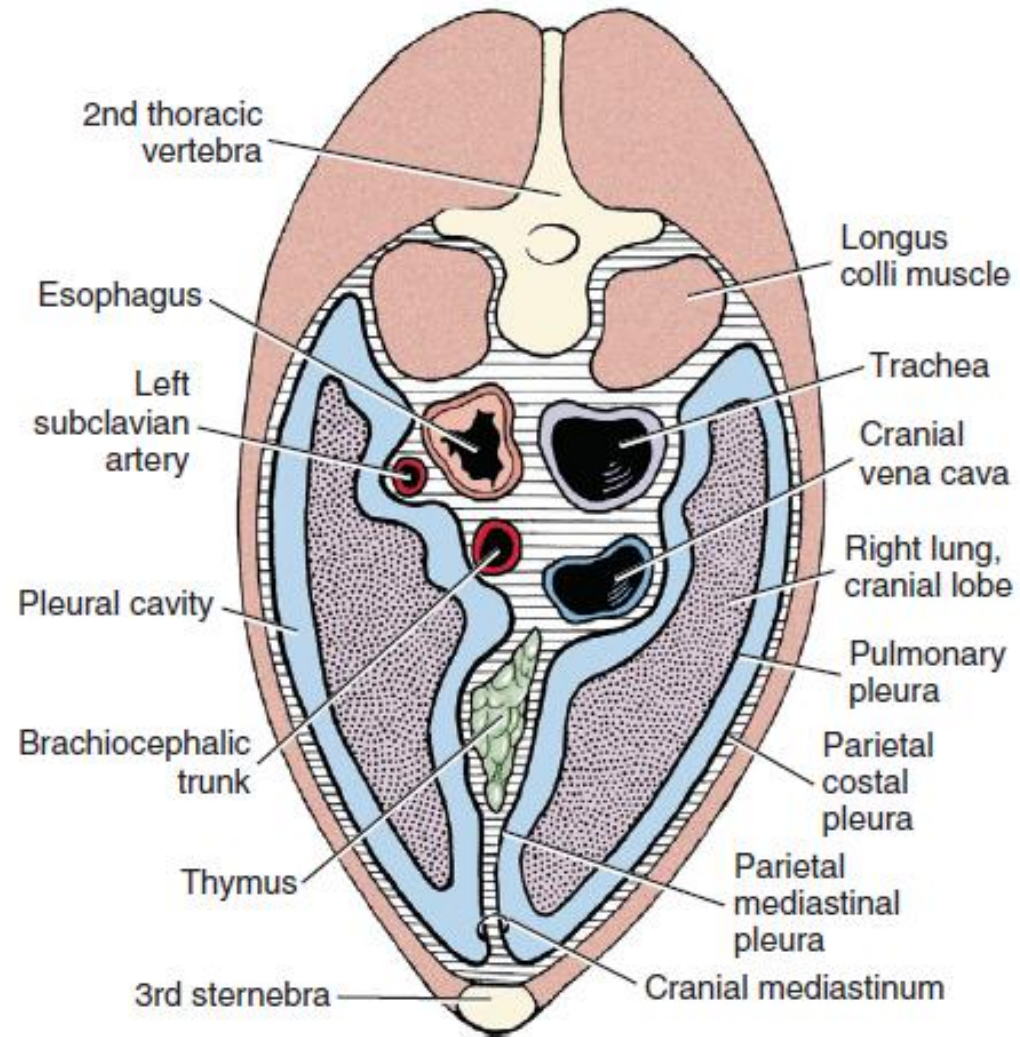


FIGURE 8-30 Schematic transverse section of thorax through cranial mediastinum and lungs.

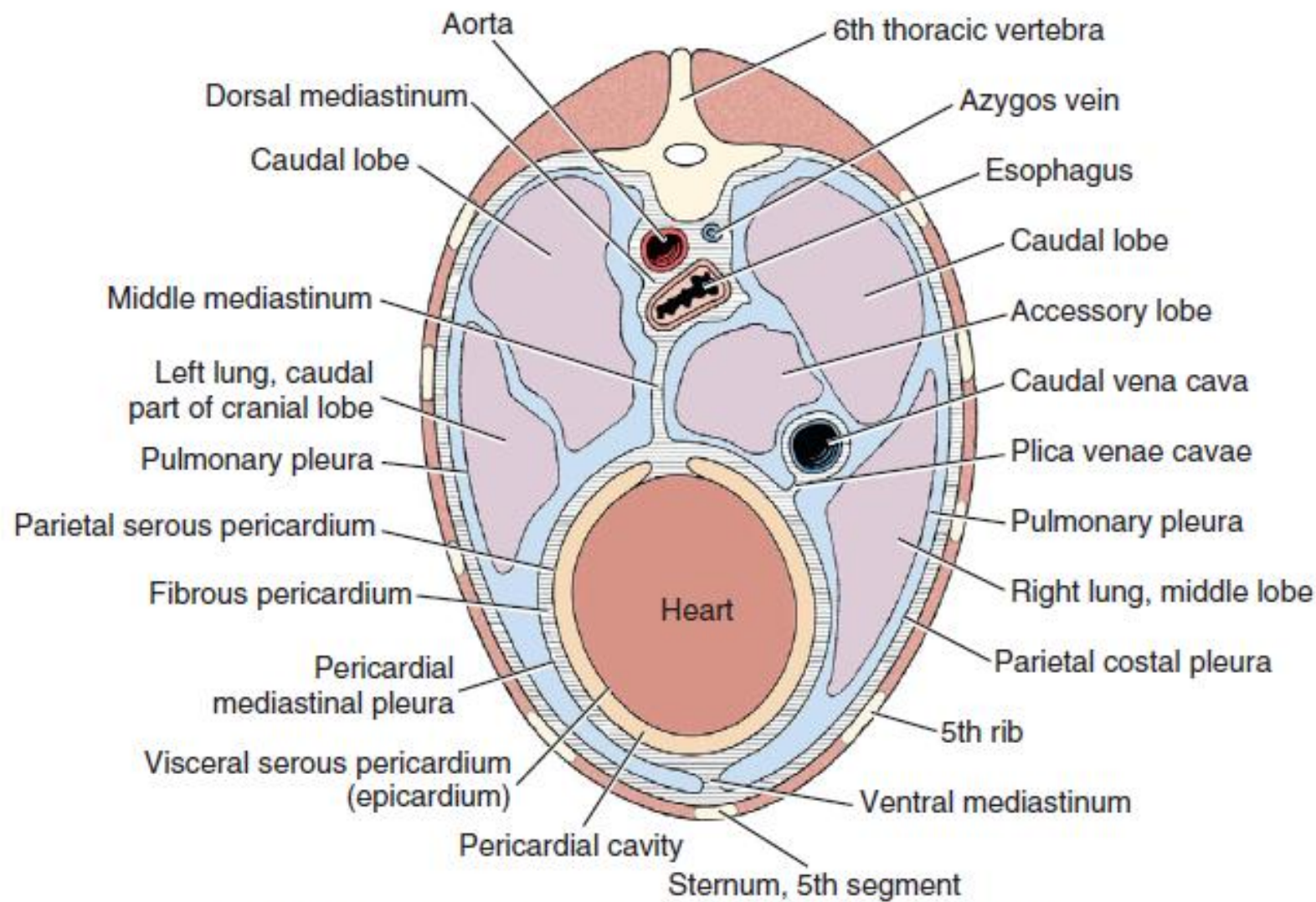
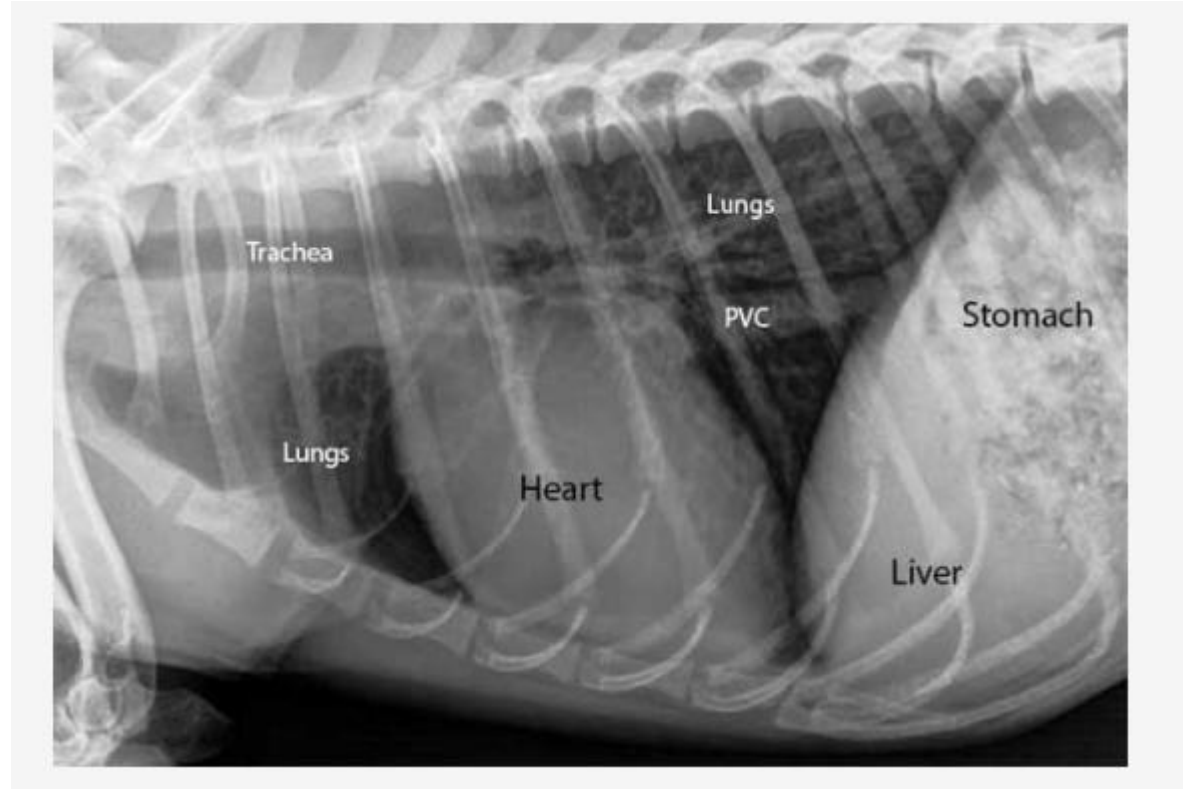


FIGURE 8-31 Schematic transverse section of thorax through heart and lungs.



Lateral view of a normal chest.

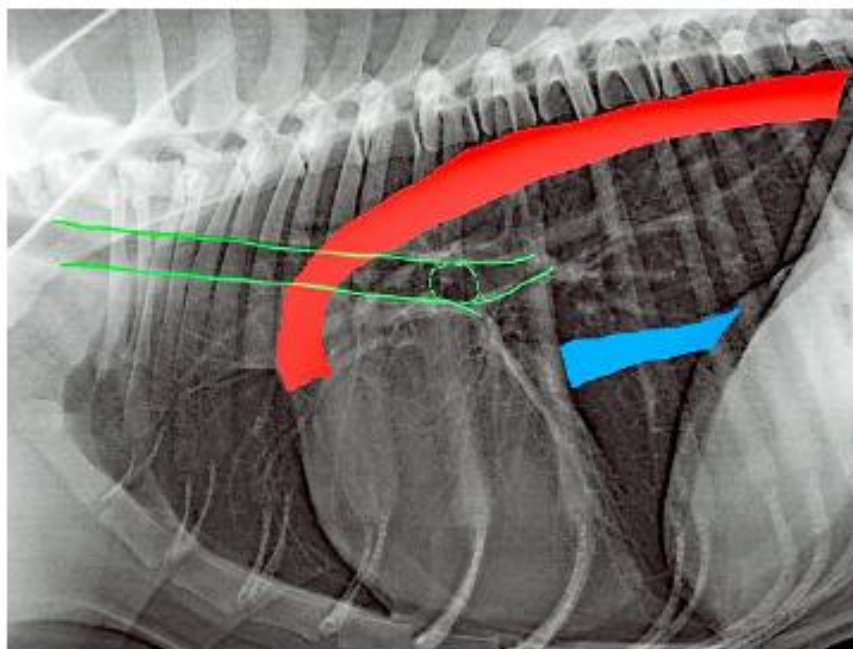
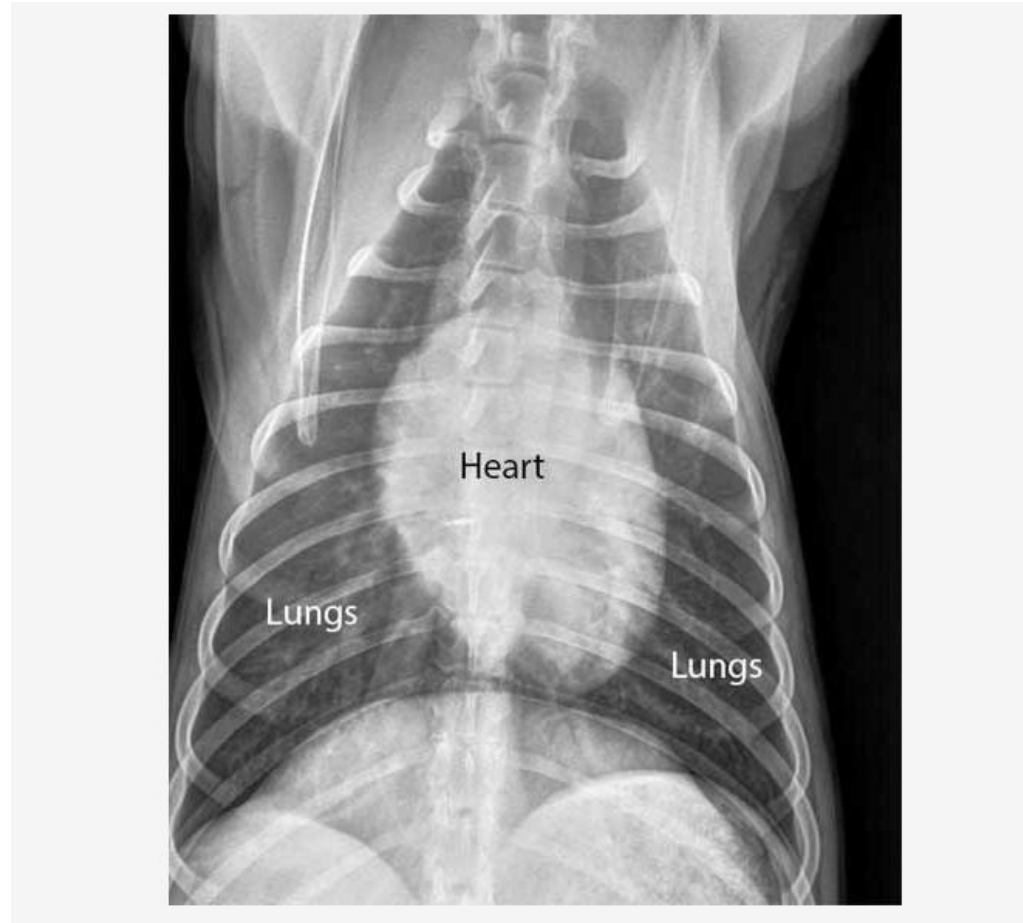


FIGURE 4.1-3 Normal lateral radiograph of the canine thorax (right laterally recumbent projection). The trachea is outlined in *green*; the tracheal bifurcation is seen as a radiolucent (*dark gray*) circle dorsal to the heart. The aorta is shown in *red* and the caudal vena cava in *blue*.

Radiographically, the air-filled trachea is easily seen on lateral projections of the thorax , but on the ventrodorsal and dorsoventral projections, it is obscured by the sternum and thoracic vertebrae



Dorsoventral view of a normal chest.

Summary Table: Lung Lobes in Dogs and Cats

Lung Side	Lobes	Notes
Right	Cranial, Middle, Caudal, Accessory	Identical in dogs and cats
Left	Cranial (cranial & caudal parts), Caudal	Cranial lobe has two segments; not separate lobes 1 5

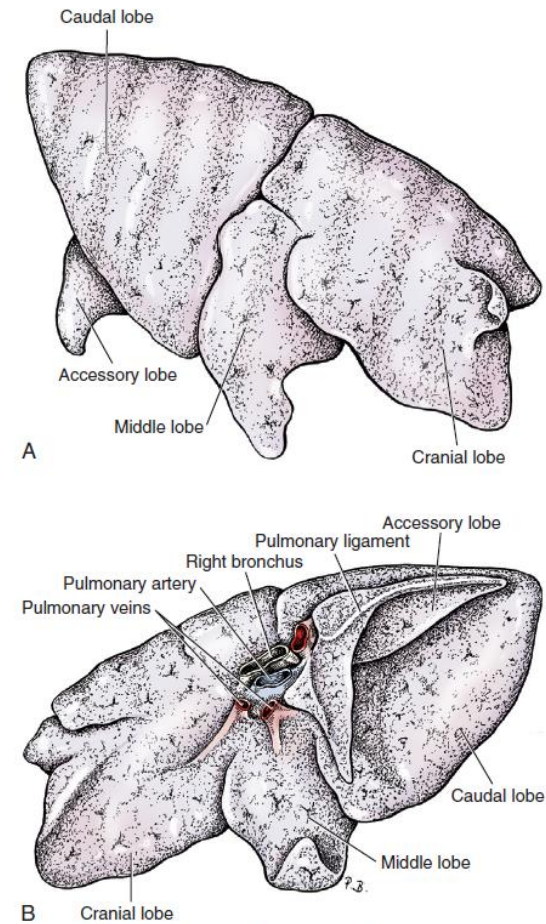
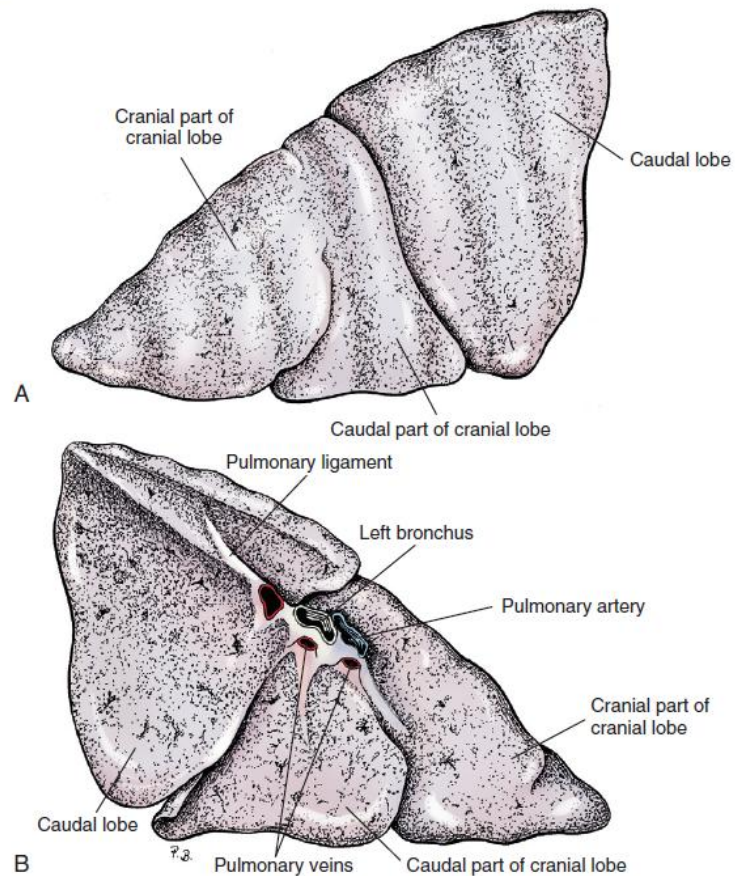
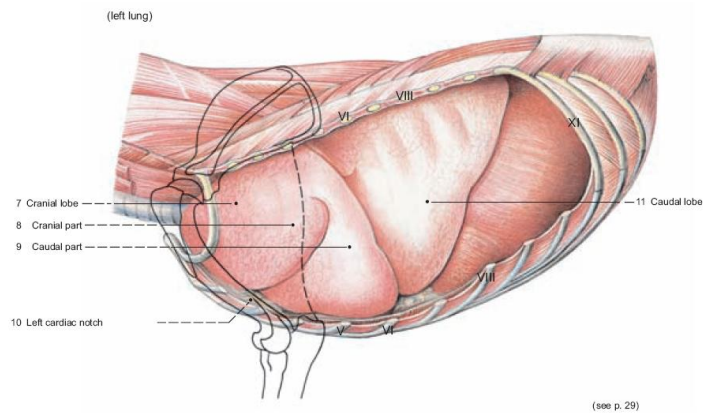


FIGURE 8-34 Right lung. **A**, Lateral aspect. **B**, Medial aspect.

Cranioventral distributions tend to be associated with pneumonias.

Caudodorsal distributions tend to be associated with cardiogenic and non-cardiogenic pulmonary edemas.

Cats do not follow this rule.

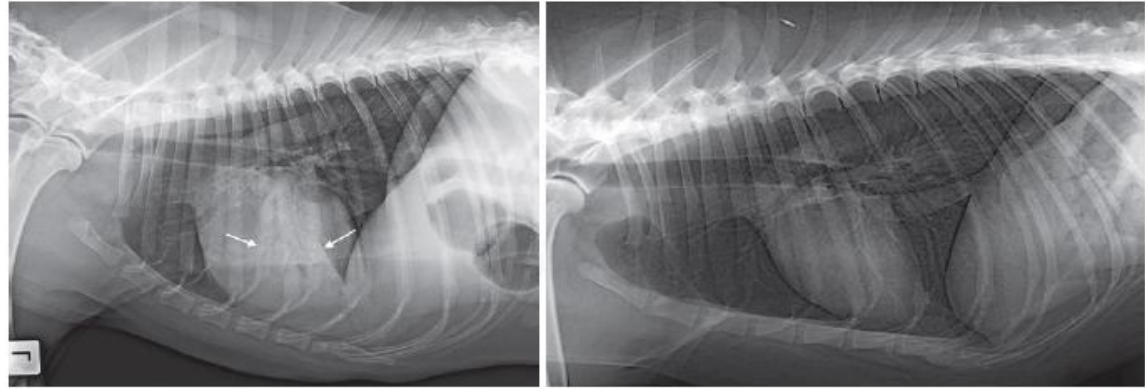


FIGURE 4.1-1 Lateral thoracic radiographs of the dog with pneumonia (left) and, for comparison, a dog with normal lungs (right). In the image on the left, there is opacity within the right middle lung lobe (between the *arrows*) (best seen in the ventrodorsal view in [Fig. 4.1-2](#)).

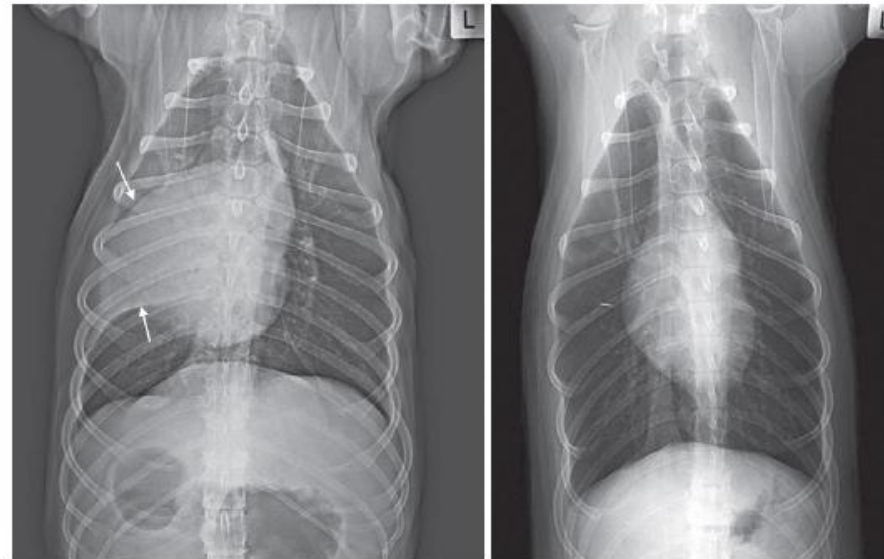
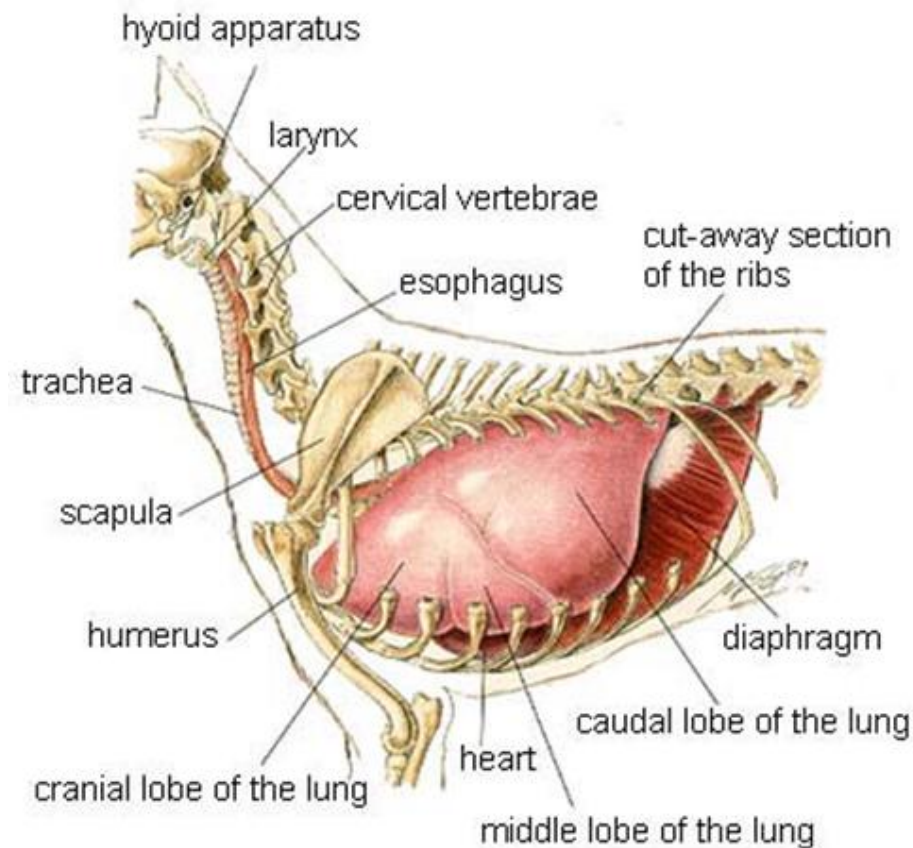


FIGURE 4.1-2 Ventrodorsal thoracic radiographs of the dog with pneumonia (left) and, for comparison, a dog with normal lungs (right). In the image on the left, the opacity within the right middle lung lobe is clearly seen (between the *arrows*).

The pleural cupula represents the cranial-most portion of the pleural cavities on each side, lined by parietal pleura. Because of their location, they are potential sites where pleural fluid or air can accumulate, impacting lung expansion and respiratory function.

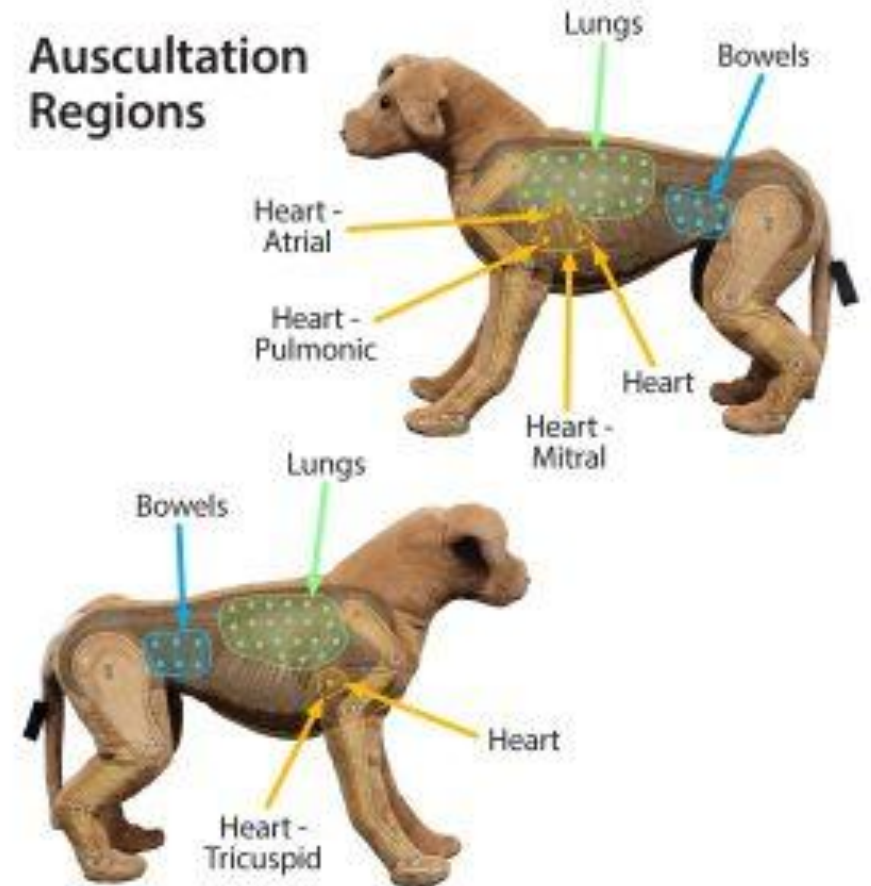
Pleural effusion is a common cause of respiratory compromise in dogs and cats. The pleural cupula can be involved in such effusions, which may be unilateral or bilateral due to the fenestrated nature of the mediastinum in these species, allowing fluid to pass between sides unless exudates block these fenestrations.



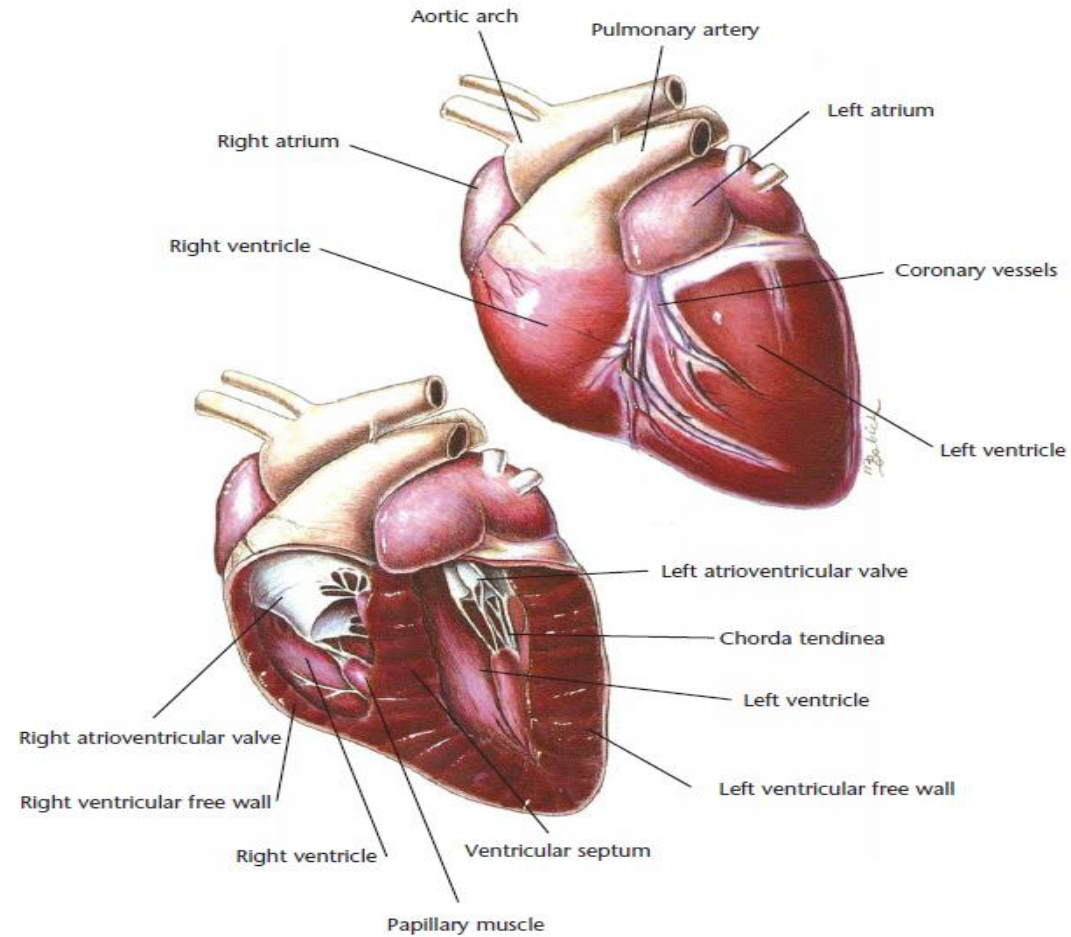
Location for Lung Auscultation in Dogs and Cats

Thoracic region: Place the stethoscope on the chest wall, moving it systematically over multiple spots covering the entire lung fields on both sides. Typically, 4 to 6 spots per side are auscultated to cover the lung fields adequately.

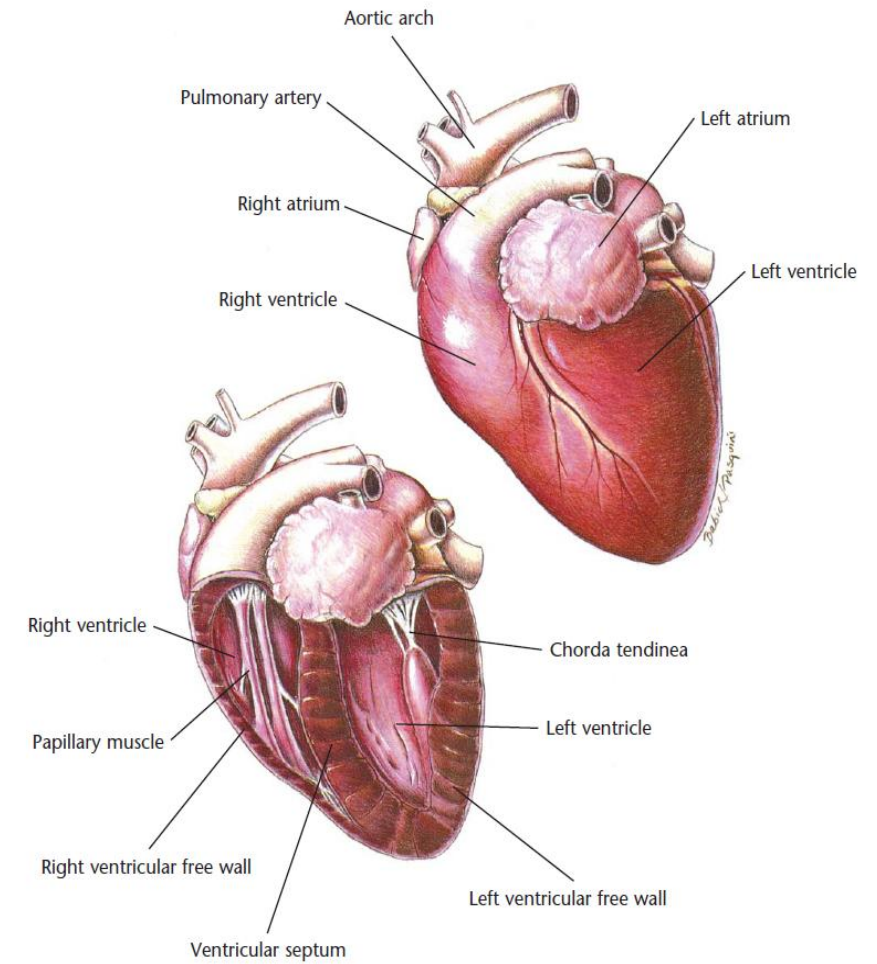
The stethoscope should be moved around the thorax, including dorsal and ventral areas, to detect variations in lung sounds. This includes areas just behind the elbows (axillary region) and along the ribs, avoiding the sternum area where breath sounds are minimal.



Canine heart

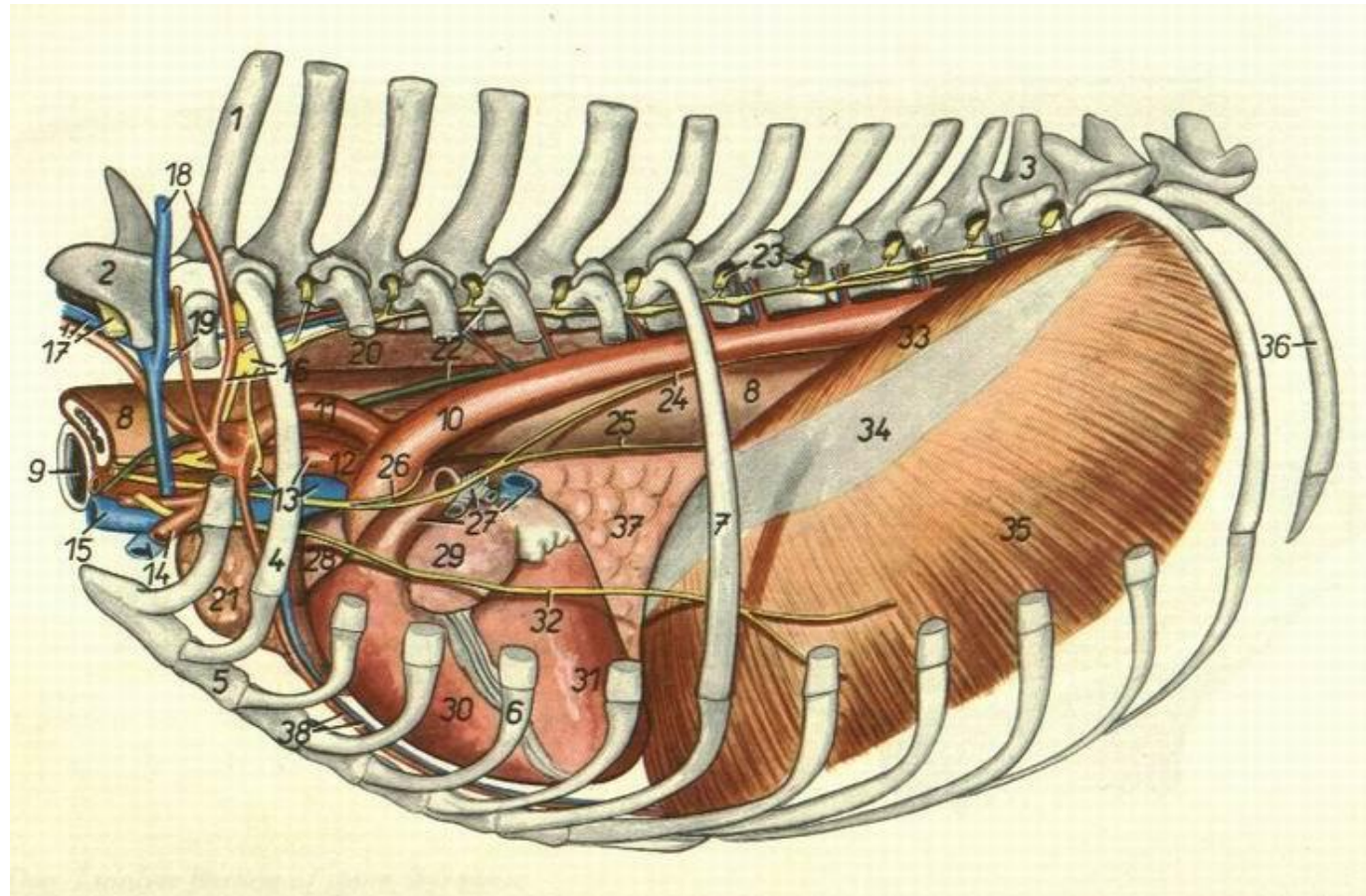


Feline heart



The heart in dogs is positioned mainly between the 3rd and 5th intercostal spaces, sometimes extending to the 7th. The cardiac notch in the lung provides a window for auscultation and echocardiography.

- In dogs, mitral valve disease is the most common
- In cats, hypertrophic cardiomyopathy (HCM) is prevalent



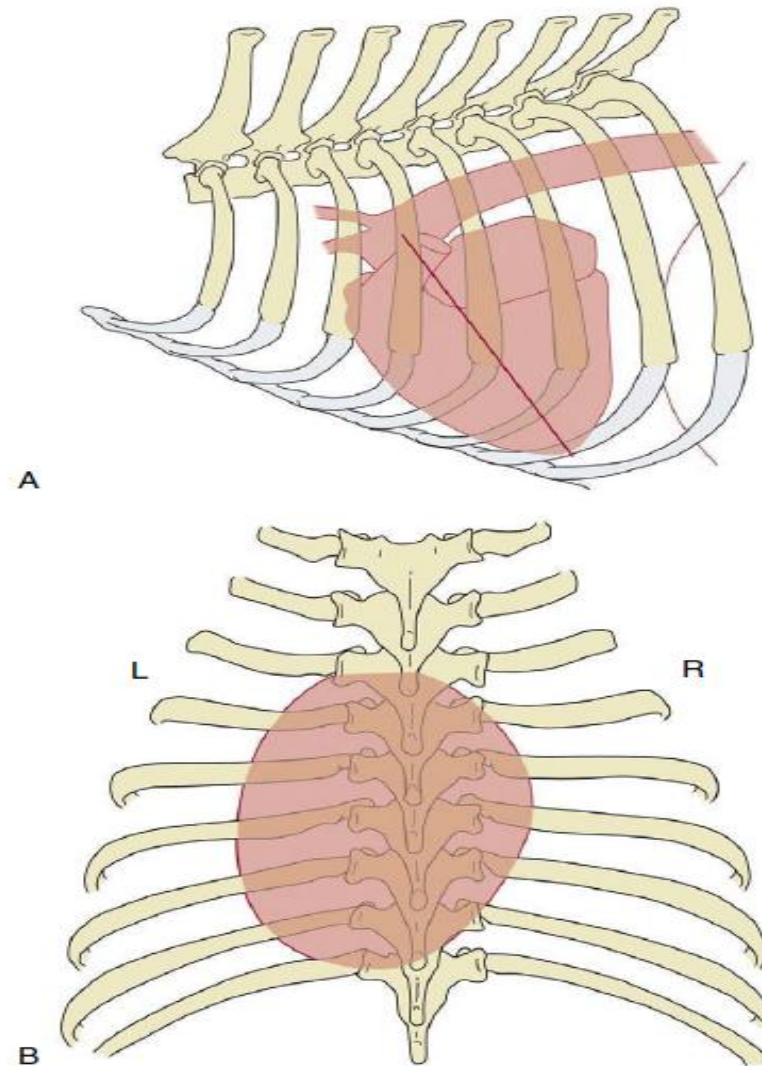


Figure 7-6 Schematic drawings to show the position of the canine heart, based on radiographs. **A**, Left lateral view; the caudoventrally sloping long axis (*straight line*) of the heart is indicated. **B**, Dorsoventral view showing the asymmetrical position of the heart.

Dogs

Mitral valve: Best heard over the left apex, typically at the 5th intercostal space near the costochondral junction.

Aortic valve: Located craniodorsal to the left apex, around the 4th intercostal space just above the costochondral junction.

Pulmonic valve: Found on the left side at the base of the heart, between the 2nd and 4th intercostal spaces just above the sternum. In some breeds, this may be around the 3rd intercostal space.

Tricuspid valve: Best auscultated on the right hemithorax, near the 3rd to 5th intercostal spaces close to the costochondral junction.

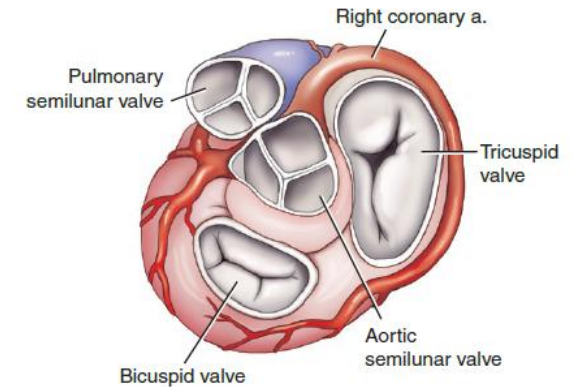
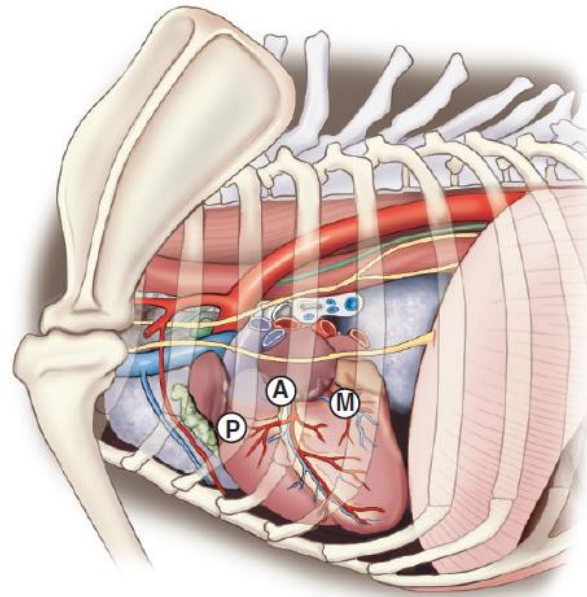


FIGURE 4.7-1 Location of heart valves on auscultation of the left side of the thorax in a dog or cat. A, aortic valve; M, mitral valve; P, pulmonic valve.

Cats

Mitral valve: Heard on the left side, usually at the 5th to 6th intercostal space near the sternum.

Aortic valve: On the left side at the 2nd to 3rd intercostal space, just above the costochondral junction, similar to dogs but slightly more cranial.

Pulmonic valve: Left side, 2nd to 3rd intercostal space, about one-third of the way up from the sternum.

Tricuspid valve: Right side, 4th to 5th intercostal space near the sternum

Summary Table of Valve Sound Locations

Valve	Dog Location	Cat Location
Mitral	Left apex, 5th ICS near costochondral junction	Left side, 5th–6th ICS near sternum
Aortic	Left base, 4th ICS just above costochondral junction	Left base, 2nd–3rd ICS above costochondral junction
Pulmonic	Left base, 2nd–4th ICS just above sternum	Left base, 2nd–3rd ICS, ~1/3 up from sternum
Tricuspid	Right hemithorax, 3rd–5th ICS near costochondral junction	Right side, 4th–5th ICS near sternum

Dogs	8.4–10.5
Cats	6.7 - 8.1

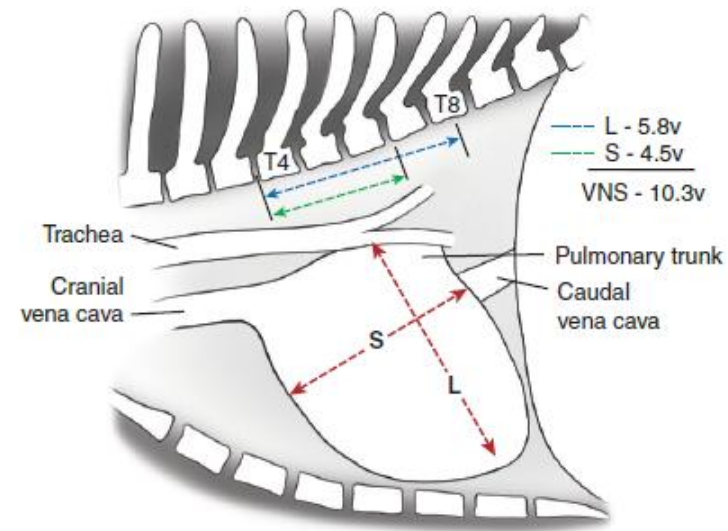


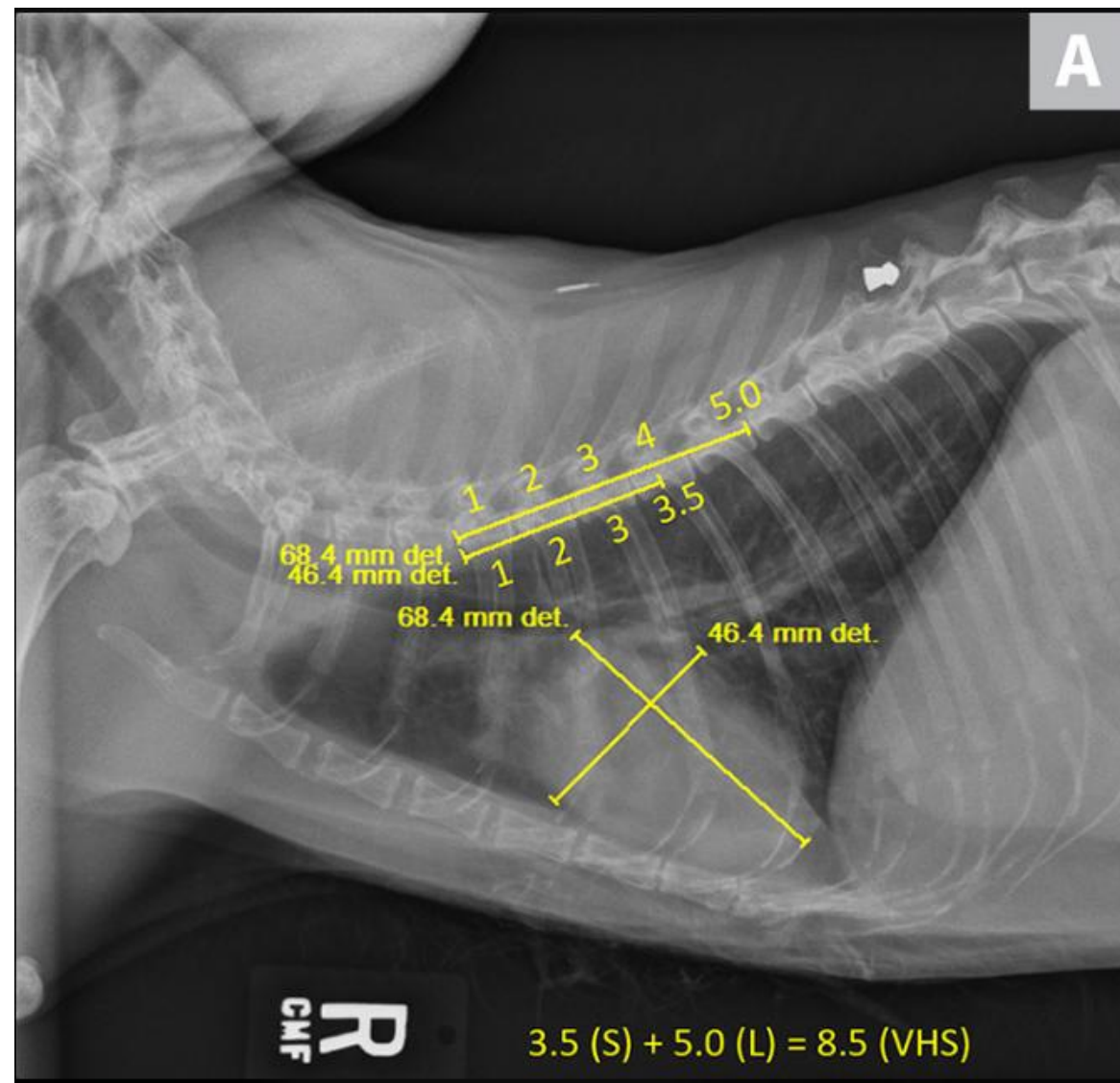
FIGURE 4.4-6 Measurement of vertebral-heart size (VHS) in dogs and cats. Key: *L*, long axis of the heart; *S*, short axis of the heart; *T4*, body of the 4th thoracic vertebra.

Dogs:

VHS > 11 suggests cardiomegaly; ≥ 11.5 indicates advanced disease (e.g., mitral valve disease).

Cats:

VHS > 8.0 may indicate cardiac enlargement.



Thoracic Surgical Approaches

Intercostal (lateral) thoracotomy and median sternotomy are the two most common surgical approaches. Intercostal thoracotomy is used for localized lesions but limits access to one hemithorax. Surgical access to the lungs in cats can be achieved via intercostal thoracotomy for lobectomy or pneumonectomy.

Median sternotomy provides access to both hemithoraces and is preferred for large masses or bilateral disease.

Transdiaphragmatic thoracotomy is another approach, depending on the target organ and disease location.

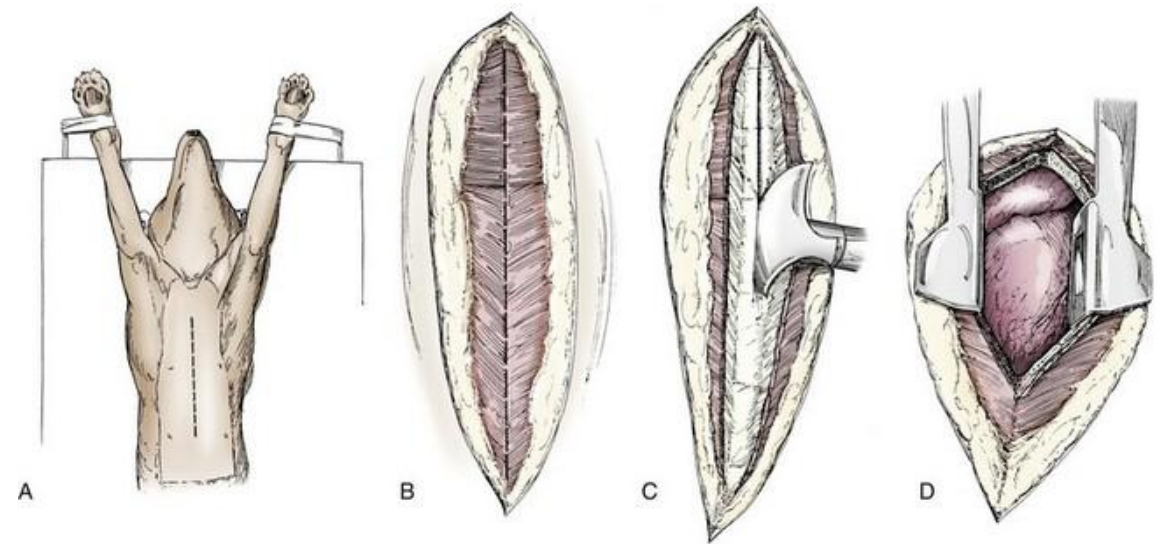
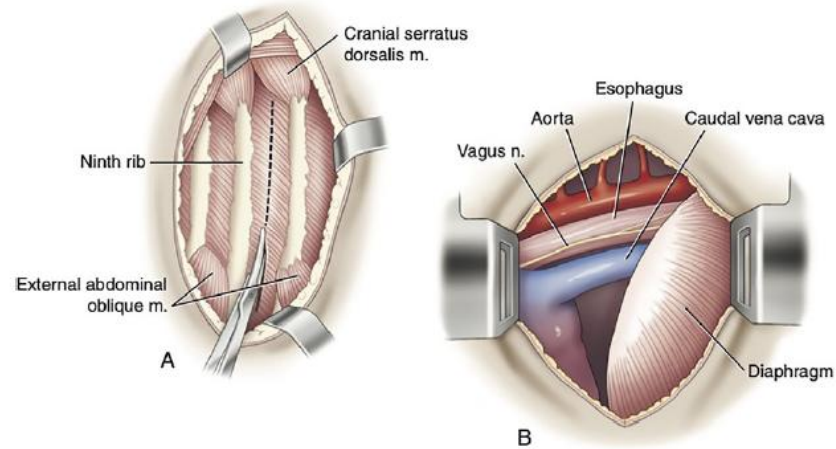


FIGURE 4.8-3 Approach to the caudal esophagus through a left lateral thoracotomy. The aorta is dorsal to the esophagus at this level of the thorax.

In dogs, esophageal foreign bodies are most commonly bones, but rawhides, other chew treats, sticks, fishhooks, and small toys have also been reported. In cats, needles (often with thread attached), trichobezoars (hair balls), and string are most common. Surgery is indicated in cases of suspected perforation, when the foreign body is immovable, or if esophageal wall necrosis is found upon endoscopy after foreign body retrieval.

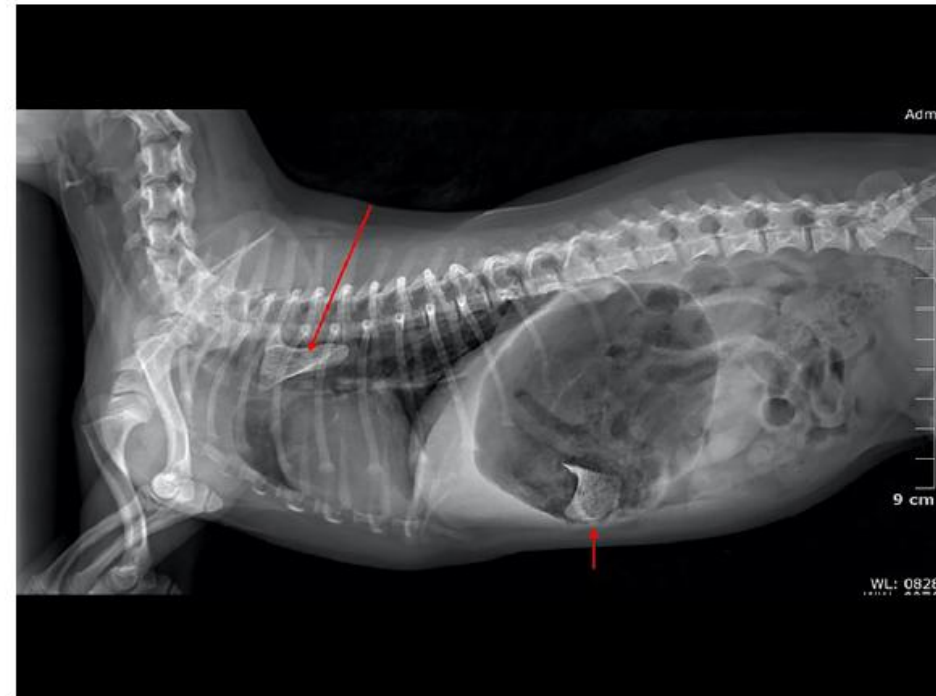


FIGURE 4.8-1 A foreign body (bone) is visible in the thoracic esophagus dorsal to the heart base (*long red arrow*). Note the gastric dilation and the presence of an additional bone foreign body in the stomach (*short red arrow*).