

**THE RADIOGRAPHIC NEWSLETTER FOR SMALL ANIMAL PRACTITIONERS**  
*..... written by vets for vets*

**SMALL  
ANIMAL**

## THE VASCULAR PATTERN

Pulmonary vessels are assessed for size, nature and direction. The pulmonary artery and vein should be equal in size. The diameter of the cranial lobar vessels should be no greater than  $\frac{3}{4}$  of the width of the proximal third of the fourth rib and the caudal lobar vessels should be no wider than the ninth rib where they cross. The vessels taper gradually as they extend towards the periphery of the lung. The cranial lobar vessels extend cranio-ventrally, the middle lobar vessels extend laterally and ventrally and the caudal vessels extend caudally and dorsally. Enlargement of the pulmonary artery, the pulmonary vein or

both, leads to an **increased** vascular pattern. Reduction in size leads to a **decreased** vascular pattern.

### Increased vascular pattern

An increased vascular pattern may be seen as enlargement of the pulmonary artery, the pulmonary veins or both. The causes of this type of pattern are varied. Enlargement of the pulmonary artery may be found with heartworm infestation and may be accompanied by pruning or loss of the normal tapered appearance of the vessels. *Dirofilaria* is only seen in the U.K. in dogs which have been imported but *Angiostrongylus vasorum* infestation may be seen in dogs in certain regions of Britain and Ireland. Other causes of arterial enlargement include any event or process which will produce arterial hypertension such as for example, pulmonary thromboembolism.

Enlargement of the pulmonary veins may be found with left sided heart failure and may be accompanied by pulmonary oedema.

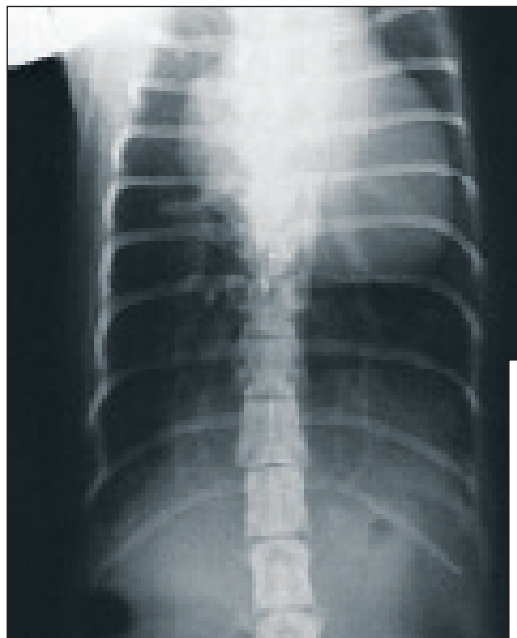


Fig. 1a

### The Dorsoventral Projection

This dorsoventral projection of a young cat with a left to right shunting ventricular septal defect (VSD) demonstrates the enlargement of the caudal lobar arteries and veins. These are fairly equal in size and both are greater than the ninth rib where they cross. Tortuosity of the vessels is also seen and this is especially notable in the right caudal pulmonary artery. There is cardiomegaly.

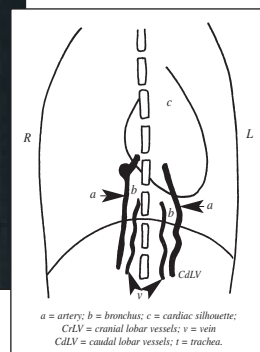


Diagram 1a

**An increased vascular pattern - dorsoventral projection.** The dorsoventral projection shows the tortuosity of the caudal pulmonary vessels. Both the arteries and the veins are enlarged.

Enlargement of both the pulmonary artery and pulmonary vein may be due to left to right shunting of blood such as may be found with patent ductus arteriosus (P.D.A.) or ventricular septal defect (V.S.D.). (Figs. 1a and 1b, Diagrams 1a and 1b).

In all of these the vessels appear enlarged and may be seen further into the periphery than is considered normal. They may appear tortuous.

Accompanying cardiac changes may also be seen.

**Decreased vascular pattern**

As decreased vascular pattern is usually the result of reduced cardiac output - commonly secondary to hypovolaemia e.g. due to shock, dehydration or hypoadrenocorticism (Addison disease). The decreased vascular pattern is usually the result of reduced cardiac output. Congenital right to left cardiac shunts may also produce smaller than normal vessels.

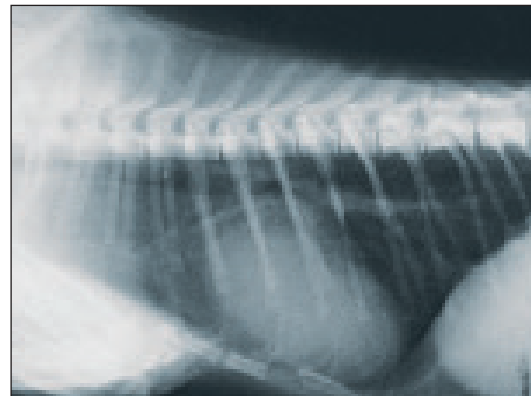


Fig. 1b

*The Lateral Projection*

The lateral projection of the same cat confirms the vascular enlargement. The artery and vein are equal in size and both are greater in diameter than the proximal third of the fourth rib. The superimposed caudal pulmonary vessels which are seen as a single linear soft tissue opacity extending caudodorsally are thicker and more prominent than usual. Vessels are seen extending to the periphery of the lung tissue. The heart shape is abnormal and there is cardiomegaly.

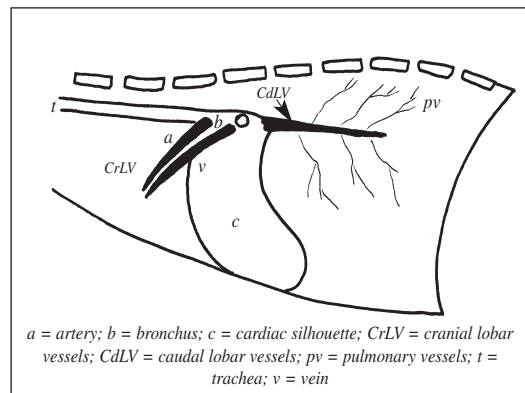


Diagram 1b

An increased vascular pattern - lateral projection. The caudal lobar vessels which are superimposed are more prominent than is normal. The cranial lobar vessels are greater than three quarters of the proximal third of the fourth rib in diameter.

The pulmonary vessels are smaller than usual and do not extend into the periphery of the lung. This creates the impression of hyperlucency of the lung tissue. Additionally the cardiac silhouette and the great vessels may be reduced in size. It is useful in these cases where the vessels are poorly seen to additionally view the radiograph using a bright light. This will allow faint vascular markings to be more easily identified if present. (Fig. 2 and Diagram 2).

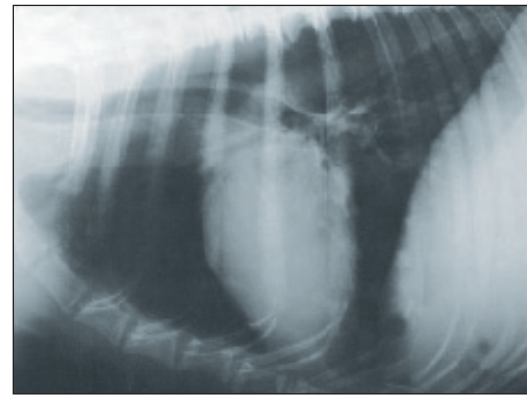


Fig. 2

*The Lateral Projection*

This lateral projection of an old dog with pulmonary metastases also shows a reduced vascular pattern. The cardiac silhouette is very triangular in shape and has a craniocaudal width of only 2 intercostal spaces. The pulmonary vessels are small (both arteries and veins) and the periphery of the lung appears radiolucent. The pulmonary metastases are seen as soft tissue nodules approximately 0.5cms in diameter at the 6th intercostal space.

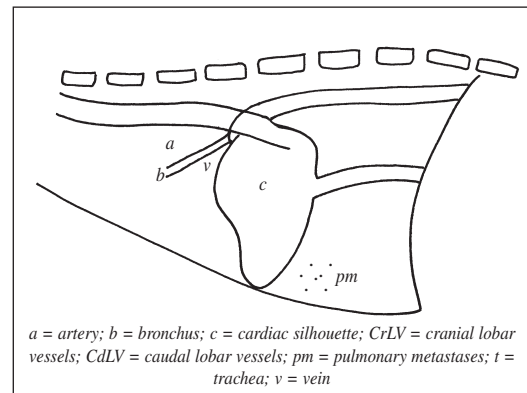
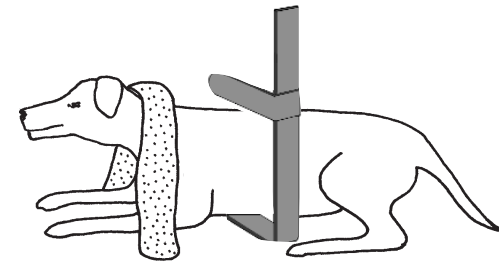


Diagram 2

An decreased vascular pattern - lateral projection. The pulmonary vessels are small in size and there is also microcardia. The cardiac silhouette is triangular. Pulmonary metastases are seen.

**CHEST AND ABDOMINAL X-RAY EXPOSURE WALL CHART AND MEASURE**



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developed with the help of Ruth Dennis MA VetMB DipECVDI DVR MRCVS (The Animal Health Trust).

For further information please contact:  
Celtic Vet - Tel: 0800 279 9050

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