

Diagnostic Thoracocentesis

Bernie Hansen DVM MS

North Carolina State University – College of Veterinary Medicine

Diagnostic thoracocentesis is indicated in any animal with increased respiratory effort (or signs of respiratory distress) and reduced breath sounds. This should be done BEFORE attempting to obtain thoracic radiographs. In contrast to abdominocentesis, a single attempt at aspiration with a small needle is a very sensitive test for pleural space disease. If air or fluid is discovered with this procedure in an animal with respiratory difficulty, you should immediately proceed to *therapeutic* thoracocentesis.

Materials needed:

3 ml syringe with a 22 ga 1” needle (25 ga 5/8” is OK for thin cats).

Procedure:

Position the animal in *whatever position it is most comfortable – do not stress it by forcing it to lie in lateral recumbency!* For most animals this will mean doing the procedure with the animal standing or in sternal recumbency. Try to avoid letting it sit during the procedure, as this will make it more difficult to identify landmarks.

If you suspect pneumothorax, you will want to aspirate the ‘highest’ accessible portion of the chest at around the 7th or 8th interspace. For an animal standing or in sternal recumbency, this will usually be at the junction of the dorsal and middle thirds of the chest wall at that interspace. Don’t go too high up – the muscles of the spinal system get too thick near the top. If the animal prefers to lie in lateral recumbency, aspirate at the ‘highest’ part of the chest at those same interspaces.

If you suspect that fluid is in the pleural space, go in at the junction of the middle and ventral thirds, near the costochondral junction. If for some reason an animal with pleural fluid seems to prefer to lie on its side, try to get it into sternal recumbency first, since fluid will gravitate to the lowest part of the chest.

If time permits, clip the hair and clean the skin at the proper location. However, if time is short, don’t worry about it – this procedure is similar to performing cystocentesis, and a stainless steel needle is unlikely to drag significant contamination through the skin.

For demonstration purposes, the figures here show a cadaver in lateral recumbency, with the hair clipped and each rib marked with an overlay of red ink.



Palpate the 13th rib, and then the 12th interspace immediately in front of it. 'Walk' your fingers cranially from one interspace to the next, counting 11-10-9-8-7 as you go, to identify the 7th and 8th interspaces.



Once you've identified the desired location, advance the needle through the skin. As soon as the needle enters the subcutaneous space, pull back on the plunger to apply 1-2 cc's of vacuum. You should be able to feel the plunger tugging against your fingers. Never release this vacuum as you advance the needle! You need it there to alert you the instant you enter the pleural space.





While maintaining a strong suction, advance the needle through the chest wall at the leading (cranial) edge of the rib behind it. The instant the needle enters the pleural cavity, you will either lose the vacuum (in the case of pneumothorax as shown here) or observe the entry of fluid into the needle barrel (in the case of pleural fluid accumulation).



Never advance the needle deeper than you think the pleural space is – your main goal is to avoid lacerating the lung in animals that in fact have no pleural space fluid or air. *Withdraw the needle* as soon as you get a positive tap (loss of vacuum or observation of fluid), and proceed to a *therapeutic tap*.

What if I can't tell how far to advance the needle?

This situation usually comes up in obese animals with a heavy layer of fat over the ribs. When you can't be sure how deeply to advance the needle, how can you tell if a negative tap is truly negative?

The answer to this dilemma is to use the rib as a depth gauge. In this case, identify the rib by deep palpation with your index finger, and carefully advance the needle onto the periosteal surface of the bone. Then, withdraw the needle a few mm's and direct it a bit more cranially to search for the leading edge of the rib. 'Walk' the needle off the leading edge in this fashion, until you identify exactly where the edge lies. Then, advance the needle into the pleural space (remember to maintain that vacuum!). In cats, the pleural space lies no further than 4-5 mm deeper than the rib and in dogs no further than 1-1.5 cm. Thus, if you advance the needle to that depth and still have a negative tap, you can be confident that it is a true negative.