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Pleural space disease is a frequent cause of respiratory distress in cats, and less common in dogs. Clinical signs include:

- Increased respiratory rate and effort, “restrictive” breathing pattern
- Dyspnea
- Cough may occur
- Dull or diminished lung sounds on auscultation
- Fever may occur
- Weight loss and lethargy

Clinical examination of any animal with respiratory difficulty should include auscultation of the thorax. Sometimes it is difficult to hear air movement in all or part of the lung fields. If lung sounds cannot be heard in one localized area of the chest, this suggests absence of air movement through one particular lung lobe, such as might occur with a consolidated lung lobe, neoplastic masses, or lung lobe torsion. If the sounds are dull all over the chest, one might consider pleural disease such as pleural effusion, pneumothorax, or diaphragmatic hernia. In some cases, a fluid line may be ausculted above which air movement can be easily heard, but below which the sounds are dull. Heart disease is an extremely important cause of dyspnea and pleural effusion in cats, therefore the heart should be carefully ausculted in each case. Although some cats with congestive heart failure have normal cardiac auscultation, most will have evidence of a murmur or an arrhythmia. Discovery of an abnormal sound on cardiac auscultation elevates heart failure on the list of differentials and provides the clinician with an important therapeutic direction.

**DIFFERENTIAL DIAGNOSES FOR PLEURAL SPACE DISEASE**

**Fluid (Pleural effusion)**
- pyothorax
- non-bacterial exudates eg FIP
- chylothorax
- hemothorax
- transudates (pure and modified) eg right heart failure
- neoplastic effusions
- lung lobe torsion

**Air (Pneumothorax)**
- traumatic pneumothorax
- spontaneous pneumothorax

**Soft tissue lesions**
- diaphragmatic hernia
- pleural neoplasia or mass
- lung lobe torsion

**THORACOCENTESIS**

Thoracocentesis should be performed in any animal that has evidence of pleural effusion on clinical examination or on a thoracic radiograph, and in any animal with a clinically significant pneumothorax that is affecting respiratory function. Thoracocentesis is a readily available and practical technique that is often of immense diagnostic as well as potentially life-saving therapeutic value, and in most cases no other technique or therapy can be substituted for its use. Since all fluids within the pleural cavity appear the same soft-tissue density radiographically, it is vital to obtain samples in order to reach a diagnosis. Large amounts of pleural fluid or air are likely to significantly impair respiration, so their removal can often be a life-saving procedure. In the case of an animal with pyothorax, drainage of even moderate amounts of purulent fluid may also be life-saving by minimizing the risk of sepsis. In an emergency when an animal presents in respiratory distress, obtaining radiographs may be time-consuming and stressful. In this instance, diagnostic and therapeutic thoracocentesis may be performed immediately to rule out a pneumothorax or pleural effusion, since this procedure is easy and may be life-saving. This is of particular importance if auscultation of the chest reveals dull or absent lung or heart sounds.

Sedation is not usually required in dogs, but some cats may require short-acting or reversible sedatives in order to carry out thoracocentesis. The dog or cat is restrained by one or two assistants in a sternal position if possible. It can be more difficult to perform a successful thoracocentesis if the animal is in lateral recumbency, since fluid will tend to drain downwards towards the dependent side. The usual site for thoracocentesis is the 7th or 8th intercostal space, which can be located by counting backwards from the 13th rib. If fluid is present in the pleural space, the needle is inserted low down, near the costochondral junction, to maximize the chance of obtaining a sample. If a pneumothorax is thought to be present, the needle should be inserted more dorsally in the intercostal space. The clinician should attempt to insert the needle cranial to the rib, since the intercostal blood vessels run caudal to the rib.
Once the site has been located, it should be clipped and scrubbed. The needle and extension tubing are attached to the 3-way stopcock and the syringe. The needle is then inserted perpendicular to the skin and advanced slowly through the intercostal muscles. Once the needle is in the intercostal muscles, an assistant can begin to create some negative pressure using the syringe. As soon as the needle passes through the pleura into the intercostal space, fluid will be seen within the tubing, and the needle should then be kept stationary as fluid is aspirated into the syringe. If a pneumothorax is present, when the needle penetrates the intercostal muscles the assistant will find the syringe filling with air. The needle should be kept stationary as long as fluid or air continue to be obtained. If a scraping or bumping sensation of the needle is felt, the needle should be withdrawn slightly. Eventually negative pressure will be reached and the needle can be removed. The same procedure may then be repeated on the other side of the chest.

In some patients, especially if fluid is loculated within the pleural cavity by fibrin tags and fibrous adhesions, it can be difficult to clear all of the fluid by aspirating from one site. These animals can be very frustrating to treat since multiple sites must then be used, either selected at random or using thoracic radiographs for guidance. In these cases, ultrasonographic guidance can be very helpful, by helping to locate fluid pockets within the chest.

Thoracocentesis is not a particularly stressful or painful procedure, but some animals in respiratory distress (especially cats) may object to the restraint that is required. If excessive struggling occurs in the dyspneic animal, this can be life-threatening. Sedation or anesthesia may be vital in this situation in order to allow thoracocentesis. If the clinician elects to use chemical restraint, respiration must be observed carefully, and ideally the animal should be intubated and ventilated with oxygen if it is anesthetized.

The incidence of complications with thoracocentesis is generally low, and primarily relates to damage by the needle within the thoracic cavity. Lacerations of lungs leading to pneumothorax, or coronary vessels leading to hemorrhage, may occur. This can be minimized by careful control of the needle tip, and by reducing struggling by the animal. Coagulopathies are a relative contraindication of thoracocentesis - but sometimes the procedure cannot be avoided, especially in the case of life-threatening pleural hemorrhage. Occasionally air may escape into the pleural cavity through the needle, but this usually leads to only minor pneumothorax.

**EMERGENCY MANAGEMENT OF ANIMALS WITH PLEURAL SPACE DISEASE**

- Provide oxygen supplementation
- Rest the patient and avoid stress
- Obtain vascular access if it does not induce too much stress
- Perform thoracocentesis, analyze fluid
- Thoracic radiographs if possible after thoracocentesis

**Fluid analysis:**
- Cell counts
- Cytology
- Aerobic and anaerobic culture
- Biochemical analysis if indicated (triglycerides)

**References available from the author on request**

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