Pleural Effusion

Pleural effusion is free fluid within the pleural cavity or the space between the chest wall and the heart and lungs. Generally, the fluid is categorized according to its protein and cellular content. The major categories are transudate, modified transudate (including neoplastic), exudate, hemorrhage (blood) and chyle. Each category has its own set of differential diagnoses or underlying causes that it suggests, with some over lap between.

Transudates are low in protein and cells. Modified transudates have slightly higher amounts of protein and somewhat higher cell counts. Truly pure transudates result from low blood protein (i.e. albumin/hypoalbuminemia) and a resultant low oncotic pressure within blood vessels. Oncotic pressure helps keep fluid within the blood vessels and when it decreases, fluid is forced out from the opposite pressure gradient. Other transudates can be caused by heart failure (right-sided in particular), herniation of abdominal organs through the diaphragm into the chest cavity and neoplasia/cancer within the chest cavity. Exudates are high in protein and white blood cells.

Exudates are subdivided into septic and non-septic. This refers to whether bacterial infection is causative or not, respectively. A septic exudate is termed “pyothorax,” meaning puss within the pleural cavity. The source of the bacterial infection in a pyothorax can be a penetrating chest wound, a ruptured lung abscess or unapparent. Cases with an unapparent source are called idiopathic. Idiopathic pyothorax most often affects kittens. Non-septic exudates can arise from neoplasia/cancer, Feline Infectious Peritonitis (FIP) viral infection, a torsed/twisted lung lobe and long-standing herniations through the diaphragm. FIP infection tends to cause a very characteristic thick, straw-colored, non-septic exudate.

Hemorrhagic or bloody effusions have a protein and cellular content similar to circulating blood. Hemorrhage into the pleural cavity can occur with trauma, bleeding/clotting disorders or rupture of a vascular neoplasm/tumor. Probably the most common cause of hemorrhagic pleural effusion that we see is ingestion of anticoagulant rat poisons (especially in dogs). These poisons inhibit normal blood clotting and so lead to bleeding into the chest cavity.

Finally, chylous effusions have a moderate protein content and a low to moderate cell count. They are typically white to blood-tinged and opaque. Chyle is the fluid that flows within lymphatic vessels from various tissues back to the heart, to re-mix with blood. The major lymphatic vessel in the chest cavity is the thoracic duct. Anything causing damage or leakiness of this vessel will cause a chylous effusion. Trauma that causes tearing of the duct and tumors affecting the integrity of the duct’s walls, for examples. In addition, back pressure from different heart diseases can cause chyle leakage. Perhaps the most common cause of chylous effusion is idiopathic/unapparent. Both dogs and cats of any age can be affected by an idiopathic chylous effusion.

Regardless of the type of effusion and the underlying cause, pleural effusions generally present the same. Owners usually find their pets suddenly in respiratory distress. Because the fluid is between the lungs and the chest wall, it prevents normal expansion of the lungs during inspiration/inhalation. Often the pet is taking rapid, shallow breaths. Other vague signs (such as lethargy, decreased appetite, exercise intolerance) may or may not have preceded the respiratory

distress. The general diagnosis of a pleural effusion is based on the clinical signs, muffled or absent heart and lung sounds when ausculting the chest, radiographic/x-ray findings and ultimately a chest tap. The tap is very important so that the fluid can be categorized and submitted for additional testing (such as a bacterial culture and sensitivity or cytologic analysis for tumor cells), if indicated. In addition, tapping is the main way to relieve respiratory distress and save the patient.

After the initial tapping to stabilize the patient, therapy revolves around oxygen supplementation, re-tapping when necessary, broad-spectrum antibiotic therapy (especially in pyothorax), IV fluids, control of bleeding disorders if present, possibly surgery for diaphragmatic hernias, thoracic duct rupture, lung lobe torsions etc. Obviously the treatment is tailored to the underlying cause, if one can be identified. A chest tube is often placed in patients that require repeated taps.

The prognosis for pleural effusions varies greatly based on the underlying cause and how severe the patient is affected when presented to the veterinarian. Some underlying causes are much more treatable than others. However, if the patient with a very treatable cause (for example anti-Vitamin K anticoagulant rat poison toxicity) presents without adequate tissue oxygenation for a prolonged period of time, treatment may not yield the expected results. The key to attaining the best prognosis possible is presentation to a veterinarian as soon as possible.

Pleural effusions, as with any type of respiratory compromise, are critical emergencies and must be treated rapidly and aggressively.