

Pulmonary Hypertension

Pulmonary hypertension is defined as high blood pressure within the vessels of the lungs. Primary pulmonary hypertension (meaning not resulting from another disease process) is rare in veterinary medicine and is diagnosed by ruling out all other causes of pulmonary hypertension.

Most common causes of pulmonary hypertension in dogs include:

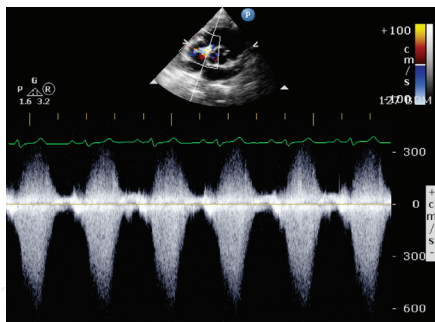
- Chronic lung disease and low blood oxygen concentration
 - Chronic bronchitis (COPD)
 - Pulmonary fibrosis (scarring of the lung tissue)
- Obstruction of the blood vessels
 - Pulmonary thromboembolism (PTE, blood clot to the lungs)

Typically dogs with PTEs have another disease process that predisposes them to spontaneously forming blood clots within the body. These processes most commonly include a recent history of major trauma, Cushing's disease, protein-losing intestinal or kidney disease, and cancer.
 - Heartworm disease

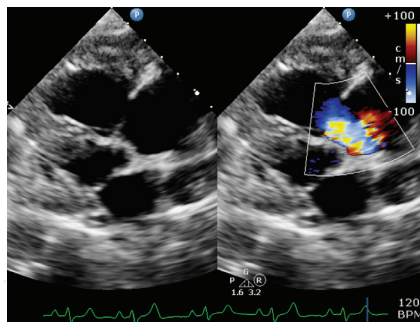
Obstruction by the worms themselves and reaction of the blood vessels to the worms' presence.
 - Cancer
- Long-standing left-sided heart disease and heart failure
 - Degenerative mitral valve disease
 - Dilated cardiomyopathy

Clinical signs and physical exam findings common in pulmonary hypertension patients:

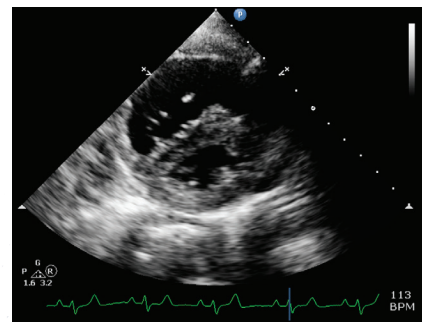
- Coughing
- Changes in breathing - increased respiratory rate and/or effort
- Exercise intolerance
- Fainting (syncope)
- Heart murmur
- Abnormal lung sounds (crackles +/- wheezes)
- Cyanosis of the tongue or mucous membranes (blue/purple color to the tongue or gums)
- Signs of right-sided congestive heart failure (most commonly free abdominal fluid)



The speed of the tricuspid valve leak can be used to estimate lung pressures.



Color-compare image showing severe right heart enlargement and moderate tricuspid regurgitation.



Short axis view of the ventricles showing severe right ventricular dilation and flattening of the septum.

Diagnosis

- An echocardiogram can be used to diagnose, assess the severity of, and monitor pulmonary hypertension. It can also be used to assess for secondary changes to the right side of the heart, the side of the heart that pumps blood to the lungs.

Treatment

The aim of therapy is to improve clinical signs and overall quality of life. The long-term prognosis is variable and dependent on our ability to treat and manage the underlying disease. Therapy may include:

- Theophylline (or other bronchodilators)
 - Medication to help open up the airways and strengthen the muscles of respiration.
 - Side effects may include pacing, panting, nervousness, hyperactivity, increased thirst/appetite, and vomiting/diarrhea. If noted, most will resolve with a dose reduction.
- Viagra (Sildenafil)
 - Medication to help directly lower the blood pressure inside of the lungs.
 - Side effects may include lethargy, decreased appetite, or nausea.
- Vetmedin (Pimobendan)
 - Medication to help improve heart muscle strength and also to help lower the blood pressure inside of the lungs.
 - Side effects may include lethargy, diarrhea, or decreased appetite.
- Antibiotics
 - With severe lung disease, a secondary pneumonia may complicate matters.
- Anti-platelet therapy with Aspirin, Clopidogrel (Plavix) and/or Heparin
 - Pulmonary hypertension can result in blood clots within the lungs. Anti-platelet therapy helps to prevent platelets from sticking together and forming a blood clot.

Determining the underlying cause of the pulmonary hypertension may improve the overall prognosis. Further diagnostic testing such as blood work, serial chest x-rays, abdominal ultrasound, coagulation testing, or advanced airway diagnostics may be recommended. Often, despite our best efforts, the cause of the pulmonary hypertension remains undiagnosed. CVCA's goal is an open collaboration with you and your family veterinarian in order to optimize the quantity and quality of your canine companion's life.



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