



EAST COAST VETERINARY CARDIOLOGY

Pulmonary Hypertension

Pulmonary hypertension is a somewhat common disease in animals characterized by high blood pressure in the blood vessels within the lungs. It is more often diagnosed in older, small breed dogs and is rarely diagnosed in the cat. There are many causes of pulmonary hypertension in veterinary patients. Pulmonary hypertension is generally classified as idiopathic or secondary to various disease processes. Idiopathic pulmonary hypertension typically occurs in young animals where they are born with abnormalities of their pulmonary arteries (malformation). This is rare in veterinary patients.

There are many diseases which can result in secondary pulmonary hypertension. In certain regions of North America, heartworm disease can be a common cause for pulmonary hypertension. This occurs because the heartworms live in the pulmonary arteries leading to damage and narrowing of these blood vessels. In these patients, treatment of their heartworm disease may reverse their pulmonary hypertension. The prevalence of heartworm disease in Atlantic Canada is low so this would be an uncommon cause for pulmonary hypertension in animals here, unless they travelled to an endemic area and were not up to date with heartworm prevention.

A more common cause for pulmonary hypertension in our location is secondary to left sided heart disease. This means any cardiac condition which affects the left side of the heart (such as mitral and aortic valve disease, dilated cardiomyopathy) can lead to pulmonary hypertension. This occurs because of high left sided heart pressures which back “upstream” to the lungs resulting in a reactive increase in pulmonary artery pressures. Pulmonary hypertension is also commonly noted secondary to pulmonary diseases which result in chronic hypoxia. Examples of pulmonary disease can include chronic lower airway disease, pulmonary fibrosis, pulmonary parasites and some pulmonary cancers. One of the last causes of secondary pulmonary hypertension in animals is thrombotic or embolic disease. This refers to blood clots that either form in the pulmonary arteries or move to the arteries (embolize). In a normal animal, clots should not form spontaneously. However, there are many diseases which predispose animals to spontaneous clot formation including immune mediated disease, cancers, protein losing diseases such as enteropathy or nephropathy, Cushing’s disease, sepsis or trauma. It is important to identify



the underlying cause of the pulmonary hypertension if possible. This is because treatment of the primary cause can in turn improve the severity of the pulmonary hypertension.

Ideally in affected patients, treatment is initiated both for the pulmonary hypertension directly as well as any precipitating causes. One of the primary drugs used is called sildenafil (Viagra) – this drug relaxes and dilates the pulmonary arteries and helps to improve the function of the right ventricle. Studies to date in dogs with pulmonary hypertension have shown that this treatment improves both clinical signs and improves survival in patients with pulmonary hypertension. Although Viagra used to be very expensive, in recent years the use of compounded sildenafil and generic sildenafil have made this treatment more affordable. Other adjunctive therapies include therapy for lower airway disease, treatments to reduce risk for clot formation, and therapy to manage heart failure if present. At-home oxygen therapy can also be helpful for some patients.

Prognosis for dogs with pulmonary hypertension is extremely variable – a recent study suggested survival times anywhere between 7 days to over 700 days after diagnosis. A study of 22 dogs with pulmonary hypertension treated with sildenafil revealed that if dogs survived the first week of therapy, the probability of survival to 3 months was 95%, to 6 months was 84% and to 12 months was 73%.

Affected animals can be at risk for right sided congestive heart failure (CHF) which is typically associated with free fluid retention in the abdominal or thoracic cavities. Prognosis for patients with right sided CHF is considered more guarded than those patients with pulmonary hypertension without CHF. Patients with significant pulmonary disease (such as fibrosis) also have more guarded long-term prognosis.

Clinical signs of animals with pulmonary hypertension can include exercise intolerance, trouble breathing (sometimes worse at night), coughing, fainting, lethargy, reduced appetite and abdominal distension. Diagnosis of pulmonary hypertension can be challenging as the clinical signs and physical examination findings are often similar to primary valvular heart disease in dogs. Therefore, echocardiography is the best non-invasive method to diagnosis pulmonary hypertension in veterinary patients. Echocardiography is warranted in any patient exhibiting signs typical of pulmonary hypertension and in those patients with acute development of a new heart murmur, especially in an older small breed dog.

Key Points

Pulmonary hypertension (PH) is a common disease diagnosed in older, small breed dogs.

PH generally occurs secondary to other diseases such as left sided heart disease, primary lung disease or conditions that result in blood clots.

Treatment is directed at the primary cause for the pulmonary hypertension as well as the pulmonary hypertension directly using sildenafil (Viagra).

Clinical signs of PH may include exercise intolerance, fainting with exertion, labored breathing, coughing, lethargy, poor appetite or abdominal distension.

Prognosis is variable and is dependent on how animals respond during the first week of treatment – animals who responded well generally had a higher probability of survival in the long term.

Patients with right sided CHF and/or significant pulmonary disease generally have a more guarded prognosis.

Diagnosis of PH in animals is generally through echocardiography. It is considered the gold standard non-invasive test for animals.

