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Chronic degenerative atrioventricular valvular disease, endocardiosis, chronic valvular fibrosis

Mitral valve disease, mitral valve degeneration, mitral valve insufficiency

Affected Animals:

Dogs. The disease is extremely rare in cats. Mitral valve disease more commonly affects middle-aged and older small-to-medium sized breeds. Breeds with a high prevalence of this disease include the cavalier King Charles spaniel, the Chihuahua, the miniature poodle, the miniature pinscher, fox terriers, Boston terriers, and miniature schnauzers. Males are 50 percent more likely than females to be affected. Cavalier King Charles spaniels may have symptoms at an earlier age than other breeds.

Overview:

Mitral valve disease is a serious heart condition caused by the abnormal function of the valve that separates the upper and lower chamber of the left side of the heart. Dogs with mitral valve disease typically have difficulty exercising and a cough that increases in frequency as the disease progresses towards congestive heart failure and pulmonary edema.

The heart is made up of four chambers: the left and the right atria and left and right ventricles. Each upper chamber, or atrium, is separated from a lower chamber, or ventricle, by an atrioventricular valve. The valve on the left side of the heart is called the mitral valve, and the valve on the right side is called the tricuspid valve. In a normal dog, the leaflets of each valve open to allow blood to move from the atria into the ventricles and then close completely when the heart pumps the blood out of the ventricles and into the blood vessels.

- 1 Right Atrium
- 2 Right Atrioventricular Valve (Tricuspid Valve)
- 3 Right Ventricle
- 4 Left Atrium
- 5 Left Atrioventricular Valve (Mitral Valve)
- 6 Left Ventricle
- 7 Papillary Muscle

8 Chordae Tendinae

9 Diseased Mitral Valve Leaflets

Mitral valve disease is caused by the accumulation of the plaque within the heart valve, although the cause of this plaque is unknown. The plaque results in the deformation of the valve leaflets and regurgitation of blood back into the atrium. This leakage in turn causes a decrease in blood flow from the heart. A valve that fails to close completely will allow blood to leak back into the atrium, resulting in a heart murmur.

In order to compensate for this deficiency, the heart dilates and the volume of blood pumped increases. This compensation allows a dog to remain free of symptoms for some time, but simultaneously worsens the disease, the eventual result of which is congestive heart failure.

Mitral valve disease is more common in middle-aged and older small-to-medium breeds. While the prognosis for dogs with mitral valve disease is poor, some dogs may be managed with medications for a period that varies from case to case. Dogs may live for years after manifesting symptoms of mitral valve disease.

Clinical Signs:

Dogs with mitral valve disease have a diminished capacity for exercise and a tendency to cough during exertion. As the heart disease progresses to pulmonary congestion and edema, the frequency of coughing and the resting respiration rate increase. The cough typically is worse at night, in the morning, and during exertion. Physical exam findings may include an audible heart murmur, an increased heart rate, and a decreased or weak pulse.

Symptoms:

See clinical signs.

Description:

The normal heart is made up of four chambers: the left and right atria and left and right ventricles. Each upper chamber, or atrium, is separated from a lower chamber, or ventricle, by an atrioventricular valve. The valve on the left side of the heart is called the mitral valve, and the valve on the right side is called the tricuspid valve. In the normal dog, the leaflets of each valve open to allow blood to move from the atria into the ventricles and then close completely when the heart pumps the blood out of the ventricles and into the blood vessels.

Mitral valve disease is caused by the accumulation of plaque within the heart valve. The plaque causes the valve to become thickened, shrunken, distorted, and hence unable to function properly. The muscles that control the valve, or chordae tendineae, may also become weak and thickened. This degeneration occurs only occasionally in the tricuspid valve.

The repeated leakage of blood through the distorted valve leaflets causes a secondary dilation of the left atrium and ventricle, which in turn causes the mitral valve opening to dilate as well, worsening the disease. Blood that leaks back into the atrium usually moves at a high velocity, and may cause fibrous lesions or scar tissue where it collides with the muscle wall. Because of these lesions, the atrial wall may become weak and susceptible to tears. A valve that fails to close completely will allow blood to leak back into the atrium, resulting in a heart murmur.

The dilation of the left side of the heart initially causes it to become strained by the increased volume of blood. This work overload causes changes in the heart that make it less effective at moving blood forward into the blood vessels. The body compensates for this deficiency by providing a larger volume of blood for the heart to pump, which in turn dilates the heart even further. In most dogs, these compensatory actions delay the onset of notable symptoms in the early stages of the disease.

However, the compensatory dilation of the atrium and ventricle continues to worsen the disease by further decreasing the amount of blood the heart can effectively move into the blood vessels. When the compensatory mechanisms are no longer able to provide for adequate cardiac function, congestive heart failure and pulmonary edema develop. Pulmonary edema is an accumulation of fluid within the lung tissues that greatly impairs the animal's ability to breathe. In the late stages of the illness, the heart muscle's ability to contract is diminished, further decreasing the amount of blood that moves out of the heart.

Although mitral valve disease typically advances slowly, there are complicating factors that may acutely exacerbate symptoms. Such complications include heart arrhythmias, rupture of the chordae tendineae, a high sodium diet, and atrial muscle tears. Any cause of an increased workload for the heart, such as anemia, exercise, high blood pressure, or other organ failure, also can cause severe complications. Episodes of acute dysfunction usually require emergency treatment.

The cause of mitral valve disease is not well understood, but a genetic predisposition is suspected in certain small breeds of dog. The disease typically affects dogs that are middle-aged to older. Although there is no cure for valvular degeneration, there are medications available that can improve the function of the heart and relieve some of the symptoms of heart failure in order to allow the dog a more comfortable life.

Diagnosis:

Common diagnostic procedures for mitral valve disease include a CBC, or complete blood count, a serum chemistry panel, and urinalysis. X-rays of the chest are used to evaluate heart size and shape, and the status of lung fields. An electrocardiogram, or reading of the electrical impulses of the heart, may suggest heart enlargement and identify any arrhythmias that may be present. For a more accurate assessment of cardiac function and the severity of the disease, a dog may be referred to a veterinary cardiologist for an echocardiogram, or ultrasound examination of the heart.

Prognosis:

The prognosis for a dog with mitral valve disease is poor. However, some dogs may be managed with medications for a period that varies from case to case. The long-term prognosis depends on how early the disease is diagnosed and how an individual dog responds to medication. Some dogs may live as long as four years or more after first showing signs of heart disease. The prognosis for a dog in an acute crisis depends on the severity of its condition and the speed with which the animal is treated.

Transmission or Cause:

As an animal ages, its heart valves become thickened, distorted, and stiff due to the accumulation of polysaccharides, or complex carbohydrates. The abnormal functioning of the valves results in the regurgitation of blood back through the closed valve, increased pressure within the atria of the heart, decreased blood pumped out of the heart, activation of compensatory mechanisms, and congestive heart failure. The resulting volume overload within the heart leads to dilation of the ventricles and impaired ventricular function. All of these problems worsen and lead to even further dysfunction of the heart. It is also possible for the atria to tear, resulting in acute symptoms such as weakness and acute collapse.

Treatment:

Valvular replacement surgery is not usually an option for dogs, as it is for humans with mitral valve disease. Consequently, veterinarians usually prescribe medications to reduce the symptoms of heart disease and improve the function of the dog's ailing heart. But even with long-term treatment, most dogs will require frequent reassessment of their illness and periodic adjustments to their medication regimen. Acute destabilization can cause severe symptoms, but often these may be treated successfully with aggressive techniques.

Common treatment regimens include a lower sodium diet, which may become increasingly restrictive as the disease progresses. Exercise is restricted until symptoms of heart failure are controlled, and then only mild to moderately intense activity is recommended.

There are numerous medications available to treat heart abnormalities. Typically, dogs with congestive heart failure secondary to mitral valve disease are treated with multiple drug types simultaneously in order to improve the forward movement of blood flow, decrease the backflow of blood into the atrium, and moderate the compensatory mechanisms. These medications include diuretics, such as Lasix, which promote urine formation and excretion and thereby decrease the amount of excess fluid in the body. The veterinarian may also prescribe drugs that dilate the blood vessels in order to prevent high blood pressure. These include enalapril, an angiotensin-converting enzyme inhibitor, as well as other specific arteriolar and venous dilating drugs. Medications called positive inotropic agents, such as digoxin, may also be prescribed to promote the heart muscle's ability to contract.

The examining veterinarian or veterinary cardiologist will determine the appropriate time to start medical therapy, as well as what drugs are necessary for the individual patient. Because this heart condition is progressive, patients will require frequent reassessment in order to appropriately adjust the treatment as the disease worsens. A dog with heart failure will require long-term medication.

Animals that have an acute episode of congestive heart failure and pulmonary edema will require more aggressive types of therapy in order to be stabilized. In such cases, a veterinarian will prescribe cage rest and the avoidance of stress and anxiety, and diagnostic procedures should be kept at a minimum until the animal is stabilized. The dog may be given oxygen in order to reduce the load on its heart and lungs. In some cases, free fluid will accumulate around the lungs of a dog with congestive heart failure, limiting the space in which the lungs can expand. This fluid can be removed by means of a procedure called a thoracocentesis. High doses of fast-acting drugs may be administered in order to promote the improved functioning of the heart.

Prevention:

There are no preventive measures for mitral valve disease. Early detection and appropriate treatment of the disease may improve the prognosis.