Mitral Valve Disease in Dogs

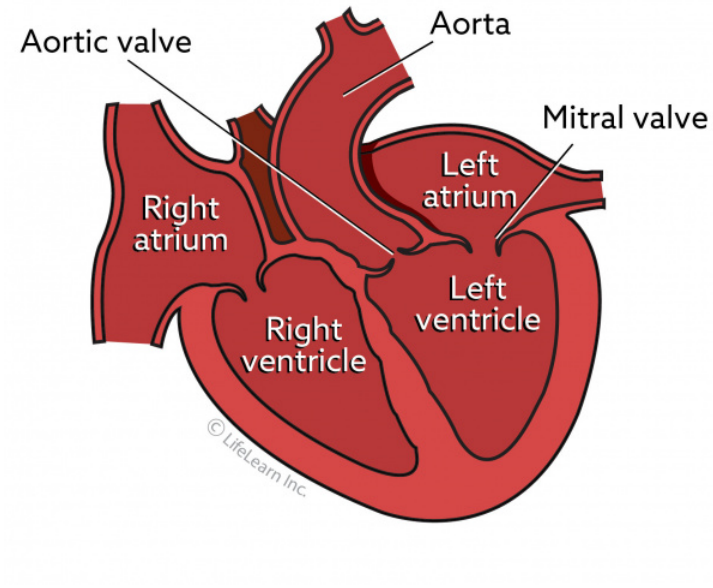
Print Article

By Malcolm Weir, DVM, MSc, MPH; Ryan Llera, BSc, DVM; Ernest Ward, DVM

What is the mitral valve?

The heart has four chambers. The upper chambers are called atria (the right atrium and left atrium) atria and the lower chambers are called **ventricles** (right ventricle and left ventricle). The heart is also divided into right and left sides.

> **"The valve between the left atrium and left ventricle is called the mitral valve."**



Each chamber of the heart has a one-way valve to keep blood from flowing backward. The valve between the left atrium and left ventricle is called the **mitral valve**.

How does blood flow through the heart?

Unoxygenated blood returns from the body to the heart by entering the right atrium and then is pumped into the right ventricle. The right ventricle pumps blood into the lungs where it picks up oxygen. Oxygenated blood flows from the lungs into the left atrium before flowing into the left ventricle. From the left ventricle, oxygen-rich blood is pumped throughout the body.

What causes mitral valve disease?

Mitral valve disease occurs when the valve undergoes a degenerative change, thickening and becoming floppier. The exact cause or causes of this degeneration are currently unknown; however, an inherited or genetic component is suspected in some breeds. Mitral valve disease is also known as mitral valve insufficiency (MVI) or mitral regurgitation and is often associated with a heart murmur. Other causes of mitral valve insufficiency include ruptured chordae tendinae, a condition in which the fibrous cords that hold the valve leaflets in position break, leading to the heart valve not closing properly.

How common is mitral valve disease?

Approximately one in ten dogs (10%) will develop some form of heart disease during their lifetime, and approximately 80% of the heart disease is due to mitral valve insufficiency. MVI is more common in small dogs than large breeds and occurs more often in males compared to females. Dogs predisposed to this

Initially, MVI is asymptomatic (produces no obvious clinical signs). As time progresses, the regurgitation can become more severe and as more blood flows back into the atrium, the heart's efficiency is reduced. Eventually, congestive heart failure develops. From the time a murmur develops, it may be a few months to several years until heart failure occurs.

A heart murmur does not mean that heart failure is imminent, but congestive heart failure can occur with time. Dogs with a heart murmur, however, do have an increased risk of sudden death.

When I took my dog for his annual health examination, my veterinarian told me he had a mitral murmur but said he was not going to treat it at this stage. Is this correct?

Veterinary cardiologists differ in when they recommend medical intervention for asymptomatic heart murmurs. As a result, they have developed a staging system for heart disease and heart failure which is useful for classifying the severity of disease and the appropriate time to treat. These range from Stage A (no apparent structural heart abnormalities, and no murmurs, but are at a high risk for developing heart disease, e.g., Cavalier King Charles Spaniels), to Stage D (clinical signs of heart failure that are non-responsive to standard therapy). Your dog's staging criteria is often used to determine when to start certain therapies.

How will I know if my dog has heart failure?

When the left side of the heart is not properly pumping blood, the blood slowly backs up in the lung vessels. This results in small amounts of fluid leaking out of the capillaries into the air passageways. This fluid collection produces the earliest signs of heart failure, which include gagging as if trying to clear the throat, a chronic, hacking cough, and lack of stamina (your dog will tire more easily on walks). Dogs with heart failure are usually sick, whereas dogs with heart murmurs may have few, if any, clinical signs until heart failure develops.

> **"The degree of clinical signs is directly related to the amount of decreased blood flow that is occurring."**

The degree of clinical signs is directly related to the amount of decreased blood flow that is occurring. This is why early diagnosis and treatment are essential in slowing the progression of heart failure.

What happens in congestive heart failure?

Congestive heart failure begins when the heart is unable to provide the tissues with adequate oxygen and nutrients. Without adequate oxygen, the body's cells become distressed and trigger a series of responses. Various hormones are released in an attempt to increase blood oxygen levels and blood circulation. These hormones conserve fluid in an effort to increase blood volume and the output of blood and oxygen by the heart. For several months, these compensatory responses help the situation and the dog has few observable clinical signs.

Eventually, the increased fluid retention becomes a detriment as more and more fluid leaks out of capillaries and into the lungs, abdomen, and other body tissues. Fluid in the lungs is called **pulmonary edema**, fluid below the skin is called **peripheral** or **limb edema**, and fluid in the abdomen is called **ascites**. When these are present, congestive heart failure is present. Left-sided congestive heart failure (LS-CHF) is generally associated with MVI and most commonly results in pulmonary edema and coughing. However, heart failure can progress to bilateral heart failure.

What tests are needed to diagnose heart valve disease?

There are several tests that provide valuable information while looking at different aspects of heart function.

Physical examination will determine if there are other symptoms or underlying conditions that may complicate or be affected by heart disease.

Blood and urine tests are performed to give an indication of any other disorders in the body. Liver and kidney function are often decreased in dogs with heart disease.

An **electrocardiogram (ECG)** may be performed to measure the electrical activity of the heart and allow accurate determination of both heart rate and rhythm. Any abnormal rhythms (arrhythmias or dysrhythmias) can be detected and evaluated. The presence of an abnormal heart rhythm helps your veterinarian determine the prognosis for your pet's condition.

Ultrasound examination (echocardiogram) utilizes sound waves to evaluate the heart's contractions and to measure the amount of blood pumped by the heart. This test is the most useful one to assess the heart's function, and serial (repeated) examinations are recommended to chart the progress of mitral valve disease and the response to treatment.

The combination of all of these tests gives the best evaluation of the dog and its heart function.

Is there treatment for a leaky mitral valve and heart failure?

A leaky heart valve can be replaced surgically in people. However, this is usually not feasible in dogs. There are several drugs and treatments that will improve heart function.

The choice of medication often depends on the stage of heart disease present (Stage A to D). These can include:

Diuretics (furosemide, spironolactone). These are drugs that stimulate the kidneys to remove excess fluid from the body. Furosemide and spironolactone are the most commonly used diuretics in veterinary patients.

Inotropes. These are drugs that are used to help improve heart muscle strength and they also lower the pressure in the arteries and veins. Pimobendan is more often used in advanced stages of heart failure but is now often recommended in earlier stages of mitral valve disease as it could slow down the progression. More research is being done in this area as this is still of some debate.

Angiotensin converting enzyme (ACE) inhibitors. ACE-inhibitors work by lowering blood pressure and reducing the afterload or resistance to blood flowing out of the heart. Enalapril and benazepril are commonly used ACE-inhibitors in dogs.

Cardiac glycosides. Digoxin is the most common drug of this type used in veterinary medicine. It is most often used for rhythm disturbances such as atrial fibrillation. Digoxin can have several potentially harmful side effects and must be carefully monitored and regulated.

Additional medications are available for treatment of congestive heart failure, and may be recommended for other heart concerns as they arise. Examples of this are sildenafil for pulmonary hypertension, or other diuretic medications.

Low salt diet. Dietary salt restriction may help prevent retention of excessive fluid in the body. Several low-salt or low sodium veterinary prescription diets are available. Avoidance of high-salt treats is particularly important in dogs with MVI.

Not all of these treatments are used in an individual case of heart failure. The results of the various tests will determine which ones are appropriate for your pet's condition. Your veterinarian will choose the appropriate medication(s) for your dog.

Is it expensive to treat MVI with heart failure?

Most dogs diagnosed with heart failure will require treatment for the rest of their lives. Treatment is tailored according to each patient's needs and many of the drugs and follow-up tests are relatively inexpensive and effective.

Some drugs are more expensive but are more effective at improving the quality of life and generally have fewer side effects. Your veterinarian will design a treatment plan that best meets your pet's unique needs.

How much longer will my dog live?

There are many factors that must be considered before that question can be answered. The results of the diagnostic tests are important and your pet's response to treatment is another indicator. If a favorable response does not occur within a few days, especially in more advanced cases, the prognosis is not good. However, most dogs that stabilize quickly will live a good quality of life that with treatment, is extended for many months or a few years.

Keywords

Medical Conditions | Pet Services