

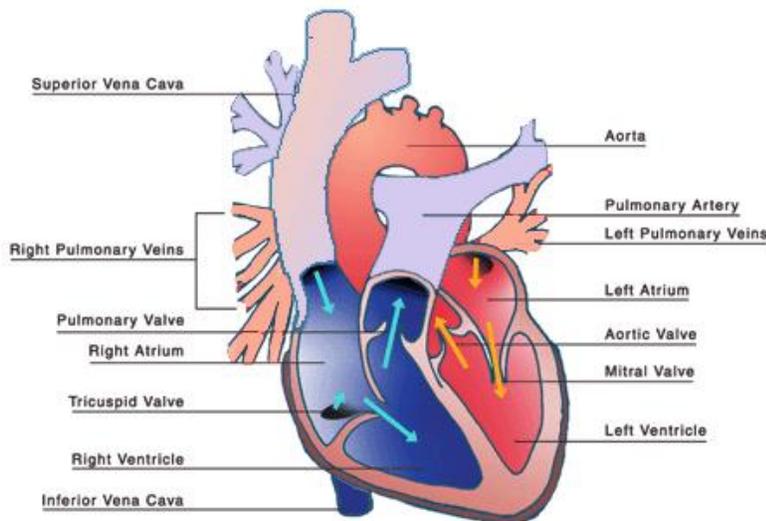


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## HEART MURMURS AND MITRAL VALVE DISEASE.

### ***What is the mitral valve?***



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

Unxygenated blood flows from the body into the right atrium. It is stored there briefly and then pumped into the right ventricle. The right ventricle pumps blood into the lungs where it receives oxygen. It flows from the lungs into the left atrium where it is held before flowing into the left ventricle. The left ventricle is

surrounded by the largest and strongest of the heart muscles. This large muscle is necessary to pump blood throughout the body.

Each side of the heart has a one-way valve to keep blood from going backward from the ventricles to the atria. The valve between the left atrium and left ventricle is called the mitral valve. Because of the high pressure created when the left ventricle contracts, the mitral valve will begin to leak or “wear out” in many dogs. This is known as mitral valve insufficiency and is often associated with a heart murmur.

### ***What is a heart murmur?***

The earliest sign of a leaking valve is a heart murmur. This is produced by the turbulence created when some of the blood goes backward through the leaking valve back into the heart chamber. With a diseased mitral valve, the blood goes backwards from the left ventricle back into the left atrium. This produces the characteristic murmur, heard most prominently on the left side of the chest.

### ***How common is mitral valve disease?***

Approximately 10% of older small-breed dogs have mitral valve disease. In some breeds, most notably the Cavalier King Charles Spaniel, the incidence is much higher.

### ***How is mitral valve disease diagnosed?***

The first and simplest test is **Auscultation** which is listening with a stethoscope. This allows us to identify murmurs. In addition, we can detect abnormal heart rhythms and evaluate lung sounds.

In most cases, a veterinarian will presumptively diagnose MVD based on three things.

- Older age
- Small breed
- Left sided murmur.

This diagnosis is often a surprise to the owner, with the pet showing no clinical signs, especially while the disease is mild. It is only when the disease progresses to the point of congestive heart failure (CHF) that a problem may become clinically apparent.

With a presumptive diagnosis of MVD, **Chest X-rays** should be performed. This allows us to examine the lungs and measure the size and shape of the heart; information which is essential to staging, treatment and prognosis of MVD.

### ***What other testing may be recommended?***

In some cases, especially if there is some doubt about the diagnosis or it appears more complicated than usual, an **echocardiogram** is recommended. This ultrasound of the heart gives the most accurate determination of each heart chamber's size and the thickness of the heart walls. Measurements of the heart contractions can be taken to evaluate the heart's pumping efficiency.

If an abnormal rhythm is detected during auscultation, an **electrocardiogram (ECG)** may be needed. This is an assessment based on the electrical activity of the heart. It allows us to accurately determine heart rate and to diagnose any abnormal rhythms.

**Blood and urine tests** may be recommended, especially for pets with other clinical signs or on medications. We are especially concerned about liver and kidney function because these organs are often impaired in heart disease.

### ***Staging of Mitral Valve Disease in Dogs***

**Stage A** - Dogs with no symptoms and no murmur, but are a breed which is known to have a genetic predisposition to mitral valve disease. This is most notably the Cavalier King Charles Spaniel.

**Stage B** - Dogs with no symptoms, but that have a heart murmur. This is further divided into two subcategories based on the appearance of the heart on X-Rays or ultrasound.

Stage B1 – The heart is normal sized on x-rays.

Stage B2 – The heart is enlarged on x-rays.

**Stage C** - Dogs with an elevated resting respiratory rate or other signs of congestive heart failure (CHF) as well as characteristic signs of CHF on x-rays.

**Stage D** - Dogs already on appropriate medications but still showing clinical signs of CHF.

### **What are the signs of congestive heart failure (CHF)?**

Congestive heart failure begins when the body is unable to provide the tissues with adequate oxygen. When the heart is not properly pumping blood, the blood moves more slowly through the lungs. This results in small amounts of fluid leaking out of the blood stream into the air passageways. This plugs the airways, making them less effective at transferring oxygen to the blood stream. Without adequate oxygen, the body's cells become desperate and trigger a series of responses. Various hormones are released in an attempt to correct the problem. These hormones conserve fluid in an effort to increase blood volume and the output of blood and oxygen by the heart. Initially, these responses help, but eventually the increased fluid retention becomes a detriment as more and more fluid leaks out of blood vessels and into the lungs, abdomen and other body tissues.

Fluid in the lungs is called *pulmonary edema*. This fluid collection produces the earliest signs of heart failure: increased breathing frequency, trouble breathing, gagging as if trying to clear the throat, a chronic, hacking cough, and lack of stamina.

### **What are the recommended treatments for MVD?**

Recommended treatment options for MVD are based on the stage of disease present. This is why x-rays are so important.

Stage A: No treatment is recommended. Annual re-evaluation of the heart is recommended.

Stage B1: If there is no evidence of any changes on x-rays, treatment is not necessary. Monitoring resting

respiratory rate and annual re-evaluation of the heart is recommended. Treating too early may simply

be a waste of money.

Stage B2: If there are changes to the shape or size of the heart on x-ray, it is recommended to start treatment with

pimobendan (Vetmedin®) to slow the progression of the MVD. It is also recommended to monitor the

resting respiratory rate and re-evaluate every 6 months.

Stage C: If there are signs of congestive heart failure starting, as well as changes to the heart and lungs on x-ray,

it is recommended to continue with the pimobendan and add a diuretic (furosemide) and possibly other

medications.

Stage D: In some cases, adjusting or adding medications may help to try to return a pet to stage C

### **Is surgery possible for a leaky valve?**

A leaky heart valve can be replaced surgically in people. However, this is usually not feasible in dogs. There are currently only centers in Japan, UK and France where this is being done in dogs with reasonable success. The cost, however, for a repair is around \$40,000 USD making it unaffordable for most dog owners.

### **More on treating MVD**

1. **Pimobendan (Vetmedin®)** is an enzyme blocker that improves contractility of the heart and dilates the blood vessels. Studies have shown this drug increases the average time that it takes for a heart with mitral valve disease to go into heart failure by 60% (more than a year).

This drug also benefits hearts that already have gone into heart failure

2. **Diuretics (such as Furosemide).** These drugs stimulate the kidneys to remove excess fluid from the lungs and body, helping with cough, shortness of breath and decreased stamina of CHF.
3. **Ace Inhibitors (such as benazepril).** These drugs dilate the arteries and veins of the body to permit better blood flow. This effect opens up circulation peripherally. (If you think of the circulation as a roadway system, this is like achieving less highway congestion by opening more side streets). Blood pressure drops to normal and the heart has less work. Benazepril is commonly given in conjunction with a diuretic like **furosemide**. In these cases, kidney parameters (BUN and creatinine) should be measured prior to starting benazepril and periodically thereafter.
4. **Low salt diet.** Dietary salt restriction prevents retention of excessive fluids. Avoiding high salt treats is important. Many people foods that dogs love are high salt including cheese, deli meats, chips etc. These snacks can cause a dog that has been well managed with drugs to develop CHF.
5. **Activity restriction.** Some exercise is good for the dog's well-being and quality of life. Avoid exercise that leads to excessive panting or weakness.

### ***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.

Dogs in stage B2, treated with pimobendan, on **average** are symptom free (ie do not progress to stage C) for almost 3 1/2 years (compared to those with no treatment the average time is about 2 years).

Those dogs that are in stage C have more variable results. If response does not occur within a few hours or days, the prognosis is not as good. However, most dogs that stabilize quickly when treated with pimobendan and a diuretic, live, on average approximately 9 months.