

Mitral Valve Disease

Mitral valve disease (MVD) is the most common cause of a heart murmur in dogs. Murmurs are often picked up at routine examinations such as vaccinations, before the dog shows any signs of illness.

What is mitral valve disease?

The mitral valve is one of four heart valves in the heart. The mitral valve is situated on the left side of the heart between the top (left atrium) and bottom (left ventricle) chambers. The valve regulates the one-way direction of blood flow from the top chamber through to the bottom chamber. When the valve is diseased, blood flows backwards through the valve into the top chamber. This causes turbulence and a resulting murmur.

Causes of mitral valve disease

The most common cause of mitral valve disease is by degeneration of the valve structure due to ageing and therefore occurs later in life. This is called myxomatous mitral valve disease (MMVD). The valves edges and related structures become thickened and distorted resulting in a small gap forming between the leaflets when the valve closes, allowing blood to leak through. As the disease progresses, more and more blood leaks through the damaged valves and the murmur becomes louder. This disease can also affect other valves in the heart to a lesser extent.

Another, less common cause, is when the valve leaflets fail to develop properly (congenital valve disease). The misshapen valve can affect the flow of blood through the valve and, like the degenerative form, can cause leakage backwards. This murmur is usually detected at a very young age.

What breeds are affected by mitral valve disease?

Mitral valve disease more commonly affects smaller breeds with Cavalier King Charles Spaniels being the most common represented breed. In some cases, the disease can also affect larger dogs. Most dogs are middle to older age and it can affect both males and females. Cats rarely have degenerative valve disease but can have congenital valve deformities.

How is mitral valve disease diagnosed?

Recent studies have suggested that dogs who have large hearts benefit from starting treatment earlier on and this may delay the onset of heart failure. If your vet detects a murmur, they may want to refer your pet to a cardiologist to assess the heart further:

- Routine blood tests can be run to assess the overall health of your pet and effects of medication.
- Pro BNP and troponin blood tests are biomarkers to diagnose and monitor your pet's heart disease
- Chest X-rays are used to look at the overall size of the heart and to assess the lungs for fluid or other diseases, especially if your pet is coughing.
- Ultrasound examination of the heart is the best way to detect the cause of the murmur and to look at the size and function of the heart.
- Blood pressure measurements help to assess the function of the heart and effects of the medication.
- An ECG is a test to look at the electrical activity of the heart and is used to document any arrhythmias detected.

Except for chest x-rays, all the tests are usually run without the need for sedation.

What are the consequences of mitral valve disease?

When the blood leaks backwards into the top chamber (left atrium), the chamber needs to increase in size to accommodate the extra blood. In the early stages of the disease, the heart can adapt to the changes without any problems and with very little enlargement. This process is slow and can occur over many years without any outward signs. As the leak worsens and the left atrium reaches a certain size, pressure starts to build up in the chamber. The higher pressure affects the ability of the blood to drain out of the lungs back into the heart. This in turn causes pressure (congestion) to build up in the blood vessels within the lungs, resulting in fluid leaking out into the surrounding lung tissue (pulmonary oedema). This causes signs of congestive heart failure. Furthermore, the increased backward leak reduces the amount of blood leaving the heart and this leads to lower blood pressure. The body tries to adapt to this by increasing salt and water retention by altering the hormone levels, which regulate their control. In the initial stages, these are beneficial but over time the excess levels become harmful. The extra fluid puts a strain on the heart and lungs and worsens the signs of heart failure.

What are the signs of congestive heart failure?

In the early adaptive stage, your pet may not show any signs of disease. As the adaptive mechanisms begin to fail, your pet may not be able to exercise as well as before and tires easily. They may also be lethargic. They may start coughing when lying down or during exercise. If the blood pressure drops too much your pet may have pale gums and collapse/faint or show signs of weakness. Depending on the amount of fluid in the lungs, your pet may have rapid shallow breathing, or in severe cases, the gums turn blue and pink fluid can be coughed up. They will show obvious signs of respiratory distress. This involves them not been able to get comfortable, stretch the neck out and hold the elbows away from the chest. This is a medical emergency and you should not delay seeing your vet.

How do you treat mitral valve disease?

No treatment is required in the very early stages of the disease when the heart is not enlarged. Once the heart starts to enlarge, studies have shown that *pimobendan* can delay the onset of heart failure for up to 15 months. There are many other medications, often used in combination, to help manage congestive heart failure. These include:

- Diuretic (*furosemide, torasemide*): - Stops fluid retention in the lungs and circulation.
- ACE inhibitors: reduce fluid and salt retention and makes it easier for heart to pump blood
- *Pimobendan*: improves the heart function and clinical signs and improves appetite
- *Spironolactone*: is a weak diuretic which is used mainly to reduce the remodelling and damage to the heart. It also conserves the potassium loss from other diuretics.
- *Antiarrhythmics*: may be used if there are any arrhythmias

It is important to note that medical management does not fix the damaged valves. In the latest development in veterinary medicine, some dogs are having open chest surgery to repair the heart valve. Although this procedure carries some risks and is very expensive and is performed in a very few places in the world, early indications suggest this is the best way to improve some long-term outcomes in certain cases. They currently recommend early intervention to improve outcome.

How long will my dog live?

Many animals may live a normal life span with no clinical signs of heart failure, whilst other animals develop signs later in life. Animals with significant signs will need to stay on medication for life and the outcome will depend on how well they respond to the therapy. Most dogs will tolerate medical management for a long time, but regular monitoring is essential to optimize the treatment. This will require regular blood tests and follow-up scans. You can monitor your pets sleeping respiratory rate and effort closely to look for signs of decompensation. Please refer to a separate sheet on how to measure respiratory rates.