

Heart Murmurs in Dogs

What is a heart murmur?

When we listen to your dog's heart, we are assessing the heart rate, heart rhythm and heart sounds. We can usually hear two heart sounds ('lub' 'dub') that are produced when the heart valves close. In some dogs, additional heart sounds can be heard. These are often heart murmurs, produced by vibrations caused by a disturbance in the blood flow through the heart. Heart murmurs are given a grade from 1 to 6 depending on how loud the murmur is.

What causes heart murmurs?

Puppies can be born with abnormal heart chambers ('holes in the heart'), abnormal heart valves or abnormal blood vessels near the heart, all of which may cause heart murmurs that can be heard from birth. Puppies can also have an 'innocent' murmur, which is a quiet murmur caused by rapid blood flow through the heart that usually resolves by 4-6 months old and are not clinically significant.

Adult dogs can develop a heart murmur later in life. There are three main possibilities in these cases:

1. There is no problem with the heart.
 - a. Some very athletic dogs can also have quiet murmurs that come and go due to rapid blood flow.
 - b. Dogs with anaemia may have a murmur as the blood flowing through the heart is thinner and more watery, which creates turbulence as it flows.
2. One or more of the heart valves are leaking.
 - a. The most common cause of this is endocardiosis, a progressive, degenerative, age-related thickening of the heart valves. This results in lack of a tight seal when the heart valves close so blood can flow backwards when the heart pumps. This is more likely in small to medium breed dogs like Cavalier King Charles Spaniels, but all breeds can be affected.
 - b. Much less commonly, endocarditis, infection of the heart valves, can cause a similar problem.
3. There may be a disease of the muscle that forms the wall of the heart.
 - a. The most common disease is known as dilated cardiomyopathy (DCM) where the heart muscle becomes thin and weak resulting in heart enlargement and poor pumping function. It more commonly affects large or giant breed dogs like Dobermans, Boxers and Great Danes. However, there are some cases linked to nutritional deficiencies such as taurine deficiency or associated with certain boutique or grain-free diets high in legumes, and these can occur in any breed.

What should we do if we hear a heart murmur?

If your dog has a heart murmur, we need consider further investigation to identify the cause of the murmur. This involves an ultrasound examination of the heart (echocardiogram, or heart scan) to evaluate the size, shape and structure of the heart and visualise the heart beating. This should enable us to tell the difference between an innocent murmur, leaky heart valves, and dilated cardiomyopathy. Blood pressure monitoring and an assessment of the electrical activity of the heart (electrocardiogram, or ECG) are performed alongside a heart scan. Sometimes additional tests are required; these include blood tests that assess for stretch or enlargement of the heart (proBNP), heart muscle damage (troponins) or taurine measurement. Chest xrays may be performed to check the size of the heart and health of the lungs. A 24-hour ECG (Holter monitor) may be needed if we are suspicious of an intermittently abnormal heart rhythm.

What does a heart scan involve?

A small patch of fur clipped on both sides of the chest just behind the elbows. The patient then needs to lie on their side on a special table with a hole cut out of it. Ultrasound gel is applied to the skin, and an ultrasound probe is used to perform the heart scan. To ensure your dog remains calm during the procedure and to encourage them to lie still, we often administer a light sedation to facilitate a heart scan. We may also utilise pre-visit calming medications to avoid any stress or anxiety caused by coming to the vets.

What if the murmur is caused by a leaky valve?

The most common cause of a leaky heart valve in dogs is endocardiosis, a progressive, degenerative, age-related thickening of the heart valves. This usually affects the mitral valve and/or the tricuspid valve and is also known as myxomatous mitral valve disease (MMVD). Dogs with endocardiosis will often live perfectly happily for months or years without any problems as the heart functions adequately enough to continue pumping blood around the body. However, as time goes on, the heart can start to enlarge as more blood is left behind in the heart after each beat, and blood is no longer effectively pumped around the body. Eventually, the heart may begin to fail, and fluid can leak out of the blood vessels into the lungs (and sometimes into the abdomen). This is called congestive heart failure. Dogs in congestive heart failure usually pant a lot or seem breathless, may have a soft cough, may be reluctant to exercise or to eat, and can even collapse or faint.

To decide how best to manage dogs with leaky heart valves, we classify them into stages:

Stage A

- Dogs with no heart murmur or symptoms of heart disease but are at risk of developing valvular heart disease in the future. These include Cavalier King Charles Spaniels, Chihuahuas, Shih Tzus, Yorkshire Terriers, Poodles, Whippets and other small cross breeds.
- No treatment is required but these dogs should have regular check-ups every 6-12 months so we can listen to their heart using a stethoscope and screen for the presence of a heart murmur.

Stage B1

- Dogs with a heart murmur but no heart enlargement on a heart scan and no symptoms of congestive heart failure.
- No treatment is required but these dogs should have a heart scan performed every 6-12 months to monitor for heart enlargement.

Stage B2

- Dogs with a heart murmur and heart enlargement but no symptoms of congestive heart failure.
- These dogs should begin treatment with a drug called pimobendan. Pimobendan increases the force of the heart contractions to improve the pump function of the heart, relaxes the blood vessels to reduce the workload of the heart and improves circulation. Research has shown that starting this group of dogs on pimobendan before they show any symptoms of congestive heart failure can delay the progression into stage C by approximately 18 months. This is 18 months of symptom-free life.
- Pimobendan is given twice daily, on an empty stomach, and will be continued for life.

Stage C

- Dogs with a heart murmur, heart enlargement and symptoms of congestive heart failure (breathlessness, crackly breathing, cough, lethargy, reduced appetite, weight loss, collapse).
- These dogs should undergo a heart scan or chest xray to confirm the presence of fluid in the lungs.
- Pimobendan should be continued. Additional medications are required including a diuretic (water tablet) to help clear the fluid from the lungs by increasing fluid excretion by the kidneys, and a combined tablet containing benazepril and spironolactone to help the heart to work effectively. These tablets are continued for life, but the doses may be adjusted depending on the response to treatment. The use of these medications needs to be monitored with regular blood tests to ensure the kidneys are not pushed to work too hard (resulting in kidney damage) and to check the salt levels remain appropriate.

Stage D

- Dogs with congestive heart failure that fail to respond to standard treatments.
- Additional medications or treatments are required on a case-by-case basis.

In humans, leaky heart valves can be replaced before they start to cause a problem. Surgical treatment options are also available for dogs, but they are performed very rarely due to the lack of specialist surgeons, potential risks and high costs. This means that most dogs live with a leaky heart valve for life. If you are interested in surgical treatment then more information can be found on the RVC website (<https://www.rvc.ac.uk/small-animal-vet/specialist-referrals/advanced-techniques/cardi thoracic-surgery/mitral-valve-disease>).

What if the murmur is caused by dilated cardiomyopathy?

Dilated cardiomyopathy (DCM) is most often seen in large breed dogs (particularly Dobermans), although it can occur in other breeds like Cocker Spaniels and Golden Retrievers. Many cases have a genetic (inherited) component to their development but there have been cases linked to certain diets including grain free/high legume diets (containing peas, lentils, potato or sweet potato), boutique diets containing unusual protein sources and diets that result in taurine deficiency. These cases can improve with a diet change and taurine supplementation.

Dogs with DCM have a thin and weak heart wall resulting in a heart murmur, heart enlargement and poor pumping function. This can lead to symptoms such as lethargy, weakness and collapse. These dogs can also develop abnormal heart rhythms which puts them at increased risk of sudden unexplained death. As the disease progresses, the heart will begin to tire, the pump function will fail and fluid will leak out of the blood vessels into the lungs and abdomen resulting in signs of congestive heart failure (breathlessness, inability to exercise, cough, poor appetite, weight loss, bloating and swollen limbs).

Many dogs with DCM will live for months to years without any symptoms. It is important to identify these individuals because we have good evidence in Dobermans that starting treatment with a drug called pimobendan before any symptoms appear, will delay the development symptoms and thus allow a longer period of normal life. We assume the same is true for other breeds. Screening for DCM in Dobermans involves performing a heart scan (or measuring proBNP on a blood test) and performing a Holter monitor yearly from 3 years old. If screening is not performed, we will suggest further investigation of any new heart murmur or irregular heart rhythm identified on physical examination.

Once a diagnosis is made, we recommend starting treatment with pimobendan. Pimobendan increases the force of the heart contractions to improve the pump function of the heart, relaxes the blood vessels to reduce the workload of the heart and improves circulation. It is given twice daily on an empty stomach for life.

If an abnormal heart rhythm is identified, we may need to start medications that stabilise the heart rhythm. These are monitored with blood tests and Holter monitoring.

If signs of congestive heart failure develop, additional medications are required including a diuretic (water tablet) to help clear the fluid from the lungs by increasing fluid excretion by the kidneys, and a combined tablet containing benazepril and spironolactone to help the heart to work effectively. These tablets are continued for life, but the doses may be adjusted depending on the response to treatment. The use of these medications needs to be monitored with regular blood tests to ensure the kidneys are not pushed to work too hard (resulting in kidney damage) and to check the salt levels remain appropriate.

How can I monitor my dog's progress at home?

Regular measurement of the breathing rate when resting or sleeping at home can help identify the onset of congestive heart failure and monitor the adequacy of the treatment for congestive heart failure. If the breathing rate is trending upwards or above a certain cut-off point (often 30 breaths per minute), we recommend you call us, as your dog will likely need reassessment. It is also very helpful if you can bring your breathing rate results to your regular health check appointment. To measure the resting or sleeping respiratory rate, choose a time when your dog is resting or sleeping peacefully and the room is not unusually warm. Count the number of times that your dog's chest rises in one minute. You can record this in a diary or using an app such as Cardalis.

Summary

Dogs with heart murmurs should have a heart scan every 6 months. If there are signs of heart enlargement on the scan, they should start treatment with pimobendan. If signs of heart failure develop, additional medication is required. Medication is continued life-long once started.