



**MALVERN
VET
HOSPITAL**



Malvern Veterinary Hospital
547 Dandenong Rd
Armadale, Vic. 3143
www.malvernveter.com.au
askthetvet@malvernveter.com.au

☎ 03 9509 7611

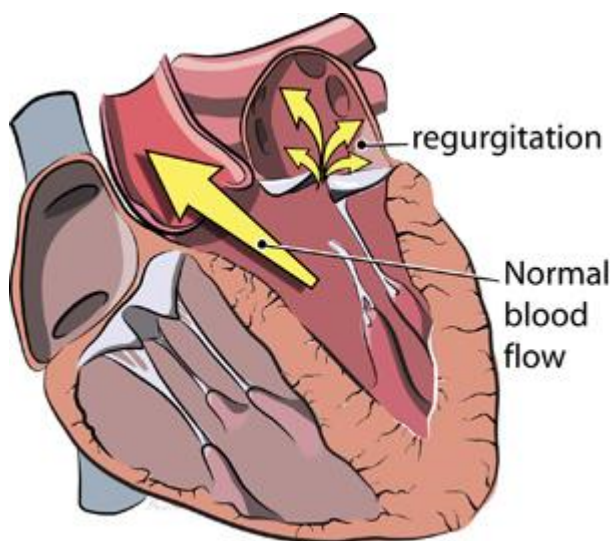
MITRAL VALVE DISEASE AND HEART FAILURE

What is the mitral valve?

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

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 a few seconds before going 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 to all parts of the body.

Each side of the heart has a 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 very large pressure created when the left ventricle contracts, the mitral valve wears out in many dogs. This wearing out process begins with a small leak that gradually gets more severe.



How common is mitral valve disease?

This is the most common cause of heart failure in small dogs. Large breeds have a lower incidence.

What are the consequences of a leaking mitral valve?

The earliest sign of a leaking mitral valve is a heart murmur. This is produced by the turbulence created when some of the blood goes backward through the leaking valve and into the left atrium. Many dogs develop a murmur from the mitral valve as early as 6 years of age. This problem is especially common in small breeds of dogs; most of them will have a murmur by 10 years of age.

However, a murmur does not mean that heart failure is imminent. As time goes on, the leak becomes more severe and more and more blood goes backwards into the atrium. This results in



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reduced pumping efficiency and, eventually, congestive heart failure. From the time a murmur develops, it may be a few months to several years before heart failure occurs.

How will I know if heart failure is present?

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 capillaries into the air spaces. This fluid collection produces the earliest signs of heart failure. The dog attempts to gag up fluid from the lungs (as if trying to clear the throat), a chronic, hacking cough, and lack of stamina when exercised.

One of the first things to change with heart failure is the sleeping breathing rate. This can be measured at home when your pet is asleep. Watch the chest rise and fall, 'in' and 'out' is counted as one breath. Normal dogs and cats take less than 30 breaths in 1 minute. If your pet's breathing rate is more than 30 breaths/min, a visit with the vet is recommended. This could indicate that medication is needed or a larger dose may be required for pets already on medication.

Does that mean that heart failure will occur soon?

Congestive heart failure begins when the body is not able to provide blood with adequate oxygen for the tissues. 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. For several months, these compensatory responses help the situation. However, eventually the increased fluid retention becomes detrimental. More fluid leaks out of capillaries causing increased gagging and coughing, reduced stamina, and increased fluid collection in the abdominal cavity and body tissues. Fluid in the lungs is called pulmonary oedema, fluid below the skin is called peripheral or limb oedema, and fluid in the abdomen is called ascites. When these are present, congestive heart failure is present.

What tests are done to assess the situation?

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

1. **Listening with a stethoscope (auscultation).** This valuable tool permits identification of murmurs, their location, and their intensity. It also allows us to hear lung sounds so that we can better understand what is happening within the lungs.
2. **Chest radiographs (x-rays).** The chest radiograph is useful for examining the lungs and for viewing the size and shape of the heart.
3. **Electrocardiogram (ECG).** This is an assessment of the electrical activity of the heart. It allows accurate determination of heart rate and rhythm. Arrhythmias (abnormal rhythms) can be detected and evaluated.



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4. **Ultrasound examination (Echocardiogram).** This test uses sound waves that bounce off the structures of the heart and are read on a TV-like monitor. It gives the best view of the size of each heart chamber, and can view the heart valves. This is a moving image so the contractions of the heart can be evaluated.
5. **Blood and urine tests.** These do not give direct information about heart function, but they allow detection of other disorders in the body that may have significance to heart function.

The combination of all of these tests give the best evaluation of the dog and its heart function. However, if cost considerations prohibit performing all of them, two or three will provide much valuable information.

Is there a 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 that will improve heart function, even in the presence of a leaky valve.

1. **Diuretics** (eg Frusemide/Flusapex or Spironolactone): These drugs stimulate the kidneys to remove excess fluid from the body. This helps to move excess fluid out of the lungs.
2. **Positive inotrope/vasodialator** (eg. Pimobendan/Vetmedin): This drug improves heart function in several ways; by stimulating the heart muscle contractions and by opening up blood vessels for better blood flow.
3. **Enzyme blockers/ACE inhibitors** (eg. Benazepril/Fortekor): These drugs block the compensation system which has become out of control.
4. **Oxygen:** In the vet clinic, 100% oxygen can assist breathing in short term emergency situations.

Not all of these drugs are used in each dog in heart failure. The results of the various tests will determine which ones are appropriate.

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 tests are important, and the response that occurs within the first few days is another indicator.

If response does not occur within a few hours to days, the prognosis is not good. However, most dogs that stabilise quickly will live for many months or a few years.

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