

# HEART DISEASE

## HOW DOES THE HEART WORK?

The heart is responsible for maintaining the circulation of blood within the body. It is a four chambered organ containing right and left atria (upper chambers) and ventricles (lower chambers). Deoxygenated blood returning from the body flows into the right atrium where it is stored very briefly before being pumped into the right ventricle. The ventricle then pumps this blood into the lungs where it picks up oxygen. From the lungs, oxygenated blood enters the left atrium then gets pumped into the left ventricle and from here is pumped out into the tissues of the body through the arteries. The left ventricle is surrounded by the largest and strongest of the heart muscles as it 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**. The valve on the right is called the **Tricuspid Valve**. In dogs, the most commonly affected valve is the mitral valve. For reasons we do not completely understand, these valves can become abnormally thickened and nodular over time. This impedes the ability of the valve to form a tight seal, resulting in a leak and then backward flow of blood between the heart chambers. This causes turbulence within the blood which can be heard as a murmur and is often detected in an otherwise healthy dog during a routine examination.

There are many names for this condition: Myxomatous mitral valve disease (MMVD), chronic degenerative valve disease, mitral valve insufficiency.

MMVD is the most common cause of heart disease (80%) in dogs and ultimately leads to congestive heart failure (CHF). Cavalier King Charles Spaniels, Miniature poodles, Cocker Spaniels, Miniature Schnauzers and terrier breeds are the most commonly affected but it can be seen in any breed. Cavalier King Charles Spaniels tend to develop MMVD earlier in life and with a faster progression than other small breed dogs.

## CLINICAL SIGNS:

### Left-sided:

When the heart contracts (or pumps) instead of the left ventricle pushing the blood into the systemic circulation, some leaks through the mitral valve back into the left atrium and then it backs up into the lungs. Fluid then seeps into the lung tissue resulting in **PULMONARY EDEMA**. This causes coughing and difficulty breathing. Left sided congestive heart failure is the most common form of CHF.

### **Right-sided:**

This causes poor venous return to the heart. When the heart contracts, instead of the right ventricle pushing the blood through the lungs for oxygenation, some leaks through the tricuspid valve back into the right atrium. This blood backs up into the systemic circulation causing fluid to accumulate within the liver tissue and the rest of the body. Once the liver is saturated, the liver capsule then leaks this fluid into the abdomen (this is called **ASCITES**) and this interferes with the function of the organs within the abdomen. Fluid may also leak from veins in the legs, causing swelling known as **PERIPHERAL EDEMA**.

Many dogs with CHF will tire more easily, have reduced stamina (exercise intolerance) and may not engage in playing or walking as they once did. Coughing when resting or sleeping, excessive panting, persistent loss of appetite, a swollen belly and pale or bluish gums are also signs commonly seen. These dogs will develop generalised weight loss and muscle wasting due to the effects of CHF on the other body systems.

### **How is heart disease diagnosed?**

**Auscultation** (listening) to the heart with a stethoscope is the first step in diagnosing heart disease. Heart murmurs are detected by auscultation; the murmur's location and intensity helps determine its significance. The heart rhythm is assessed and the pulse palpated to determine its strength and rhythm. The lungs are assessed as well, looking for evidence of changes associated with heart disease.

**Chest x-rays** are taken to evaluate the size and shape of the heart and look for lung changes such as the presence of fluid. This should be done every 6-12 months to monitor these changes.

**Blood and urine tests** are performed to give an indication of any other disorders in the body. Liver and kidney function are often impaired in patients with heart disease. Blood tests do not give direct information about the heart!

**An electrocardiogram (ECG)** measures the electrical activity of the heart and allows accurate determination of both heart rate and rhythm.

**Ultrasound examination (echocardiogram)** utilizes ultrasound waves to evaluate the heart. The size and thickness of each heart chamber can be evaluated, and the effectiveness of the heart's contractions can be directly observed. The valves can also be assessed, and the directionality of blood flow through the valves and chambers.

## My dog has a heart murmur, now what?

A heart murmur does not mean that congestive heart failure is imminent. As time goes on, the leak will become more severe as more and more blood goes backwards. This results eventually in CHF. Many dogs develop a murmur from the mitral valve as early as 6 years of age but from the time a murmur develops, in the severe case it may be a few months, but usually it is several years before CHF occurs. Each dog's condition will deteriorate at a variable rate which is why regular check ups and tests are required to help predict ongoing prognosis. At this time, there are no known drugs that will prevent or slow the progression of disease before CHF begins, we only have drugs to treat the clinical signs of CHF once they occur.

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. When these are present, congestive heart failure is present.

## 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 not feasible in dogs. There are several drugs that we can utilize to treat CHF.

1. **Diuretics:** There are 3 families of diuretics that we can use. These drugs stimulate the kidneys to remove excess fluid from the body, all three working in slightly different ways.
2. **ACE-inhibitors:** These drugs act to block the compensation system which has become out of control. They help reduce the blood volume overload, the blood pressure and ultimately the workload of the heart muscle which is already working beyond ideal capacity.
3. **Pimobendan:** is the newest drug available for treating CHF. It has a number of actions but mostly supports the heart muscle by opening the blood vessels within the muscle to allow better oxygen flow and by instructing the muscle to use energy in a better way and contract in a more effective manner.

4. **Specialised diets:** have also been developed to help control salt intake in particular and can be useful.

## **What should I watch for at home?**

It is important to become familiar with patient.entity.names normal resting breathing rate and effort. An increase in either of these is one of the first signs of fluid in the lungs and should be monitored regularly. When patient.entity.name is at rest, they should be taking less than 30 breaths in 1 minute. If you start a diary and record just twice weekly how many breaths per minute patient.entity.name is taking, you will become very aware of patient.entity.names condition. As a general rule, if you have consecutive counts above 30 you need to seek veterinary advice.

You can also monitor patient.entity.names exercise levels, appetite and urination habits as any small changes in one or more of these could be an indication of deterioration of patient.entity.names heart disease.

If you have any further questions about patient.entity.name, please do not hesitate to call us on 53811996.