



The American Ferret Association, Inc.

PO Box 554 ♦ Frederick, MD 21705-0554

1-888-FERRET-1 afa@ferret.org www.ferret.org

CARDIAC DISEASE IN THE FERRET

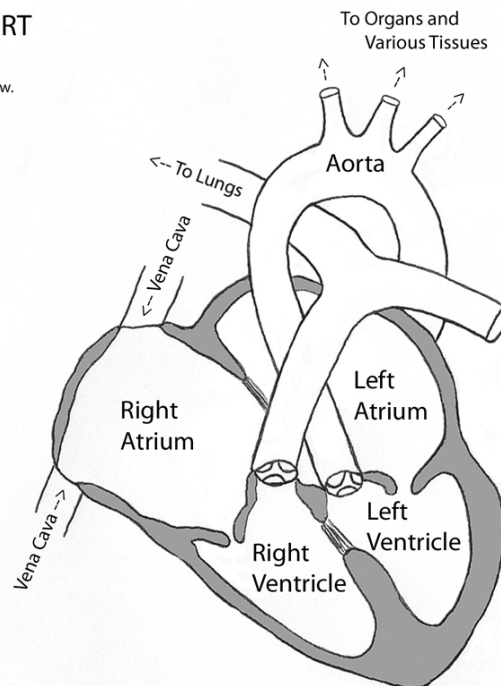
Katrina D. Ramsell, PhD, DVM

Cardiac (heart) disease is relatively common in many species, including pet ferrets. In ferrets, heart disease is usually associated with electrical disturbances, aberrations in the heart muscle (cardiomyopathy), and sometimes abnormalities of the heart valves. Heart problems arise less commonly from parasites (e.g. heartworm) and rarely from congenital defects.

Although the heart functions as one organ, the lungs separate the blood flow through the right and left sides of the heart. Valves partition each side of the heart into two chambers; other valves are located between the right side of the heart and the lungs, and between the left side of the heart and the aorta (the main vessel that directs blood from the heart to the rest of the body). The heart pumps freshly oxygenated blood from the left atrium to the left ventricle. Blood then travels to the rest of the body via the aorta. The aorta distributes blood into arteries, which feed into the various organs supplying the tissues with oxygen, glucose, electrolytes, hormones, etc. Next, the oxygen-depleted blood travels through veins to the vena cava, which returns blood to the heart. The right atrium is the first chamber in the heart to receive the oxygen-depleted blood, followed by the right ventricle. At this point, the blood goes into the lungs for re-oxygenation and then moves back into the left atrium (which is where we started).

THE HEART

*Arrows "-->" signify blood flow.



Normally, the electrical signals that keep the heart beating regularly originate in an area near the right atrium and travel through the heart to the ventricles (A-V). When there is damage to the electrical pathway, not all of the electrical signals complete their journey; this impairment is termed second-degree (A-V) heart block. Veterinarians may or may not treat this condition, depending upon the severity. If none of the electrical signals get to their destination, identified as complete or third-degree (A-V) heart block, a backup system kicks in: a ventricular pacemaker keeps the heart beating. However, this pacemaker runs at a much slower rate than the normal (A-V) pacemaker. Ferrets with complete heart block are often lethargic, have low exercise tolerance, and occasionally "pass out." This condition is not very common, and there are medications to help increase the ferret's heart rate and improve their quality of life. Ferrets with complete heart block generally have shortened life spans.

Cardiomyopathy is a disease of the heart muscle. There are two types of cardiomyopathy in ferrets: dilated cardiomyopathy (DCM) and hypertrophic cardiomyopathy (HCM); the former is much more common and occurs relatively frequently in middle-aged to older ferrets. A thin heart wall that is less able to contract properly characterizes DCM. This results in the dilation of the left (and/or right) ventricle(s), which causes a decrease in the effectiveness of blood movement through the heart and to other parts of the body. Over time, the heart begins to fail. In HCM, the heart muscle becomes very thick, leaving less room for blood in the left ventricle. Consequently, an increased pressure in the left ventricle arises, which leads to subsequent heart failure. Clinical signs associated with DCM and HCM are similar and include lethargy and difficulty breathing; a discussion of the clinical signs of heart failure is below.

A parasite (worm) that resides in the heart causes heartworm disease. Mosquitoes transmit the heartworm larvae into the bloodstream. Therefore, you can easily prevent heartworm disease with appropriate medications. Your veterinarian will recommend heartworm prevention in areas of the country where mosquitoes are more prevalent and heartworm disease is a problem. For instance, heartworm disease is not common in the northwestern states, but it can occur frequently in the southern states. Although your veterinarian can treat heartworm disease, the therapy can be difficult and dangerous; preventing the disease is unquestionably preferable.

Valvular heart disease is occurring more frequently, most often in middle-aged to older ferrets. If heart valves are "leaky," your veterinarian can hear blood "swishing" back up into the previous heart chamber with his/her stethoscope; this sound is a heart murmur. Valvular heart disease often leads to few, if any clinical signs. The severity of the "leakiness" dictates any necessary treatment.

Heart murmurs, heart arrhythmias (irregular rhythms), and an increased or decreased heart rate will lead your veterinarian to suspect heart disease. You may notice mild lethargy, exercise intolerance (increased episodes of "flat ferret"), and a decreased appetite in the early stages of the disease. As the disease progresses, you may hear coughing if the enlarged heart begins to press on the trachea. The disease is in advanced stages (heart failure) when fluid accumulates in the abdomen or chest, the ferret has difficulty breathing, and/or the gums turn blue. Middle-aged to older ferrets that appear to have respiratory difficulty frequently have underlying heart disease that has progressed to heart failure. It is important to be able to recognize the clinical signs of heart disease as it may help you extend and improve your ferret's quality of life.

When heart failure occurs, the blood will back up in the vessels and decrease flow to vital organs. Loss of normal blood flow to the kidneys encourages fluid to accumulate in the body, termed congestive heart failure. Right-sided heart failure can result in fluid accumulation in the abdomen, which leads to a "potbellied" appearance, swollen legs and feet, and an enlarged liver and/or spleen. Fluid in the abdomen can put pressure on the diaphragm, making breathing more difficult. Left-sided heart failure can cause fluid accumulation in and/or around the lungs.

A ferret in left-sided heart failure is unable to breathe in normal amounts of oxygen; fluid within the lungs reduces the space available for inhaled air, and/or the ferret has difficulty expanding the lungs due to the fluid pressure around the lungs. Decreased oxygen intake may result in low energy levels (lethargy and exercise intolerance), cyanotic (blue) gums, low body temperature, and weak pulses in the hind legs. Fluid can also accumulate in the sac surrounding the heart; this additional fluid pressure makes the heart work harder, which adds stress to the heart tissues.

Your veterinarian can obtain a definitive diagnosis for electrical disturbances, cardiomyopathy, heartworm disease, valvular disease, and subsequent heart failure with diagnostic tests, including radiographs (x-rays), electrocardiograms (ECG), and echocardiograms (ultrasound of the heart). Radiographs can show heart enlargement and fluid accumulation within the abdominal cavity and/or various compartments within the chest cavity. Electrocardiograms offer an illustration of the electrical impulses within the heart and thus, can demonstrate any electrical abnormalities. Echocardiograms show the heart in real-time; veterinarians can determine how well the heart is contracting and if there is thickness or thinness to the heart wall. Echocardiograms can also help veterinarians differentiate between heart disease and other diseases that can show similar clinical signs, such as lymphoma.

Veterinarians can manage heart disease with medications and sometimes a diet change; however, there are no cures for abnormal electrical signals, damaged heart muscle, and “leaky” valves. The goals of therapy include:

- reduced workload on the heart;
- increased blood flow, and subsequently, enhanced oxygenation to the muscles, tissues, and organs;
- improved contractility of the heart; and
- prevention of fluid accumulation.

There are medications designed to help achieve these goals, and once started, treatment is usually life-long. Ferrets with fluid in and around the lungs are effectively drowning and need relief immediately. Furosemide (e.g. Lasix®) can medically remove excess fluid from the body, but it is important that the ferret drinks well and remains hydrated while on this drug. A thoracocentesis (physical removal of the fluid from the chest) can be very helpful and greatly improve the ferret’s ability to breathe. Enalapril (e.g. Enacard®) reduces the workload on the heart; other drugs help control the rhythm of the ferret’s heart. Veterinarians use these medications together, often in conjunction with other heart medications not mentioned, or individually. Some of these drugs help achieve treatment goals in certain disease situations, but they can be devastating in other circumstances. For instance, enalapril can exacerbate third-degree heart block; ferrets with third-degree heart block usually have low blood pressure and enalapril reduces the blood pressure even further by dilating veins. When the blood pressure becomes too low, the ferret can lose consciousness (pass out). If heart failure in a ferret continues to progress and breathing is very difficult and labored despite medical therapy, you should consider euthanasia for humane reasons.

Among the several diseases that can affect the heart, clinical signs are variable and sometimes subtle, even just prior to a major crisis. Identifying a heart problem early may improve treatment results; therefore, it is important to take your ferret to your veterinarian for annual exams. If your veterinarian suspects heart disease, he/she will recommend appropriate diagnostics and may initiate medical therapy. Since ferrets with heart disease require careful monitoring, your veterinarian should re-examine these ferrets at least every six (6) months.