

## Cardiomyopathy – Dr. Bruce Williams

Cardiomyopathy is a common cause of heart disease in a number of companion animals, including dogs, cats, and as many owners and breeders know, our little friend, the ferret. The word cardiomyopathy comes from three Greek words meaning, literally, "a disease of the heart muscle", and that, unfortunately, sums up much of what we know of this disease.

The cause of cardiomyopathy in the ferret, as well as in the dog and the cat, is unknown. In humans, where cardiomyopathy was first diagnosed and has been studied most extensively, this is also largely the case, although some types of cardiomyopathy may occur as a result of pre-existing endocrine diseases, viral disease, toxicities (including alcoholism), and nutritional deficiency (Robbins, 1989). There is one cause of cardiomyopathy that has been elucidated in the cat, and although it has not been definitely linked in the ferret, may be of importance - taurine deficiency. (This is just another reason why you should make sure that your ferrets food includes taurine - make sure to check those labels on the bag of food.)

Cardiomyopathy in the ferret is an insidious disease - the majority of the damage to the heart occurs long before the owner ever realizes that the animal is ill. The general defect in all types of cardiomyopathy is the same - death of cardiac muscle fibers, which are then replaced with scar tissue. Scar tissue does not have the ability to conduct electrical impulse or to contract like heart muscle fibers can. As more and more myofibers are lost, the heart weakens and can no longer pump blood efficiently. This results in the two clinical findings which are the hallmark of diagnosis of heart disease in the ferret: a) an enlarged heart, and b) a "backing up" of the blood due to the weakened heart's inability to pump it effectively (resulting in a syndrome known as "congestive heart failure" - explained below.)

The hallmark of treatment of this type of heart disease is two-fold: you must first decrease the amount of fluid built up in abnormal locations, and second, increase the strength of contraction of the heart.

When the blood backs up in the ferret it may go to a number of places - it may back up into the abdomen, resulting in a swollen, fluid-filled belly. Additionally, it may back up into the space around the lungs or into the lungs themselves. If fluid backs up into the lungs, the ferret may initially show a soft cough. As the fluid buildup progresses, the cough may worsen, and the owner will generally notice a sharp decrease in the animal's energy. In the end stages of the disease, ferrets have marked difficulty in breathing, often as a combination of the fluid in the lungs and the fluid in the abdomen (which presses on the diaphragm, impeding the ferrets' breathing even further). This is what is known as congestive heart failure.

I have also seen cases of a different type of cardiomyopathy in a handful of ferrets, a type of cardiomyopathy which is also seen in cats and is known as "hypertrophic cardiomyopathy". In this disease, there is an overgrowth of fibers in the heart, which encroach upon the inside diameter of the heart, and in this manner, decrease the heart's effectiveness in pumping the blood presented to it. The clinical signs of this type of cardiomyopathy are identical to the congestive type which has already been discussed.

Diagnosis of the disease is difficult in the early stages, but becomes progressively easier as the disease goes along. All of the signs (enlarged heart, fluid in the abdomen or around the lungs) can be seen on a radiograph (or "x-ray"), and this is the primary method by which affected animals are diagnosed. Specialized tests, such as echocardiography, are available at some veterinary hospitals, and can help pinpoint cases earlier in the disease's progression.

We have discussed that cardiomyopathy is an insidious, progressive disease; there is no cure for cardiomyopathy, only treatment. The hallmark of treatment of this type of heart disease is two-fold: you must first decrease the amount of fluid built up in abnormal locations, and second, increase the strength of contraction of the heart. Diuretics are used to mobilize the excess fluid from the abdomen and lungs, and to keep the blood volume at a level which the weakened heart can pump it. Digitalis and related drugs help increase the strength of contraction of the remaining heart muscle to help it pump more effectively. In early cases, management of fluid volume with diuretics may be the only treatment necessary, with digitalis and like drugs held in reserve for the time when the heart becomes weaker.

However, not all animals respond well to treatment. Dr. James Fox, in his book *Biology and Diseases of the Ferret*, reports that even when treated, the clinical course is fairly rapid, and treatment failures are common. This enforces the need to monitor your pets closely and bring any suspicions that you may have to the attention of your veterinarian immediately.

1. Robbins SL, Cotran RS and Kumar V. *Pathologic Basis of Disease*. W.B. Saunders and Co., Philadelphia, 1989. p. 634-638.
2. Fox, JL. *Biology and Diseases of the Ferret*. Lea and Febiger, Philadelphia, 1988, pp 268-269.
3. Jubb, Kennedy, and Palmer. *Pathology of Domestic Animals*, vol 3. Academic Press, San Diego, 1985, pp. 26- 29.