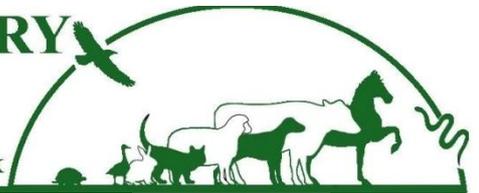


# SEERS CROFT VETERINARY SURGERY

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In the presence of heart disease, cardiac output can fall and this leads to a drop in blood pressure. In order to compensate, the body responds by:

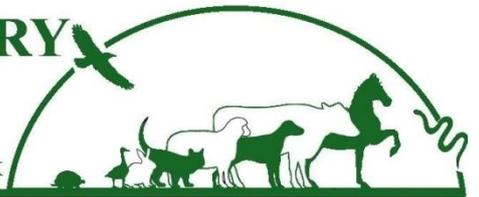
- 1) retaining salt and water to boost the blood volume
- 2) constricting the small arteries to increase blood pressure
- 3) increasing heart rate to improve cardiac output.
- 4) stimulating the production of hormones to counteract the failing heart.

Initially, the subtle drop in cardiac output leads to subtle increases in the above compensatory mechanisms. The compensatory mechanisms are effective and allow the patient to continue as normal despite cardiac disease being present. It is because of these mechanisms that animals can live with cardiac disease for prolonged periods without showing clinical signs. As cardiac disease progresses, compensation increases.

Eventually however, these compensatory mechanisms have a deleterious effect.

- 1) too much salt and water retention leads to pooling of fluid in the chest, lungs and/or abdomen
- 2) constriction of the small arteries increases resistance and cardiac work. Eventually this leads to weakening of the heart muscle.
- 3) An excessively fast heart rate wears the heart out
- 4) The hormones that were initially beneficial start to cause scarring of the heart and blood vessel walls, causing them to harden and impairing cardiovascular function.





Animals are said to be in congestive heart failure when they develop symptoms in association with poor cardiac output and the deleterious effects of the compensatory mechanisms. These symptoms include:

- 1) coughing and breathing difficulty caused by too much salt and water retention
- 2) weakness and exercise intolerance related to constriction of the arteries and poor cardiac output
- 3) Fast heart rates that lead to in-coordinated contraction of the heart muscle and further compromise cardiac output
- 4) Collapse and/or fainting episodes related to poor oxygen supply to the muscles and brain

Congestive heart failure is treated by using medications to counteract all of the above mechanisms.

- 1) Diuretics (frusemide) are frequently used to stop the kidneys from retaining salt and water. The patient urinates a little more and this draws fluid off the lungs.
- 2) Vasodilators (benazepril, pimobendan) relax the muscle within the arterial walls and thus open up the vessels. This makes it easier for the heart to pump blood through them.
- 3) Anti-arrhythmic drugs (digoxin, beta-blockers) slow the heart rate to improve myocardial efficiency
- 4) Spironolactone and benazepril are used to inhibit the action of compensatory hormones that are causing hardening of the arteries and heart muscle



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Once the symptoms have resolved, it is common to reduce the dose of diuretics to find an effective maintenance dose. As the heart disease progresses, it is expected that symptoms will return. This may necessitate adjusting the dose of medication to optimise their effect. Additional diuretics or vasodilators may be recommended if the patient becomes refractory to conventional treatment.

A complication that can be seen in some dogs with CHF is the development of Cardiac Cachexia. This is a muscle wasting disease caused by inflammatory proteins, produced from the failing heart, which causes the body to break down muscle tissue. At present, there are no specific inhibitors of these inflammatory mediators but eicosapentanoic acid found in fish oil may be useful in some individuals. Weight and body condition score should be monitored and calorie intake increased if necessary.

Exercise usually needs modification once a patient is in congestive heart failure. Cats tend to be good at self regulating their activity levels. Dogs need to avoid strenuous exercise such as ball chasing and long periods of off-lead exercise. Most dogs can tolerate 20 minutes of light exercise twice a day.

The prognosis for animals in congestive heart failure depends on the type of heart disease present, its severity and other factors such as concurrent disease. Most animals can have a good quality of life with appropriate treatment and regular monitoring.

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