A patient with heart failure can be a challenge to the veterinary nurse and clinician. Heart failure can be due to venous congestion (congestive heart failure), arterial underfilling (low output heart failure), or both.

**Congestive heart failure (CHF) that compromises breathing (pulmonary oedema, pleural effusion) is the most common presentation of heart failure in dogs and cats.**

The patient that arrives at the practice with respiratory distress and/or collapse needs to be handled in a calm but efficient manner. Stress should be avoided at all costs as this acutely increases the body’s metabolic demands and patients with heart failure do not have sufficient cardiac reserve to accommodate such an increase in demand. Consequently, for patients with CHF, the saying ‘less is often more’ is never more appropriate. As hypoxaemia is usually present, oxygen therapy and minimal handling is often the safest initial approach when dealing with these patients. Parenteral diuretics (e.g. furosemide) are also indicated to remove excess fluid causing oedema. Most patients will show clinical improvement with this approach, and more thorough investigations into the underlying cardiac disease can be performed when the patient is stable.

**What is heart failure?**

To answer that question, it is important to understand the role of the cardiovascular system. The primary role of the system is to provide a normal arterial blood pressure. Normal arterial pressure is vital to maintain adequate perfusion to the organs of the body (especially vital organs, such as heart, brain, and kidneys). This is achieved by a balance between cardiac output and vascular tone. If cardiac output is compromised, arterial pressure falls, and compensatory mechanisms are activated in an attempt to return blood pressure to a more normal level. These compensatory mechanisms include increased fluid retention by the kidneys, vasoconstriction, and stimulation of the heart to increase heart rate and stroke volume (primarily via increased sympathetic tone). Although ultimately beneficial to restore adequate arterial pressures, the ‘trade-off’ is an increase in venous pressures, which if severe enough can cause fluid to leak (effuse) into the surrounding interstitial tissues
(pulmonary oedema) or cavities (ascites, pleural effusion). If mild compensation is sufficient to normalise arterial pressure without causing effusions, then affected patients will frequently not have clinical signs, or only develop signs if they undergo excessive exertion or stress. If more compensation is required to normalise arterial pressure, then this results in the development of effusions. The affected patient is considered to have developed **congestive heart failure**. If arterial pressure cannot be normalised despite maximal activation of compensatory mechanisms, then **low output heart failure** is present. Affected patients usually have concurrent CHF, unless the fall in output is so acute that compensatory mechanisms have insufficient time to be activated (e.g. some arrhythmias, myocardial infarction). Although life saving in the short-term, long-term stimulation of compensatory mechanisms causes progressive deterioration of cardiac function due to fatigue of the heart muscle (‘cardiac remodelling’).

**What are the signs of heart failure?**

The most common clinical signs and examination findings are: -

- Respiratory distress
- Tachypnoea
- Orthopnoea (inability to breathe normally unless in an upright position)
- Cough (not always present, but very common with degenerative mitral valve disease)
- Ascites (right-sided CHF)
- Collapse
- Exercise intolerance
- Heart murmur
- Gallop rhythm
- Tachycardia
- Arrhythmia
- Abnormal lung noise (crackles, wheezes, muffled lung sounds)

**What is the approach for a patient with acute, life-threatening CHF?**

Patients with acute, life-threatening CHF are the most challenging case for the veterinary nurse, as they are almost invariably distressed and intolerant of handling, but also require intensive therapy and close monitoring. This makes nursing very difficult. The veterinary nurse can help *minimally restrain the patient* while the veterinary surgeon performs a very quick physical exam, *prepare oxygen supplementation*, place an *IV catheter* (but only if possible without stressing the patient further), and administer *diuretics*, such as furosemide. Diuretics should be given parenterally (IV, IM, or SC), and the patient left to adjust to its new surroundings in an oxygen rich environment. *Ultimately the key to successful management is minimal handling and restraint* (‘less is more’). Other nursing considerations include access to plentiful water, a litter tray for cats, and remote monitoring of respiratory rate and effort. If continuous ECG is available, and the patient is not stressed
further by electrodes attached to the limbs or thorax, then this method of monitoring of heart rate and rhythm is also useful. The nurse should also prepare for thoracocentesis if required (usually cats).

What are the treatment goals in CHF?

The treatment aims for patients with CHF are as follows:

- **Acute, life-threatening CHF** – stabilise by supplementing oxygen to improve hypoxaemia, drugs to reduce effusions (e.g. diuretics, vasodilators) and improve cardiac output (e.g. positive inotropes), and minimising stress by handling as little as possible.

- **Chronic CHF** – improve quality of life with drugs to improve haemodynamic function (e.g. pimobendan, furosemide), and increase length of life with drugs that decrease the deleterious effects of long-term stimulation of compensatory mechanisms (e.g. ACE inhibitors, spironolactone).

Management of patients with CHF can be quite challenging, when disease process, severity and temperament of the patient are taken into consideration. However, the saying 'less is more' when dealing with heart failure cases can certainly be applied. Good monitoring and record keeping is very important whilst oxygen supplementation and diuretics take effect. Nursing is very important in these patients as the primary treatment goal is maintaining quality of life.

**Suggested reading**
Ware W. Cardiovascular disease in small animal medicine. Manson Publishing, 2007