Nursing the cardiac patient: approaches to effective care

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Sophie Lamb RVN, explains the clinical signs of heart disease, and details treatment methods for what can be rewarding cases

PATIENTS coming into practice with cardiac problems fit into three main categories:

• symptomatic patients presented for assessment for cardiac disease;

• symptomatic patients requiring a diagnosis; or

• patients suffering from cardiac disease that are no longer able to compensate, and thus require medical attention.

From a nursing point of view, it is important to understand the clinical signs and treatments of heart disease to manage a patient's needs correctly.

For the purpose of this article, I am referring to nursing patients admitted with heart failure or end-stage disease.

Heart disease types

Congenital heart disease

• Cardiac shunts are abnormal communications between chambers of the left and right sides of the heart. These take the form of patent ductus arteriosus (PDA) – between the aorta and pulmonary

trunk; ventricular septal defect (VSD) – between the left and right ventricles; and atrial septal defect – between the left and right atria.

• Stenosis is an inadequate opening of the valves. Pulmonic and aortic stenosis are equally prevalent. They are congenital heart defects in which a malformation impedes the flow of blood through the heart.

Acquired heart disease

• Valvular disease is where the cardiac valves fail to open or close properly. Mitral and tricuspid regurgitation are the most common types.

• Myocardial disease is where the heart pumps or relaxes inadequately. The most common form is known as dilated cardiomyopathy (DCM).

• Vascular disease is where the systemic vessels offer too great an interference to blood flow, often leading to hypertension.

• Pericardial diseases are those that affect the protective sac around the heart. They cause it to harden and/or fill with fluid. The heart then no longer has the space in which to expand and contract properly, and loses its ability to pump efficiently. This condition is sometimes caused by a heart tumour.

• Arrhythmias are when a heart is beating too fast, too slowly or too irregularly to sustain an acceptable cardiac output.

What is heart failure?

Signs associated with any of these diseases are due either to inadequate organ perfusion (such as exercise intolerance, weakness and syncope) or blood damming up in organs and emptying inadequately (such as pulmonary oedema, ascities, pitting oedema and effusions). An animal showing signs due to inadequacy of the cardiovascular system to deliver enough blood to sustain normal function is said to be in heart failure.

Congestive heart failure

Congestive heart failure (CHF) occurs as a result of a heart having impaired pumping capability, and is associated with abnormal water and sodium retention. The condition ranges from mild congestion with few symptoms, to life-threatening fluid overload and total heart failure. The most important function of the circulatory system is to maintain adequate blood pressure. When the heart begins to fail, the body’s tissues do not receive sufficient blood supply for normal function. The body starts to stimulate compensatory mechanisms to increase blood pressure.

Cardiac output is improved by an increase in the heart rate and stroke volume via fluid retention. Vasoconstriction causes an increase in systemic vascular resistance. This is called compensated heart failure. Any further deterioration leads to more fluid retention, which results in pulmonary oedema, ascities or pleural effusion.

Left-sided congestive heart failure results from dysfunction of the mitral valve, ventricle or both. Clinical signs include:

• pulmonary congestion and oedema resulting in a cough;

• tachypnoea;

• dyspnoea;

• orthopnoea;

• pulmonary crackles;

• tiring;

• cyanosis; and

• cardiac arrhythmias.

The cough is usually secondary to pulmonary oedema.

Right-sided congestive heart failure results from a pathological condition of the tricuspid valve, ventricle, or both. Clinical signs include:

• systemic venous congestion;

• high central venous pressure (CVP);

• jugular vein distension;

• liver and spleen enlargement;

• fluid in the chest cavity (pleural effusion) causing dyspnoea, orthopnoea and cyanosis; and

• subcutaneous oedema and/ or fluid in the pericardial sac (pericardial effusion).

Common cardiovascular drugs and their effects are featured in Table 1.

Nursing care

Regardless of the condition’s aetiology, most patients entering the practice with heart failure will require the same nursing care considerations. The goals of heart disease therapy are to:

• minimise damage to the myocardium;

• remove oedema fluid;

• improve circulation;

• regulate heart rate and rhythm;

• improve oxygenation of the blood; and

• minimise the likelihood of thromboembolism.

In a busy ward, there will be many patients, so it is important to prioritise cases so they are all treated appropriately. The status of the patient may change rapidly either in response to treatment or to the underlying disease. Monitoring is one of the major roles, as early detection of deterioration gives the best chance of successful intervention. Most patients will need certain parameters recorded regularly.

A list of these is provided in ·

Physical examination

Look at the gingival mucous membrane to assess the perfusion status – it should be pink and moist. Pallor usually indicates anaemia or poor perfusion. If the mucous membranes (MM) are dry or tacky, the patient may be dehydrated, but if the patient is panting or mouth breathing excessively, the MM will be dried by the air movement. Capillary refill times longer than two seconds also indicate poor tissue perfusion.

Cardiac auscultation will allow for the evaluation of heart rate, rhythm and sounds. The heart rate should be regular, with each heartbeat separated from the following one by an identical time interval. There should be two short heart sounds in a typical “lub-dub” sound. The presence of a third sound is termed a gallop rhythm, caused by an extra heart sound, usually associated with ventricular dilation, such as with DCM, or with hypertrophy, such as with HCM. A heart murmur is the abnormal sound of blood flow turbulence, sounding like a “swishing”.

The peripheral arterial pulse quality also provides information on perfusion. An artery, usually the

femoral, should be palpated to determine pulse rate and quality. It is essential to auscultate the heart while doing this. The heart rate and pulse should be identical, and there should be a pulse of approximately equal quality produced by each heartbeat. The absence of a palpable pulse (or significant change in pulse quality) with an audible heartbeat is called a pulse deficit. This usually indicates an abnormal heart rhythm.

Describe the intensity of the pulse. A weak peripheral pulse is indicative of decreased cardiac output. The pulse may be described as slow to rise if the peak of intensity comes late in the pulse wave. This can be seen with obstruction to cardiac output, as seen with aortic stenosis. A strong or bounding pulse may be palpated when there is a rapid drop-off in diastolic pressure (PDA). Whenever pulse quality is abnormal, an evaluation of blood pressure is warranted.

Respiratory rate and effort should be noted, preferably before any stressful manipulation or handling is required. Determining effort is subjective, but it should appear comfortable and lack any abdominal effort.

Is the patient breathing with abdominal effort; is the rate too fast or too slow, or does it appear to be agonal breathing? Agonal breathing is an abnormal breathing pattern characterised by shallow, slow and irregular breaths. The patient may also gasp, vocalise or have laboured breathing. This is very serious and requires immediate attention, as the condition generally progresses to apnoea and death.

Oxygen therapy

A pulse oximeter can be used to check oxygen saturation by attaching it to the MM or skin, such as lip, tongue, pinna or vulva. The tongue is normally only used in unconscious patients, but a collapsed animal may tolerate it. It will give a reading of the haemoglobin saturation of peripheral blood vessels. It is an indirect way to monitor whether the patient has adequate peripheral arterial circulation. Direct measurement of oxygenation is monitored with arterial blood gas, which is a more invasive technique. Note that any pigmentation in the skin will reduce the reliability of the reading.

A pulse oximeter reading of less than 90 to 95 per cent is considered decreased. Most good-quality pulse oximeters will show a trace of the pulse. If you have a reading of 80 per cent saturation, for example, but the trace is not clear, it is probably not representative. Try moistening the tissue and moving the probe until you get a better trace. If in doubt, palpate the pulse yourself, to see if it fits with your trace. However, if you have a decent trace and are seeing a low saturation, this is probably correct.

Methods of oxygen therapy include oxygen cages, incubators, masks, nasal catheters and endotracheal tubes. Flow rates will vary, depending on the method of oxygen delivery. As a guide, a 5Fr nasal cannula/feeding tube (the largest size that can be placed in cats) can deliver a flow of

up to 0.5-0.75L/minute. In dogs more than 6kg, a 10Fr nasal cannula can be used with oxygen flow delivered at 5-8L/minute. Do note that flow rates greater than 10L/minute may cause trauma to the nasal mucosa.

A face mask can be used for rapid, temporary delivery of oxygen. The oxygen flow should be at least 100ml/kg/minute when using a well-fitting mask.

If long-term oxygen therapy is administered by nasal cannula or prongs, it is beneficial to deliver the oxygen through a bubble humidifier to prevent damage to the respiratory tract from the drying effect of the inhaled oxygen.

Blood pressure

The Doppler technique is the most accurate methodology, especially in smaller dogs and cats. The normal systolic blood pressure in dogs is between 131-154mmHg. In cats, the range is 115-162mmHg. Readings should be carried out in a quiet environment, with the patient as still as possible. At least three measurements should be taken to see whether the readings are consistent. For the measurement to be valid, the correct cuff size is vital. The cuff width should be 40 per cent of the circumference of the limb, and firmly applied, but without causing vascular occlusion prior to inflation.

Electrocardiogram

Electrocardiograms (ECGs) record the electrical activity of the heart. Continual or intermittent ECGs may be required to assess the patient’s response to treatment.

Other nursing considerations

• Patients should be kept as calm as possible. In a busy ward, it may be worth covering the cage to give the patient a little more privacy. However, take into account the need for close monitoring, and leave an area open so they can be observed. Cats are especially prone to stress in the surgery, so offer a box or litter tray with a blanket, so they can hide away and feel more secure.

• Keep ambient noise to a minimum, and try to move noisy dogs to the opposite end of the ward to lower environmental stress.

• Handling should be kept to a minimum, and a less-is-more approach should be employed – especially with cats.

• If the patient is on oxygen therapy, ensure you have a sufficient volume at hand and monitor the flow rate on your regulator. Have face masks available in case the patient deteriorates.

• Fluids are rarely used in heart failure patients, except to correct electrolytes imbalances, such as hypokalaemia. If fluid therapy is being administered, use extreme caution and be aware of the possibility of fluid overload and pulmonary oedema. If you do not have infusion pumps, consider using a burette.

• Venous access is vital in these patients. A peripheral intravenous catheter should be placed and maintained. Ensure the catheter is kept patent by regular flushing. However, caution should be taken to not add to patients'fluid burdens, especially in small dogs and cats. Minimise the amount used to flush the catheter and only do so when necessary.

• Diuretics will cause PU/PD – take canine patients out regularly, but slowly and at their own pace, and ensure they have a constant supply of water. Some patients may be exercise intolerant and be prone to syncope, so caution must be taken. Recumbent patients should ideally be fitted with a urinary catheter. Alternatively, ensure they have incontinence pads in their cage and check and change them regularly.

• The use of a harness and lead instead of a collar is best if the patient has a compromised airway.

• Rest is also an important consideration. Wards are usually busy 24 hours a day. Allow the patient quiet time, with the lights down. In addition, grouping medications and treatments together is a useful technique to prevent sleep interruption.

• Finally, it is wise to have equipment at hand in case the patient deteriorates to an extent that it requires intubation, or in the worst-case scenario, CPR. Keep your crash box/trolley close at hand, and ensure that its contents are checked and replenished regularly. Ensure you all know what to do in the event of an emergency – shout for help, then take action.

Summary

In conclusion, nursing a patient with heart disease can be as simple as allowing it to rest in a kennel and monitoring it, or as intensive as critical care and life-saving intervention.

Nothing is as important as a nurse's basic and observational skills. A patients'conditions can change rapidly, so quick intervention is key – this situation also makes for an interesting nursing case. We can do tangible things to make a real difference to the outcome of these cases. They can be intensive and challenging to nurse, and, at times, sad – as the outcome is not always favourable – but they can be rewarding.

Seeing a critical patient admitted with respiratory distress, for example, which then becomes stable and comfortable, is what this job is all about for me.