



Management of cardiac diseases in dogs

S. Ajith Kumar and G. Radhika

As per recent studies, the incidence of heart disease is increasing among the dogs, in Kerala (Ravindran, 2001). However most of the clinical signs of primary heart disorders can simulate the involvement of other body systems. Also other systemic disorders (eg. renal failure, anaemia, parvo viral enteritis, pyometra etc.) can cause secondary cardiac involvement. Because of these reasons the diagnosis of heart diseases will be difficult unless a detailed clinical examination and investigations including ECG, radiography, echocardiography blood and serum analysis are carried out in suspected cases.

Manifestations of cardiac disorders

The manifestations of long standing heart diseases are broadly designated as congestive heart failure (CHF) or chronic heart failure.

The basic causes leading to CHF are congenital heart diseases, aging, secondary involvement of myocardium in other diseases, etc. Male geriatric small breeds of dogs are more affected with congestive heart failure (Ravindran, 2001).

The CHF can be of two types:

1. Right sided congestive heart failure: This is occurring due to the defect in the right side of heart and congestion of blood vessels in systemic circulation. The clinical signs of right sided CHF are

exercise intolerance (animal will be easily tired after a mild exercise), oedema of limbs, ascites, catchexa, epileptic convulsions (stroke adom's seizure) spleenomegaly and hepatomegaly or renomegaly on palpation of abdomen.

2. Left sided congestive heart failure: This is due to the defect in the left side of heart characterised by congestion of pulmonary blood vessels. The main symptom is chronic cough. Animal will have paroxysmal coughing especially during the night time (Nocturnal/ cardiac cough).

Apart from CHF, there can be another form of heart failure i.e., acute heart failure. This is characterised by sudden stoppage of heart (due to primary or secondary problems) and death of the animal.

Diagnosis

1. From history and symptoms
2. Special examination of pulse and auscultation of heart.
 - * Note tachycardia, bradycardia or arrhythmia.
3. Blood pressure measurement
4. Capillary refill time - >2sec, - indicate, reduced peripheral circulation.
5. Electrocardiography
6. Radiography
7. Echocardiography

Management of heart failure

Stepwise approach in treating CHF

- a) Salt and Exercise restriction
- b) Diuretics eg., Frusemide
- c) Digoxin
- d) Diuretics + Digoxin
- e) Vasodilators

If sufficient therapeutic effect is not obtained in one step, the next step can be adopted.

I. Diuretic Therapy

This is the first line treatment for CHF. Frusemide (eg. Lasix) is the most commonly used diuretic for this purpose. Intravenous dose (2-4 mg/kg body wt, Q 6-8 hrs) is highly useful in treating severe pulmonary oedema associated with left sided CHF. This should be followed with oral maintenance dose (2-4 mg/kg BID), once the dyspnoea due to pulmonary oedema is resolved.

Animals with chronic or minimal signs of CHF, oral therapy is sufficient to get a clinical improvement. However prolonged frusemide therapy may produced increased potassium loss through the urine and

Dr. S. Ajith Kumar MVSc, PhD
Assistant professor, Clinical
Medicine, College of Veterinary
and Animal Sciences Mannuthy

Dr. G. Radhika MVSc.
Veterinary Surgeon
Extension training Centre,
Mannuthy, Thrissur.





hypokalaemia. So oral potassium supplementation (eg. Potchlor syrup) is needed along with frusemide therapy.

II. Positive inotropic agents

Positive inotropic agents will increase the force of heart contraction.

a) Chronic oral inotropic support using digitalis preparations

Commonly used digitalis preparation in dog is digoxin (eg. Lanoxin). This is used in chronic right or left sided CHF without signs of low cardiac output.

Oral digoxin is available as tablets (0.125 mg and 0.25 mg) or elixir (0.05 and 0.15 mg/ml). The gastro intestinal absorption of the two formulations differ, so the dosage must be adjusted accordingly.

The initial digoxin dosage for dogs is 0.003 to 0.004 mg/lb bid for tablets and 0.002 to 0.003 mg/lb bid for elixir. However, the individual dose can be increased or decreased based on the absence of clinical response or toxic signs. Larger dogs require proportionately less digoxin (total daily dose) than small dogs. Doberman pinschers with dilated cardiomyopathy are particularly sensitive to digoxin. These dogs should not receive more than 0.375 mg of digoxin per day.

First indications of digoxin toxicity are gastrointestinal irritation signs like anorexia, vomiting and diarrhoea. ECG monitoring often shows first degree or second degree heart blocks and such animals will be dull and depressed.

To manage digoxin intoxication

1. Discontinue digitalis for at least 24-48 hours or until the signs of toxicity abate.
2. Measure the serum digitalis concentration to confirm the toxicity
3. Identify any precipitating cause like renal failure, electrolyte imbalances like hypokalaemia etc.
4. Atropine sulphate (0.02-0.04 mg/kg s/c) can be used to treat heart blocks.
5. Monitor the renal function, and in case of renal dysfunction adjust the digoxin dose by dividing the calculated dose by serum creatinine concentration
6. If azotaemia is severe, instead of digoxin, consider using digitoxin. (eg. Crystodigin, 0.05, 0.10 and 0.15mg capsules) @ - 0.015 mg/lb body weight 2-3 times a day.

It is important to treat any preexisting arrhythmias like ventricular tachycardia before beginning the digitalis therapy.

If the animal tolerates the digoxin well, the oral administration can be continued life long. Don't discontinue the therapy when cardiac compensation is restored.

3. Vasodilators

These are the new group of drugs for treating congestive heart failure. This can be used singly or can

be combined with digoxin to get a therapeutic effect. Some of the dogs which are non-responsive to digoxin therapy showed remarkable improvement with vasodilator therapy.

Vasodilators are of two types, i.e., venodilators and arteriolar dilators.

a) Nitro-glycerin

This is a venodilator available as two per cent ointment (eg Nitrol). The medicine will be cutaneously absorbed and used to treat severe pulmonary oedema (Left sided CHF). The ointment (1/8-3/4 inch) can be applied over clipped areas, especially on ventral thorax or internal surface of the ear after wearing gloves.

b) Angiotensin converting enzyme should be properly identified by means of ECG and treatment should be adopted immediately.

Bradyarrhythmias (eg. Sinus bradycardia) can be treated using atropine sulphate (0.02-0.04 mg/kg s/c). For sinus bradycardia, ventricular asystole, AV block and SA block better drug is Glycopyrolate (eg. Glyco-p inj. 0.2 mg/ml) @ 0.005-0.010 mg/kg I/V in dogs.

Supraventricular types of arrhythmia, characterized by abnormally shaped 'p' waves in ECG, can be treated using digoxin. However if the heart rate remains excessive after 3 days of digoxin therapy, concurrent administration of propranolol (eg. Inderal-10mg, 20mg tablets and 1 mg amp for injection) is recommended. The dose is 0.2-1mg PO tid or 0.1-0.3mg/kg I/V. However, sudden withdrawal of propranolol is dangerous.

Digoxin should not be used in ventricular type of arrhythmias (eg. Ventricular tachycardia). This type of arrhythmias can be treated using intravenous Lignocaine preparations without adrenaline (eg. Xylocaine). The dose is 2 mg/kg I/V (up to 8mg/kg) over a 10 minutes period. Continuous I/V infusion can also be given @ 25-75 mg/kg/min. After correcting the life threatening ventricular tachycardia, oral antiarrhythmic agents like propranolol can be given.

References

1. Birechard, S.J. and Sherding, R.G. (2000). *Saunders's Manual of small animal practice* (2nd Ed.) W.B. Saunders Co. Philadelphia.
2. Ettinger, S.J. and Feldman, E.C. (2000). *Text book of veterinary internal medicine* (5th Ed.) Vol. I. W.B. Saunders Co, Philadelphia.
3. Goodwin, J.K., Cooper, R.C. and Weber, W.J. (1992). The medical management of pets with congenital heart defects. *Vet. Med.*, 87: 670-675.
4. Jacobs, G.J. (1989). Adding cardiovascular drugs to the CHF treatment plan. *Vet. Med.*, 84: 499-517.
5. Leib, M.S. and Monroe, W.E. (1997). *Practical small animal internal medicine*. W.B. Saunders Co, Philadelphia.
6. Ravindran, P. (2001). *Electrocardiogram abnormalities in cardiac disorders of dogs*. MVSc Thesis Submitted to KAU.

