

Congestive Heart Failure

Vasodilators

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CHF

- **cardiac output down**
- **blood pressure down**
- **sympathetic tone up**
 - vasoconstriction
 - tachycardia
- **salt and water retention up**

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congestive heart failure

- **rest**
- **low salt diet**
- **vasodilators**
- **diuretics**
- **long acting inotropes**
- **(antiarrhythmics)**

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8 yr old mongrel dog



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history

- gradual weight loss
- exercise intolerance
- coughing
- anorexia

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examination

- some lung sounds
- severe systolic murmur
- irregular beat

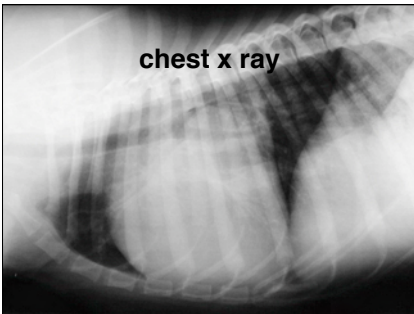
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further investigations?

- chest x ray
- ECG
- ultrasound

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chest x ray

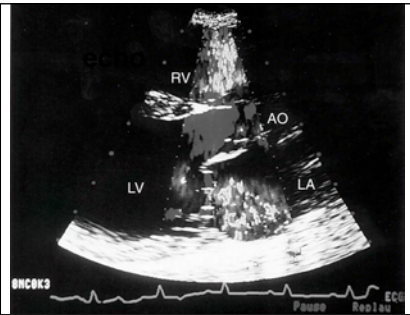


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ECG lead II



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problems

- valvular incompetence
- pulmonary oedema
- ventricular ectopic beats

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priorities

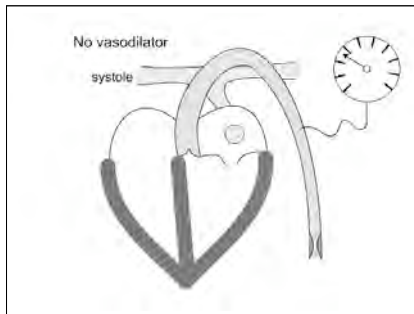
- avoid excitement
- pulmonary oedema
- arrhythmia
- increase forward flow

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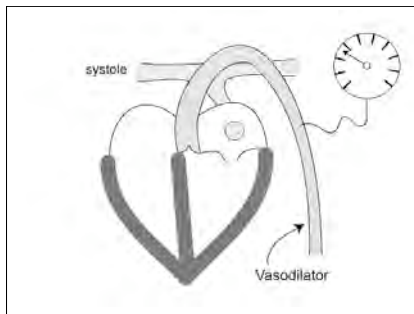
drugs

- **pulmonary oedema**
 - diuretics
- **ventricular ectopic beats**
 - antiarrhythmics
- **forward flow**
 - vasodilators
 - inotropes?

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vasodilators

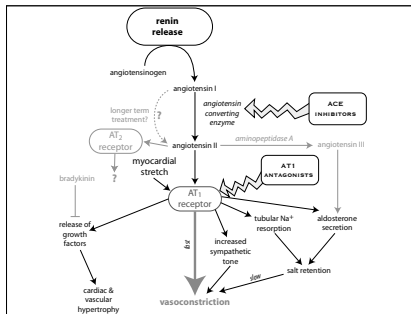
- **angiotensin converting enzyme inhibitors**
- **nitrates**
- **odds & sods**

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ACE inhibitor effects

- **normal animals**
 - none
- **CHF**
 - arterial & venous dilatation
 - reduction in pre and afterload
 - reduction in myocardial work & O₂ consumption
 - reduction in pressure across valves
 - promotes myocardial remodelling

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ACEI indications

- **congestive heart failure**
- **especially mitral regurgitation**
- **± diuretics**

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side effects

- **hypotension (± tachycardia)**
- **anorexia**
- **vomiting**
- **diarrhoea**
- **(cough)**

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care

- hyponatraemia
 - frusemide
- renal failure
- breeding bitches

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drugs

- enalapril
- benazepril
- quinapril
- captopril
- etc, etc

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congestive heart failure

- rest
- low salt diet
- vasodilators
- diuretics
- long acting inotropes
- (antiarrhythmics)

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AT₁ antagonists

- losartan
- candesartan
- no experience in dogs

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other vasodilators

- **nitrates**
- **calcium channel blockers**
- **hydralazine**

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nitrates

- **converted to NO**
- **venous & arterial relaxation**

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nitrates

- **nitroprusside**
 - very short half life
 - anaesthesia / intensive care only
- **nitroglycerine (glyceryl trinitrate)**
 - longer half life
 - iv / transcutaneous ointment
- **isosorbide dinitrate**
 - similar but tablets

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Ca channel blockers

- **vasodilators**
 - nicardipine
 - nifedipine, etc etc.
- **antiarrhythmics**
 - verapamil
 - diltiazem

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hydralazine

- old drug
- mechanism unknown
- used when all else fails

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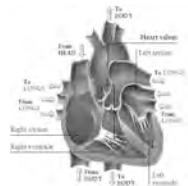
5 month old Labrador



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diagnosis

- patent ductus arteriosus



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problems

- sudden increase in afterload on ligation
- handling heart
- pulmonary hypertension

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treatment

- **intra op**
 - vasodilators
 - antiarrhythmics

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treatment

- **post op**
 - vasodilators
 - inotropes
 - antiarrhythmics
 - diuretics
 - oxygen
 - fluids
 - analgesics

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vasodilators

- reduce afterload and can prolong life in congestive heart failure
- angiotensin converting enzyme inhibitors block production of ATII, probably most useful in dogs
- nitrates - converted to nitric oxide (EDRF)
- hydralazine sometimes used if others don't work

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