

Congestive Heart Failure

Vasodilators



8 yr old mongrel dog

- gradual weight loss
- exercise intolerance
- coughing
- anorexia



examination

- some lung sounds
- severe systolic murmur
- irregular beat



CHF

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



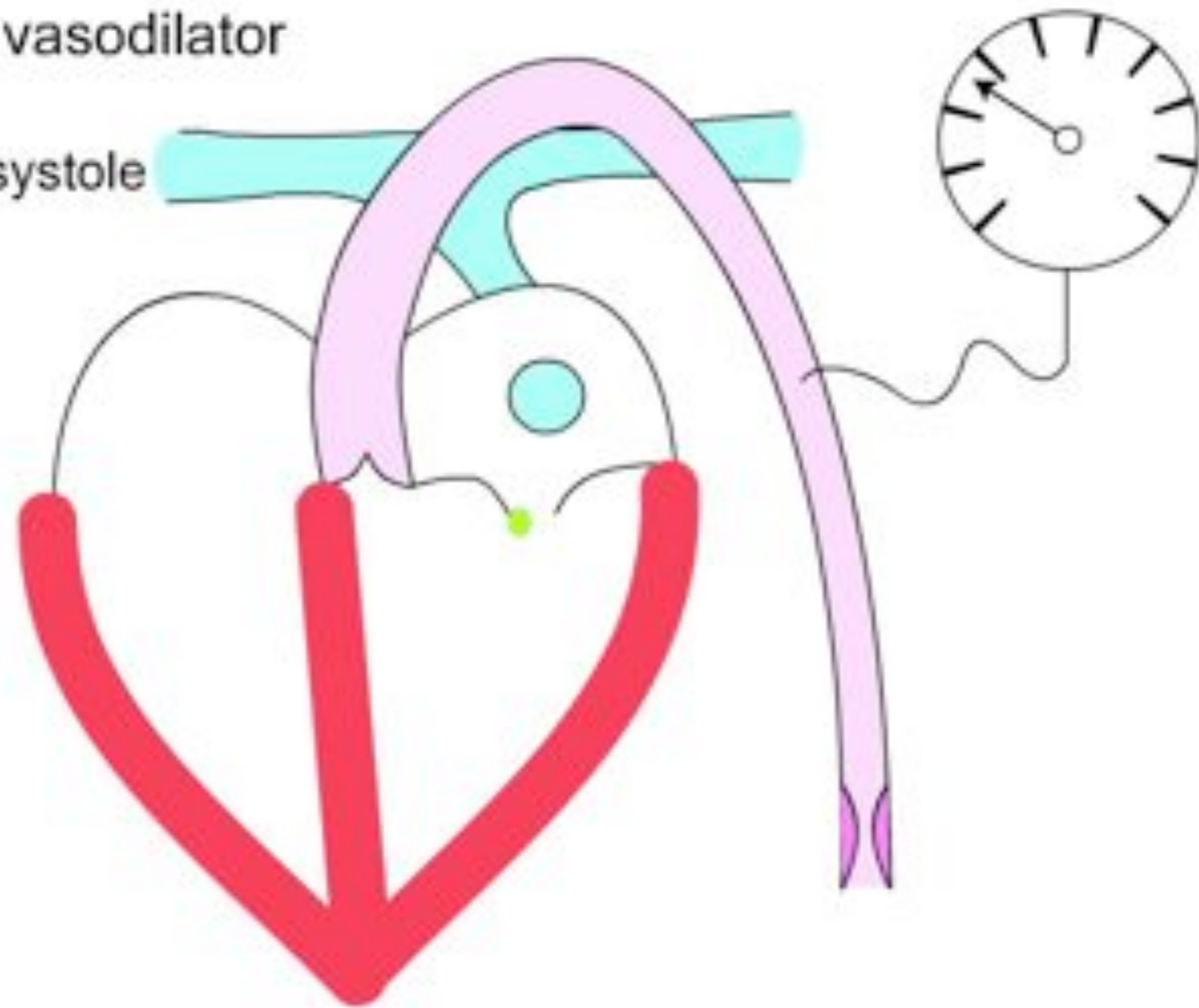
congestive heart failure

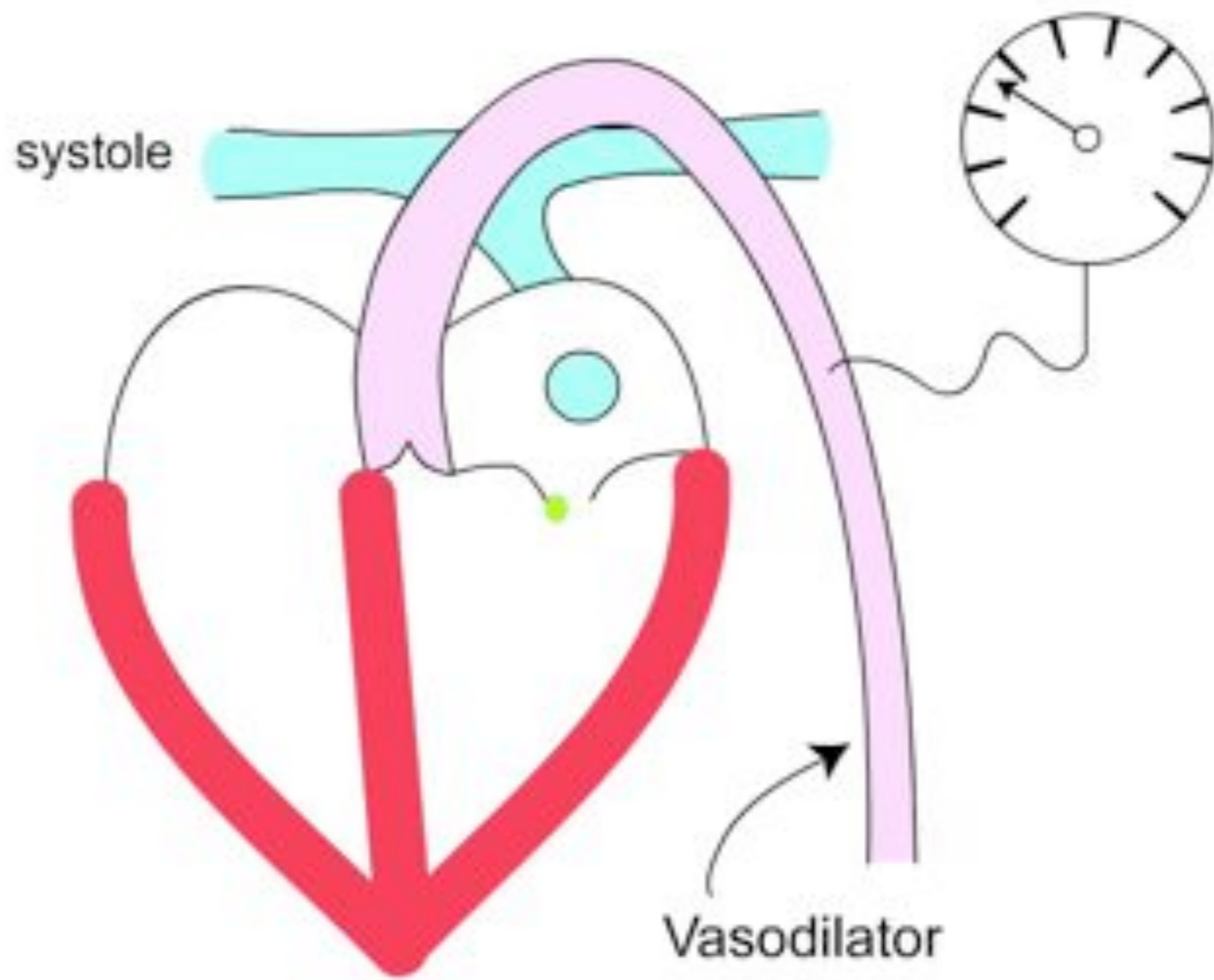
- rest
- low salt diet
- vasodilators
- diuretics
- long acting inotropes
- (antiarrhythmics)



No vasodilator

systole





vasodilators

- angiotensin converting enzyme inhibitors
- nitrates
- odds & sods



ACE inhibitor effects

- normal animals

- none

- CHF

- arterial & venous dilatation

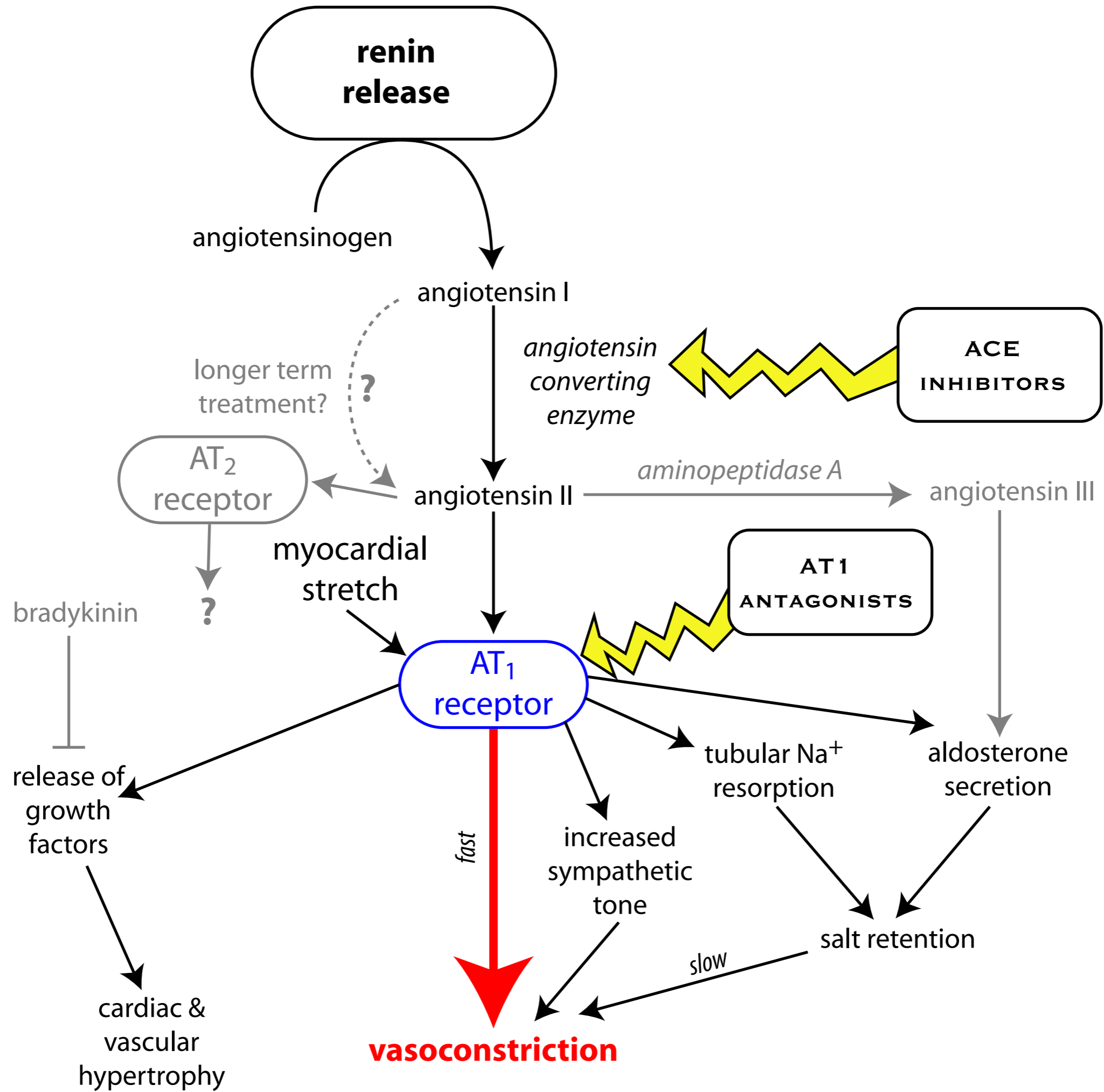
- reduction in pre and afterload

- reduction in myocardial work & O₂ consumption

- reduction in pressure across valves

- promotes myocardial remodelling





ACEI indications

- congestive heart failure
- especially mitral regurgitation
- ± diuretics



side effects

- hypotension (\pm tachycardia)
- anorexia
- vomiting
- diarrhoea
- (cough)



care

- **hyponatraemia**
 - frusemide
- **renal failure**
- **breeding bitches**



drugs

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



congestive heart failure

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



AT₁ antagonists

- losartan
- candesartan
- not much experience in dogs



other vasodilators

- nitrates
- calcium channel blockers
- hydralazine



nitrates

- converted to NO
- venous & arterial relaxation



nitrates

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



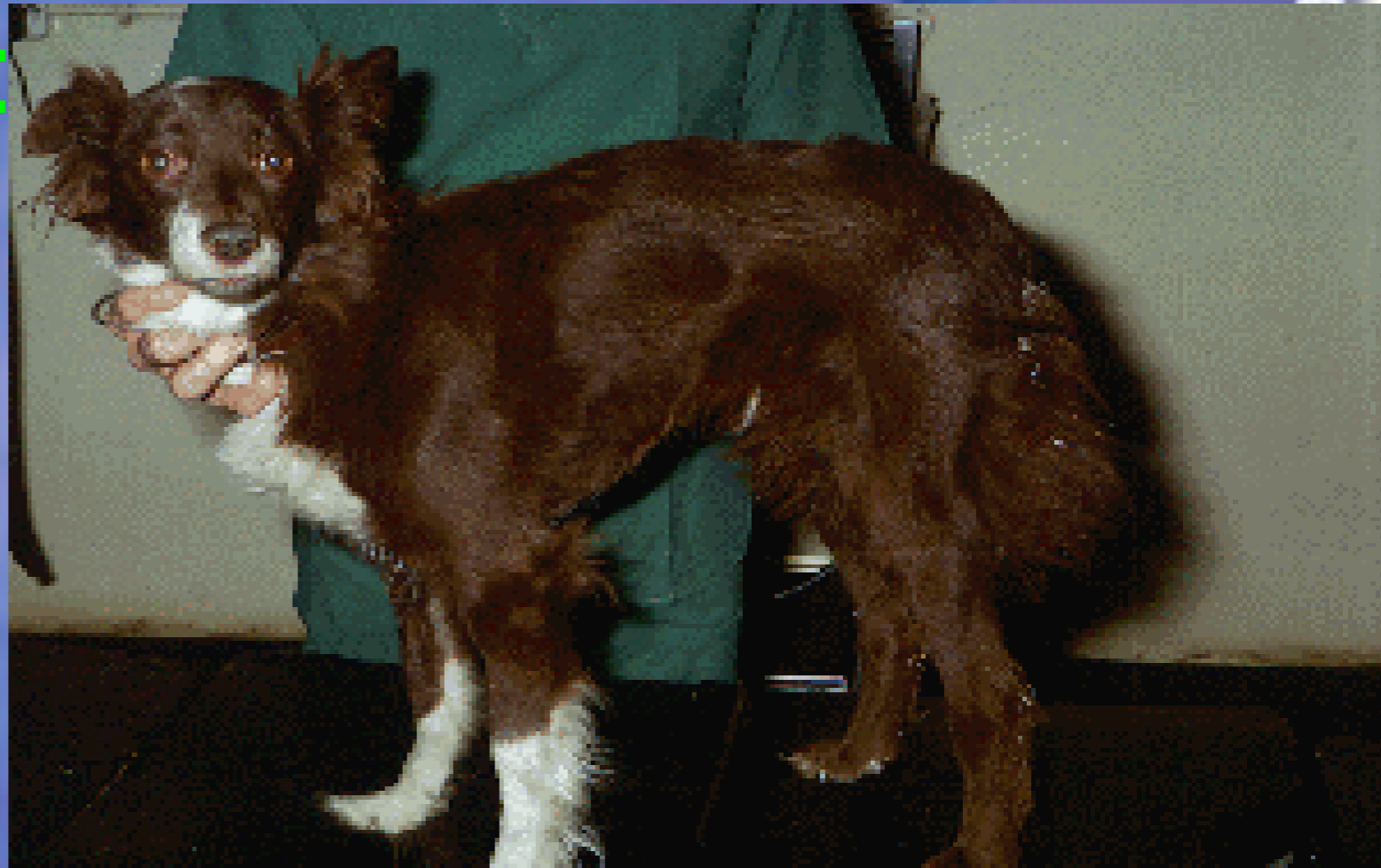
Ca channel blockers

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



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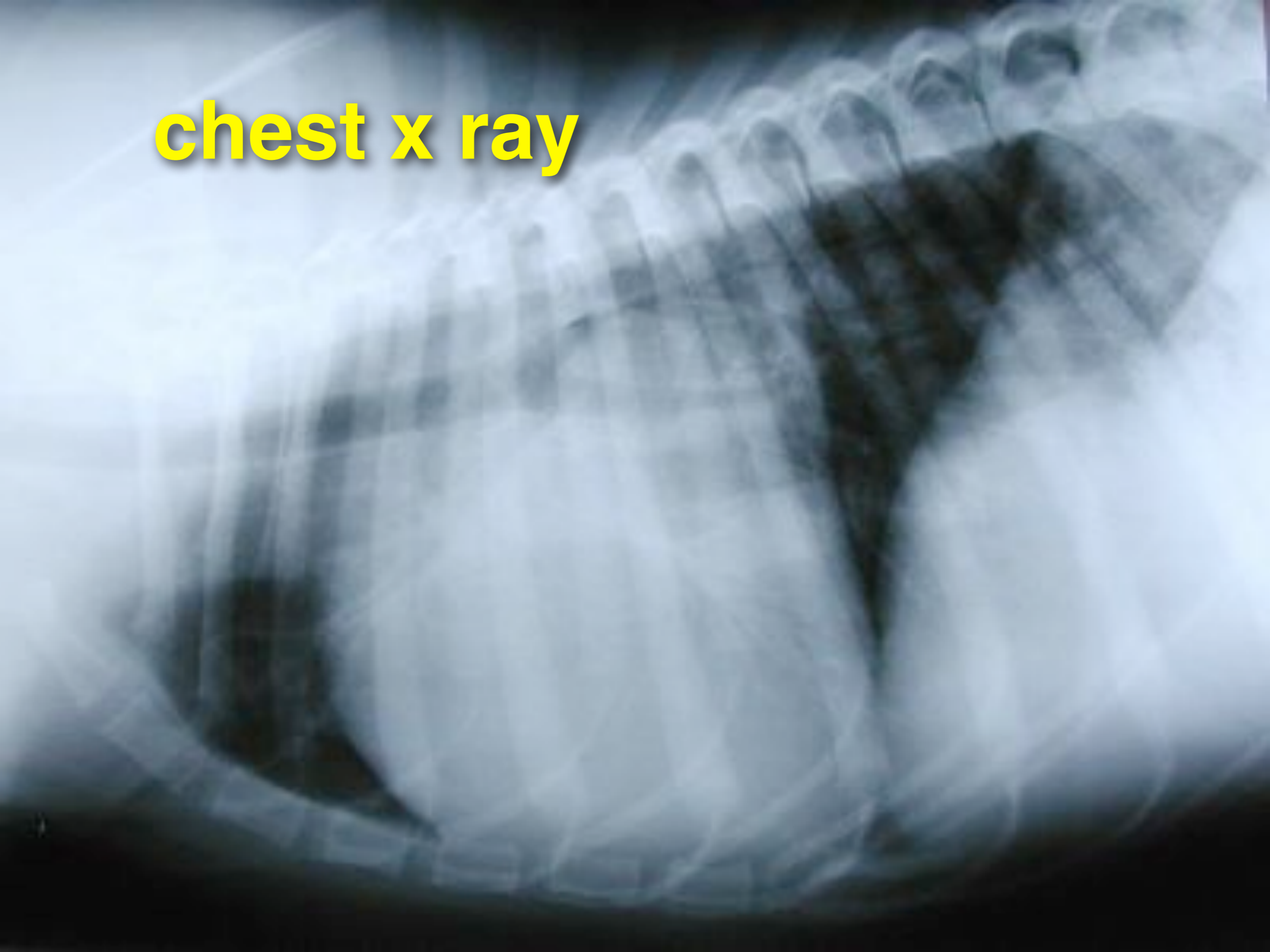


further investigations?

- chest x ray
- ECG
- ultrasound



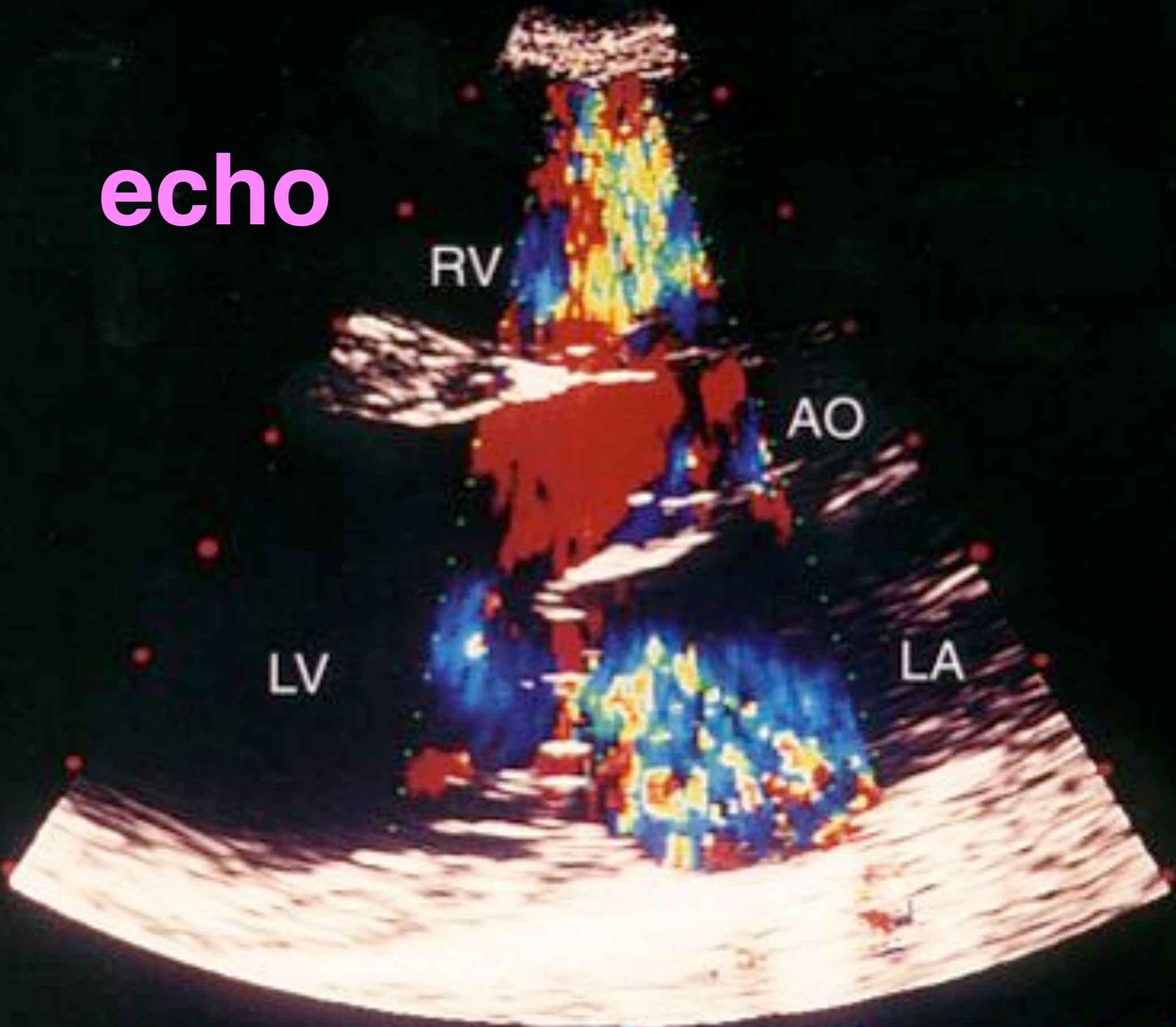
chest x ray



ECG lead II



echo



8NC0K3



problems

- **valvular incompetence**
- **pulmonary oedema**
- **ventricular ectopic beats**



priorities

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



vasodilators

- reduce afterload and shown to prolong life in congestive heart failure
- angiotensin converting enzyme inhibitors block production of ATII, probably most useful in dogs, usually with frusemide
- nitrates - converted to nitric oxide (EDRF)

