

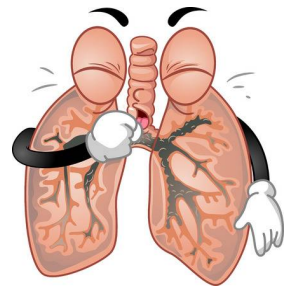
CHF or Snot?

Diagnosis and management of congestive heart failure in dogs

Kayla Grint, DVM, DACVIM (Cardiology)

Learning Objectives

- Techniques for differentiating CHF from other causes of respiratory distress
 - Physical exam findings
 - Radiographic features
- Treatment of CHF
 - Standard therapy and monitoring
 - What to do when standard therapy does not work



Congestive Heart Failure

- Left-sided CHF
 - Cardiomyopathy
 - DCM
 - ARVCM
 - Degenerative mitral valve disease
 - Congenital disease
 - PDA, VSD, valve dysplasia
- Right-sided CHF
 - Congenital
 - PS, TVD, TOF
 - Secondary to pulmonary disease
 - PH, HWD
 - Pericardial disease
 - Associated with left sided disease
 - Cardiomyopathy, valve disease

Congestive Heart Failure

- Left sided vs right sided
- Left more likely to be an emergency
 - Respiratory distress
 - Pulmonary edema
- Right more chronic
 - Ascites – common in dogs
 - Pleural effusion – unlikely in dogs

CHF in dogs



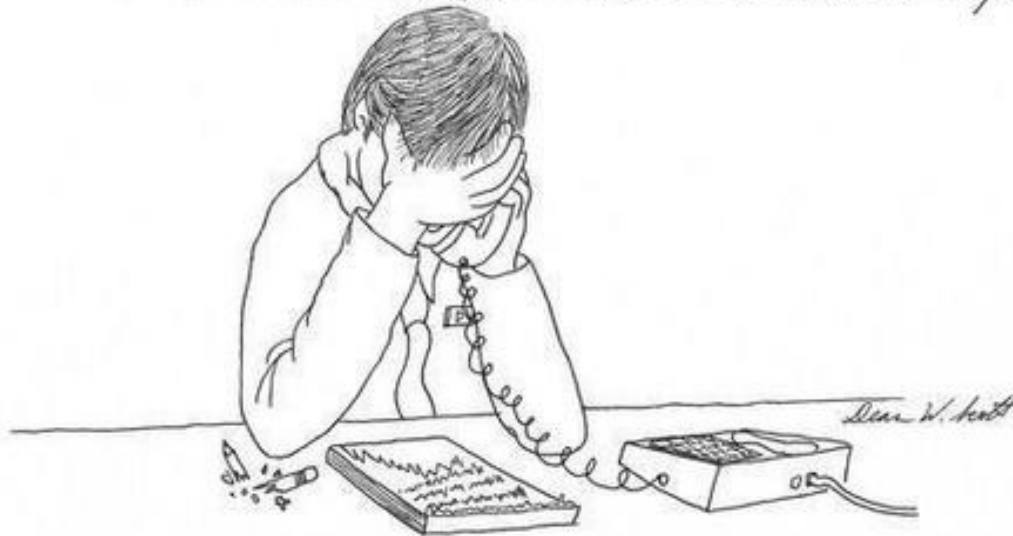
History

- Coughing
- Tachypnea/Dyspnea
- Syncope/Collapse
- Generalized signs
 - Weakness
 - Exercise intolerance
 - ADR
 - Decreased appetite



Important first step?

No, Mrs. Roberts, I don't think holding BooBoo up to the phone so I can listen to her will help. You need to bring her in so I can.....(sigh).... Hi, BooBoo...how are you?



Physical Exam

- TPR!!!!
- Mucous membranes
- Murmur
- Rhythm
- Femoral pulses
- Lung sounds
- Abdomen
- Jugular



Question 1: Who has CHF?

Bear

- T 101.7F
- Heart rate 200bpm
- Resp rate 52bpm
- Grade 4/6 left apical systolic and 3/6 right apical systolic murmur
- Harsh lung sounds all fields
- Normal femoral pulse quality
- Pulse deficits
- Irregular rhythm

Sarah

- T 102.5F
- Heart rate 80bpm
- Resp rate 48bpm
- Grade 2/6 left apical systolic and grade 3/6 right apical systolic murmur
- Crackles all fields
- Normal femoral pulses
- Irregular rhythm

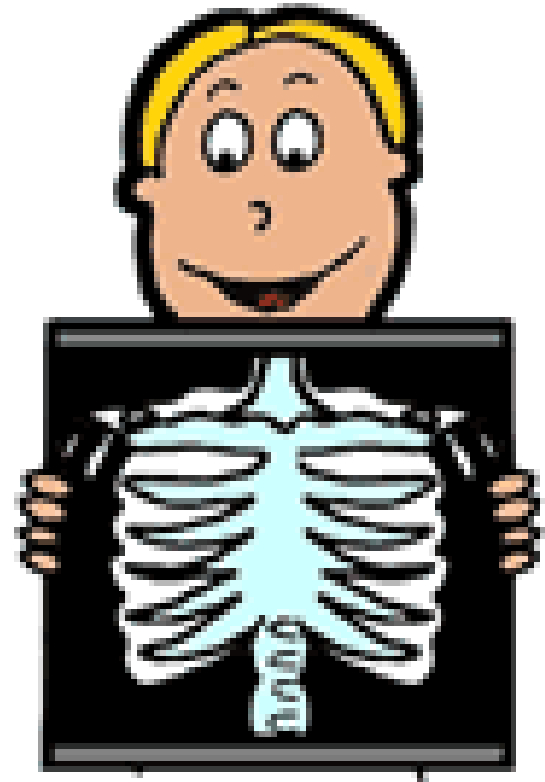
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Next step?



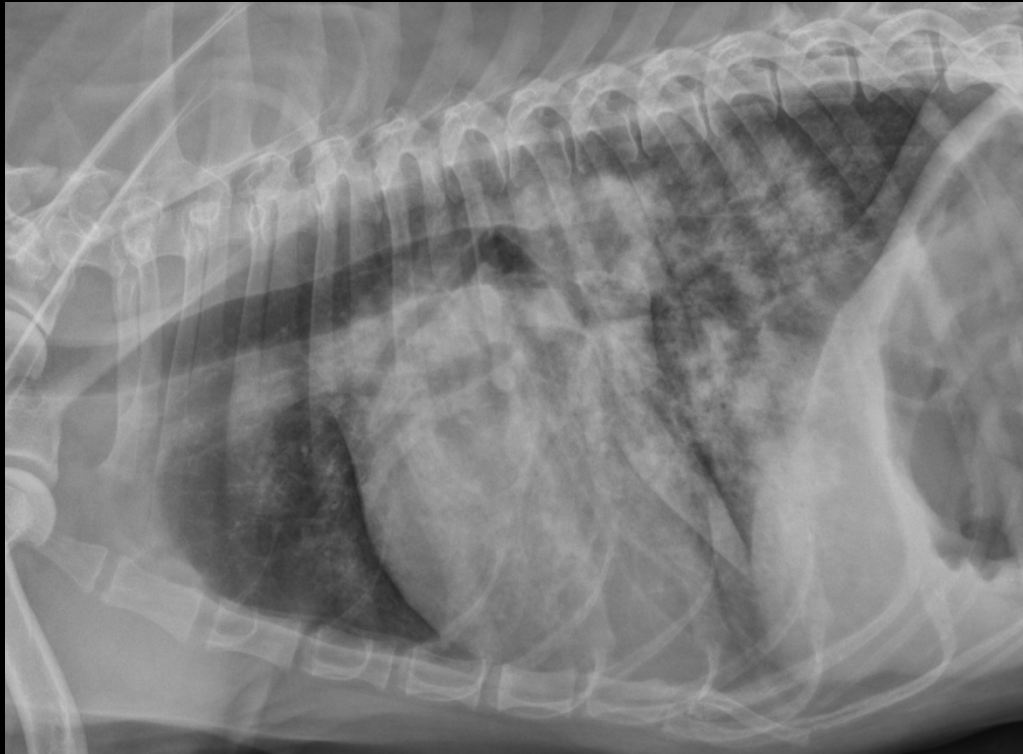
Next step?



Radiographic Features of CHF in dogs

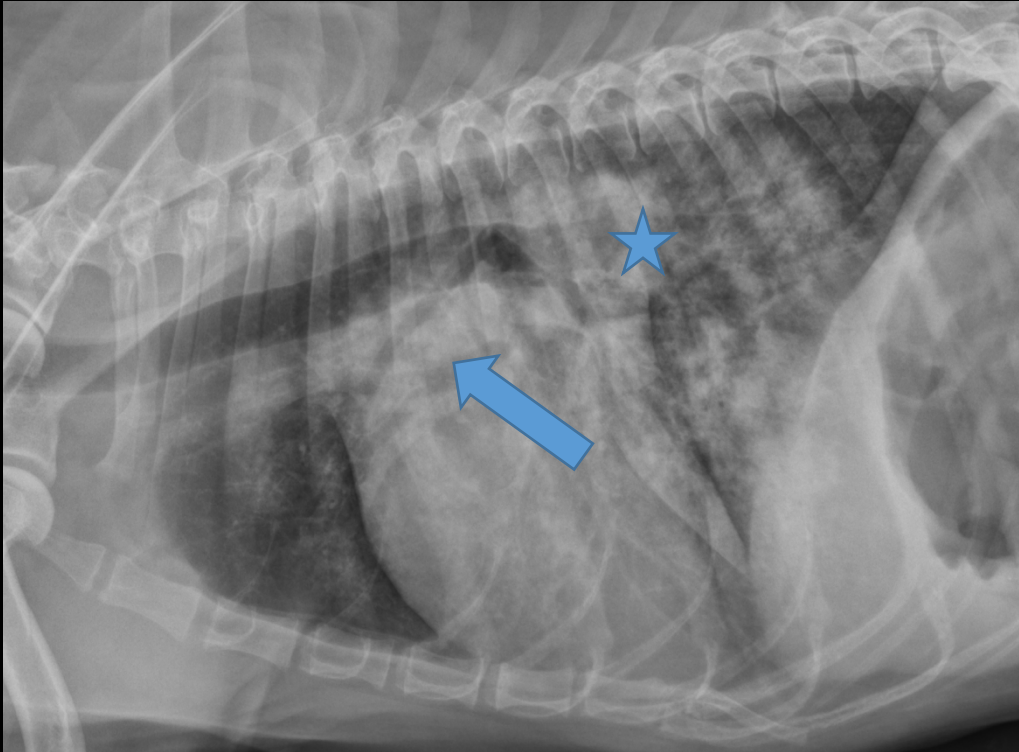
- Cardiomegaly
 - VHS over 10.5 in the dog
 - LA enlargement if L-CHF
- Pulmonary venous distension
- Pulmonary edema
 - Perihilar → caudodorsal → cranioventral
 - Interstitial to alveolar
- R-CHF
 - Pleural effusion –uncommon in the dog, cats (R or L CHF)
 - Ascites – dogs, uncommon in the cat

Question 2: Does Whitepaws have CHF?



A) CHF B) not CHF

Question 2: Does Whitepaws have CHF?



Whitepaws – A) CHF

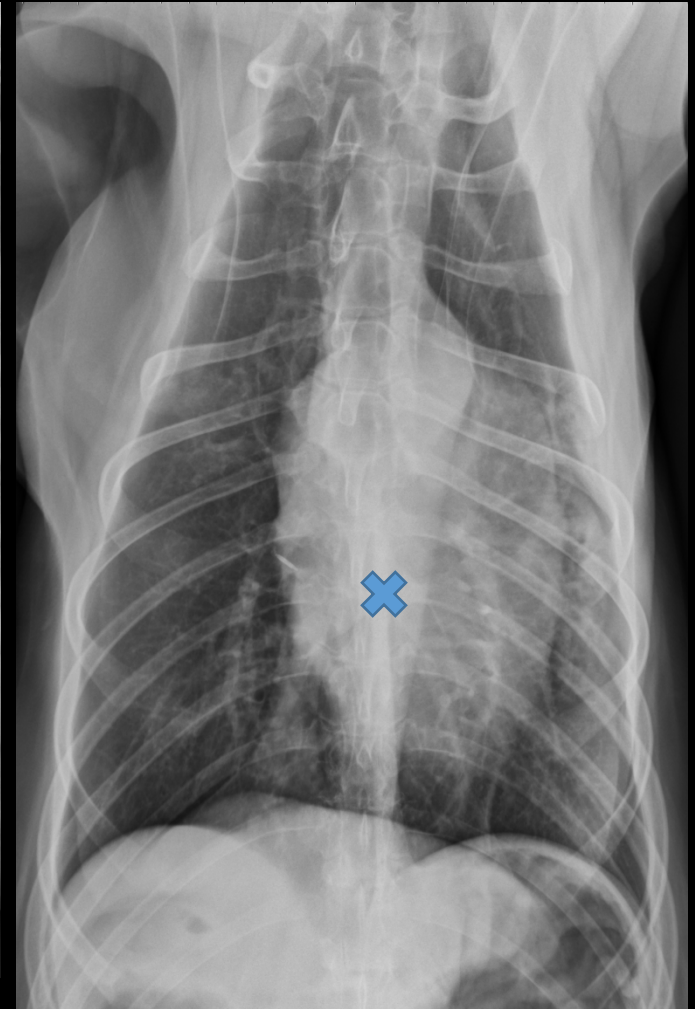
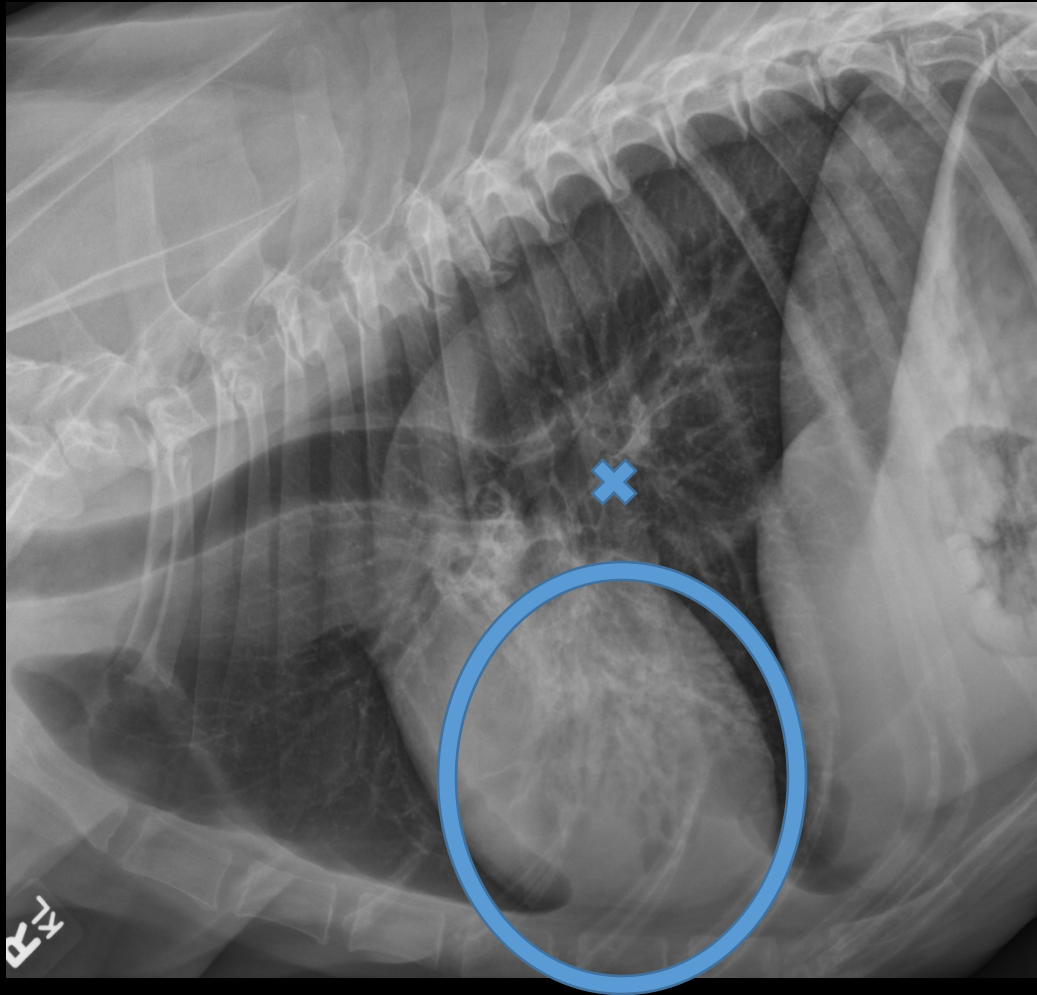


Question 3: Does Sugar have CHF?



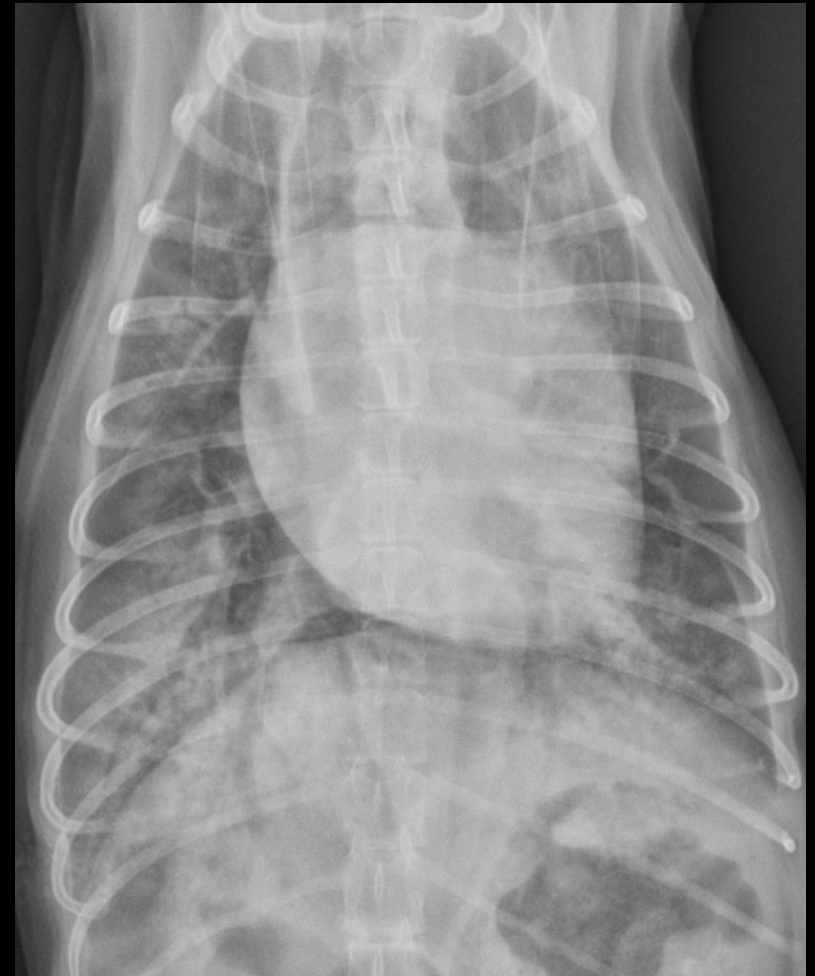
A) CHF B) not CHF

Question 3: Does Sugar have CHF?



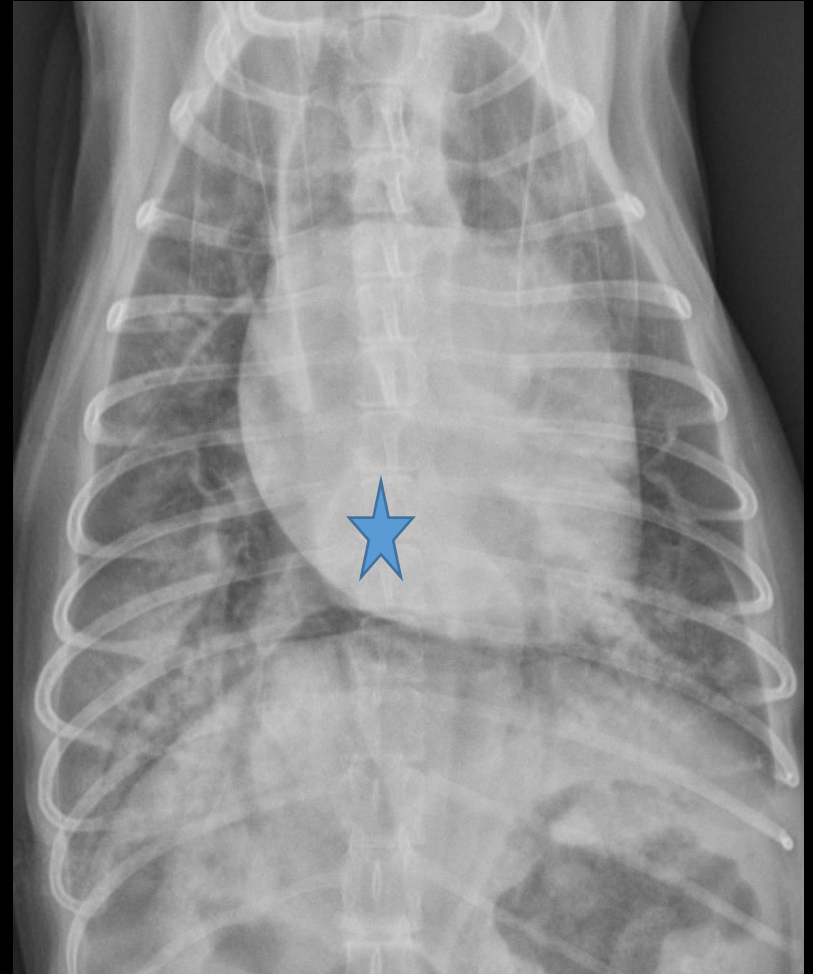
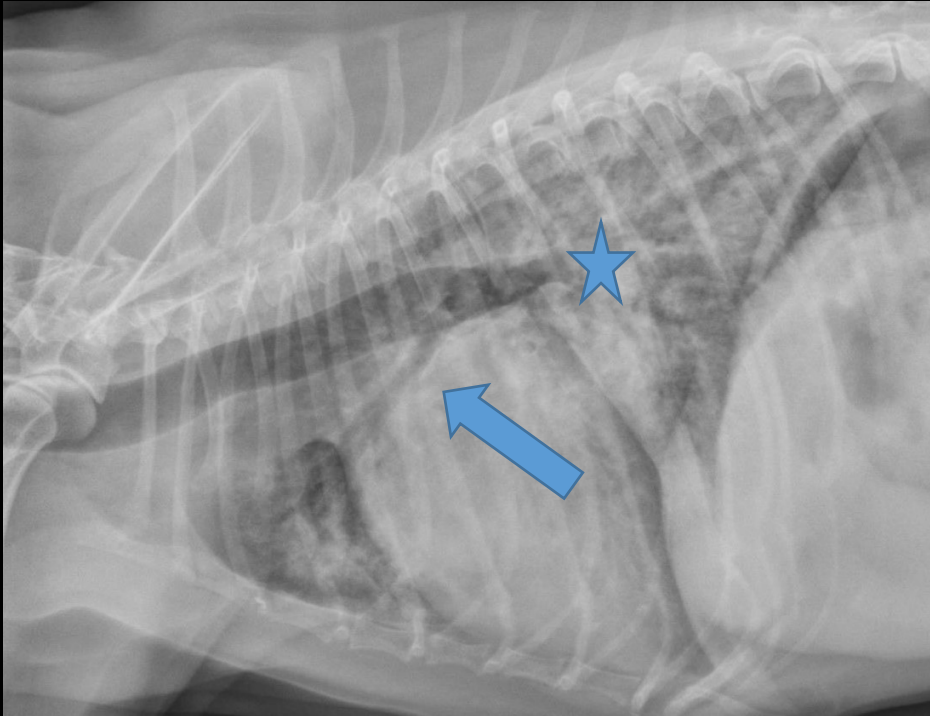
B) not CHF

Question 4: Does Max have CHF?



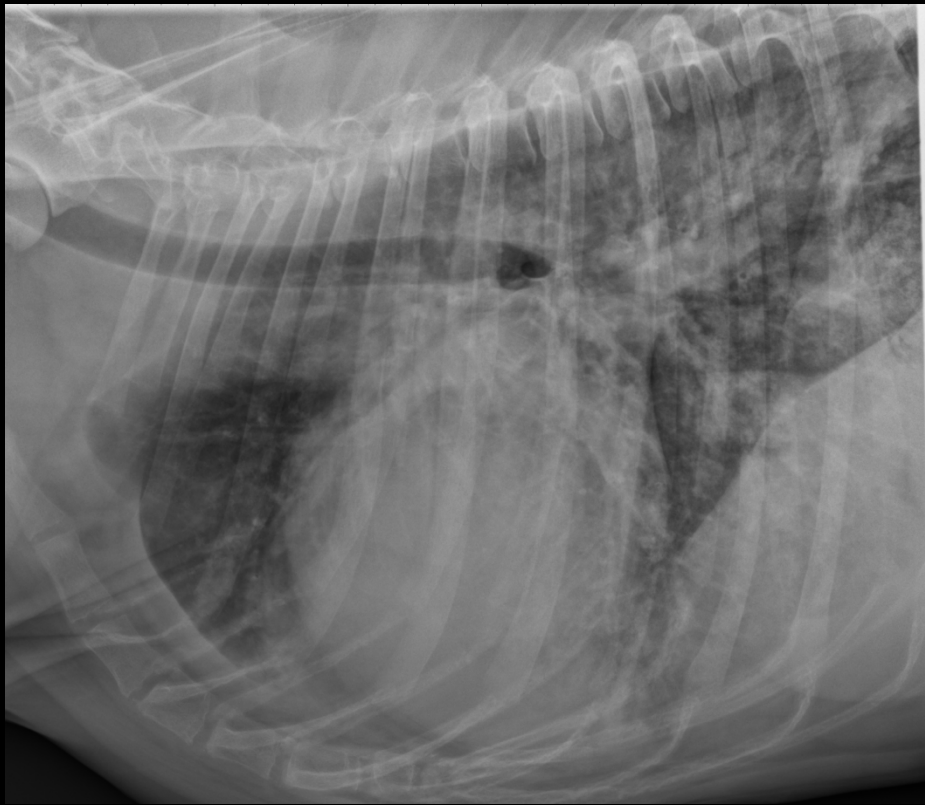
A) CHF B) not CHF

Question 4: Does Max have CHF?



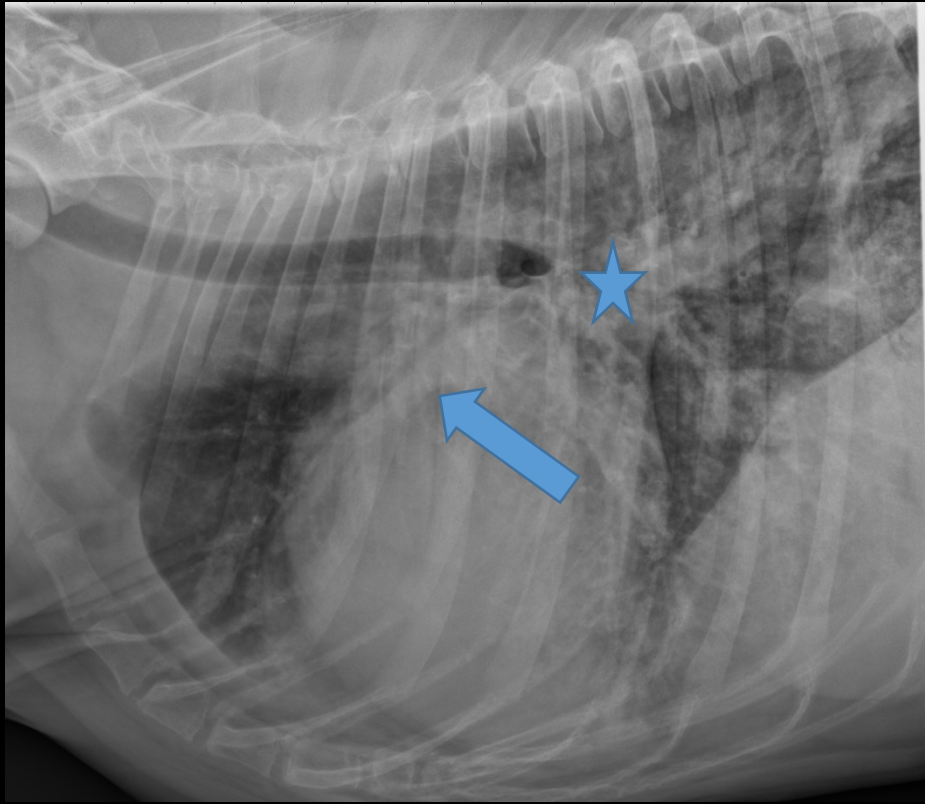
A) CHF

Question 5: Does Ben have CHF?



A) CHF B) not CHF

Question 5: Does Ben have CHF?



A) CHF

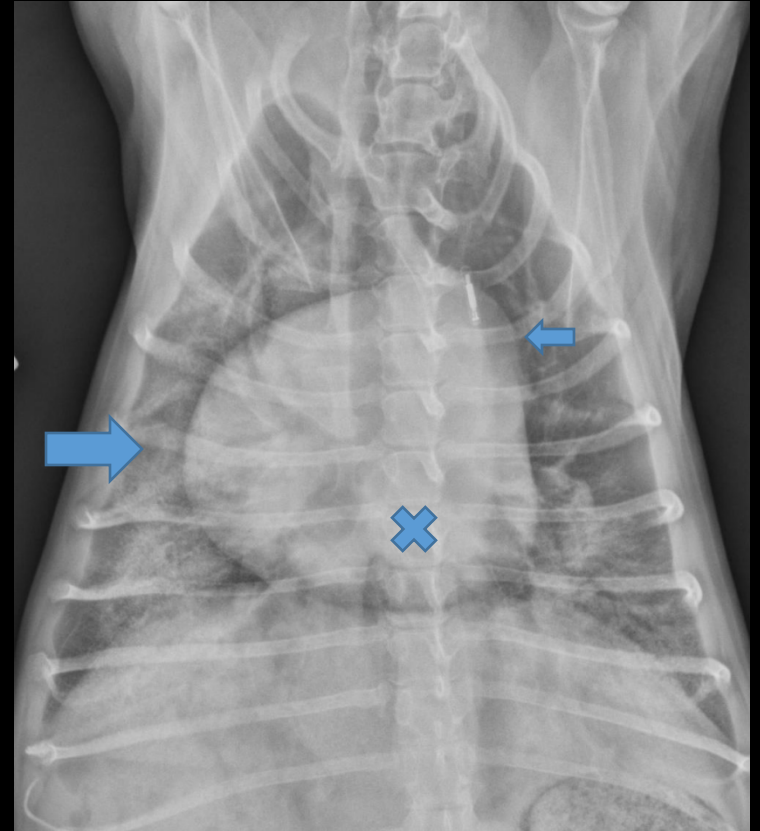
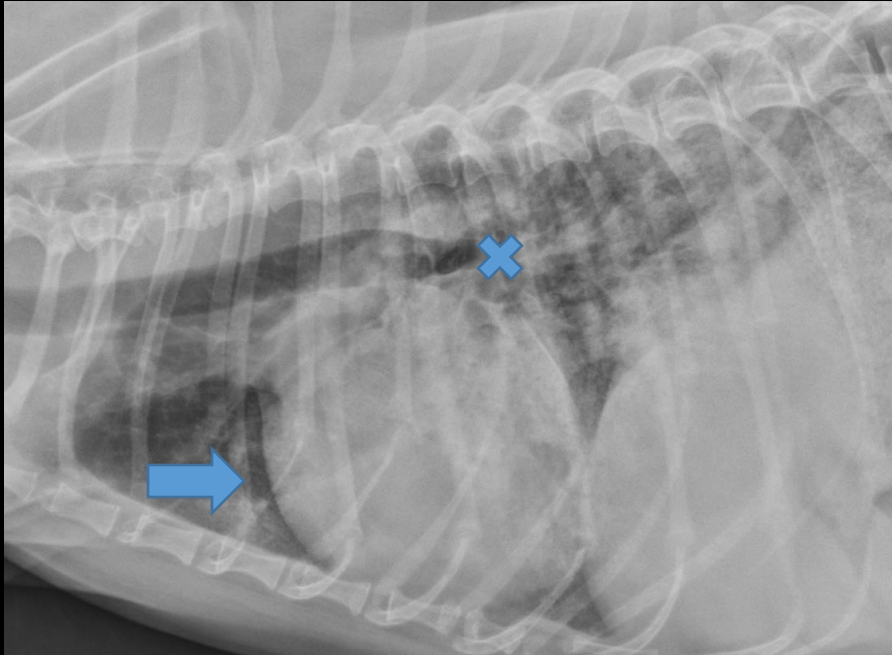


Question 6: Does Lady have CHF?



A) CHF B) not CHF

Question 6: Does Lady have CHF?

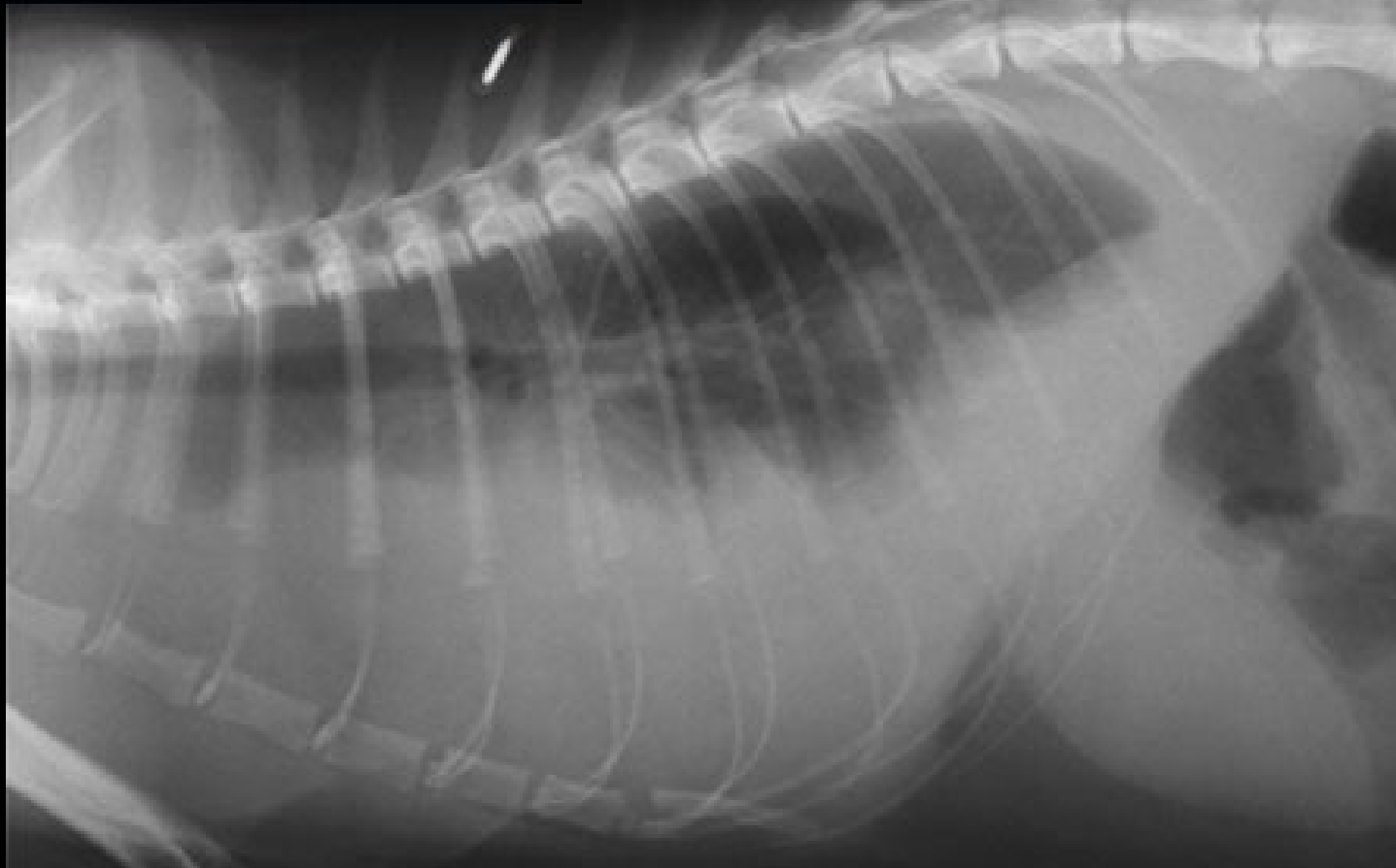


B) not CHF



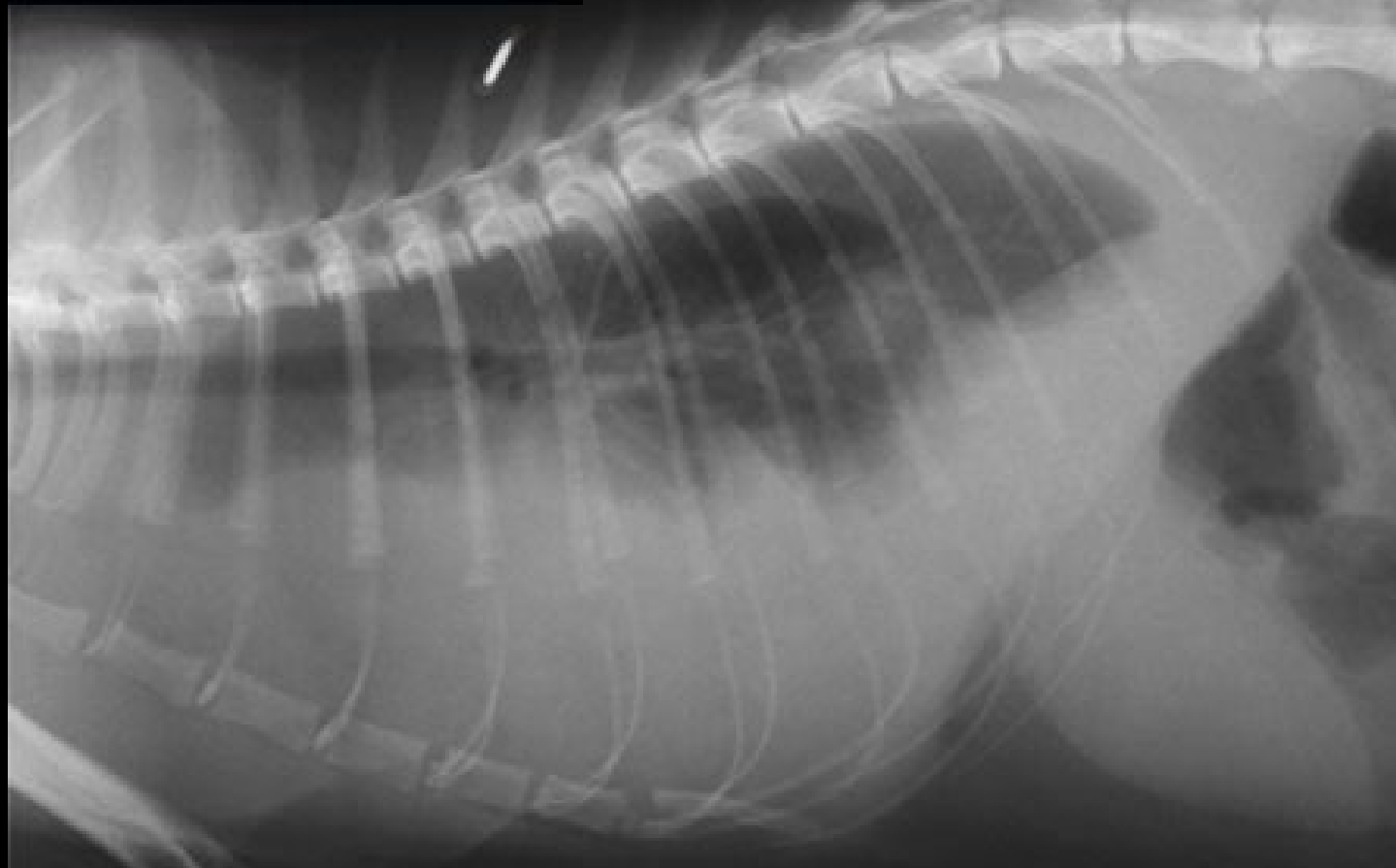
Kellihan HB, Waller KR, Pinkos A, et al. Acute resolution of pulmonary alveolar infiltrates in 10 dogs with pulmonary hypertension treated with sildenafil citrate: 2005-2014. J Vet Cardiol 2015

Question 7: Does Marty have CHF?



A) CHF B) not CHF

Question 7: Does Marty have CHF?



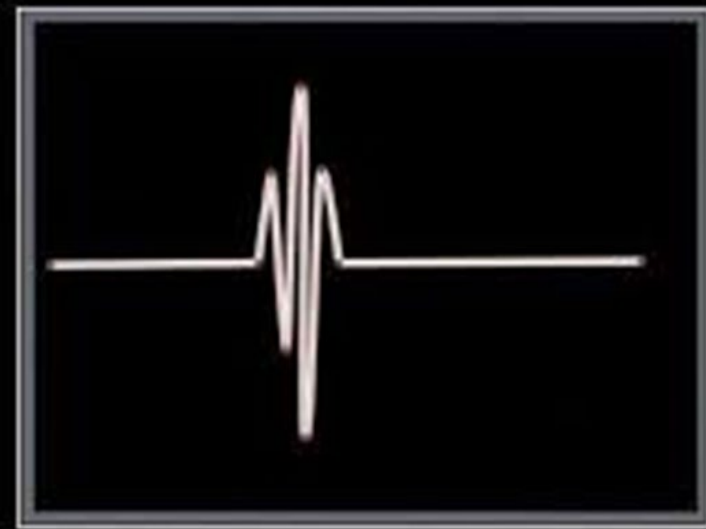
B) not CHF

Other Diagnostics?



Other Diagnostics...If Possible

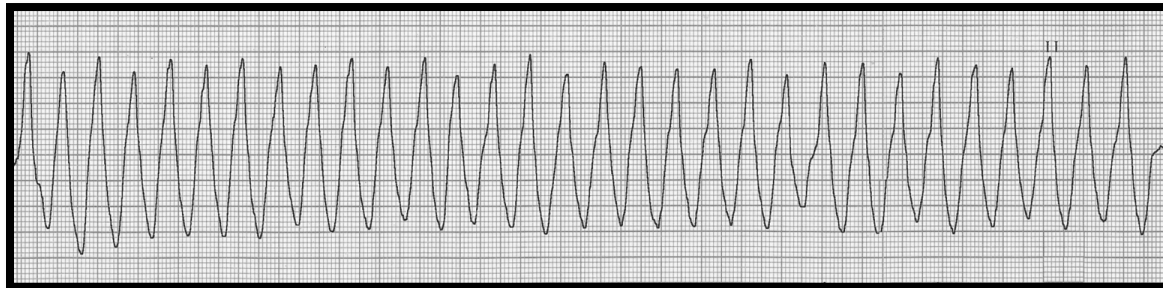
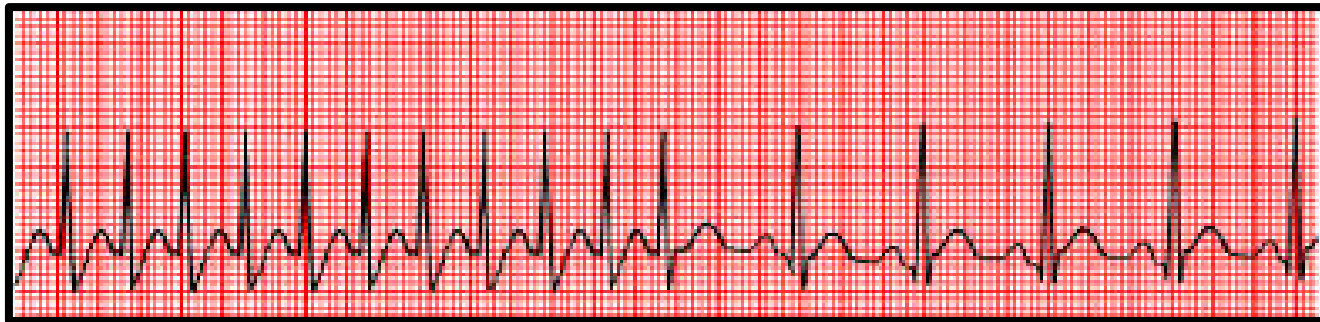
- ECG
- Blood work
- Echocardiogram
- Blood pressure
- ✕ Pulse oximetry



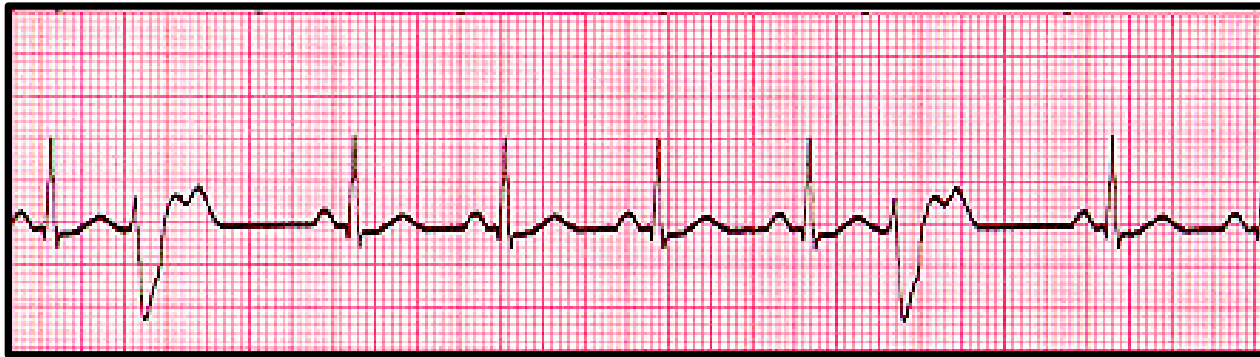
IF THERE ARE NO UPS AND DOWNS IN YOUR LIFE

IT MEANS YOU ARE DEAD

Regular Rhythm



Irregular Rhythm



Therapy?



Acute Therapy

- **Furosemide**
 - 2mg/kg IM or IV (not SQ)
 - Repeat as needed (q8 good starting point)
 - Caution with CRI
- **Oxygen**
- **Pimobendan**
 - 0.25 – 0.3mg/kg PO q8
- **Sedation**
 - +/- Butorphanol
 - Caution





Monitoring

Hands Off

- RR/RE q1hr
- Coughing
- Heart rate and rhythm
 - Auscultation
 - Telemetry
- Attitude
- Appetite
- Urination



Hands On – as needed

- Typically q24
- Repeat radiographs
- Serial bloodwork
 - Azotemia
 - Hypokalemia
- Blood pressure
 - Hypotension

Not responding



- Reduce afterload
- Increase output
- Arrhythmias
- Consider other respiratory disease processes

Re-evaluate your Tx

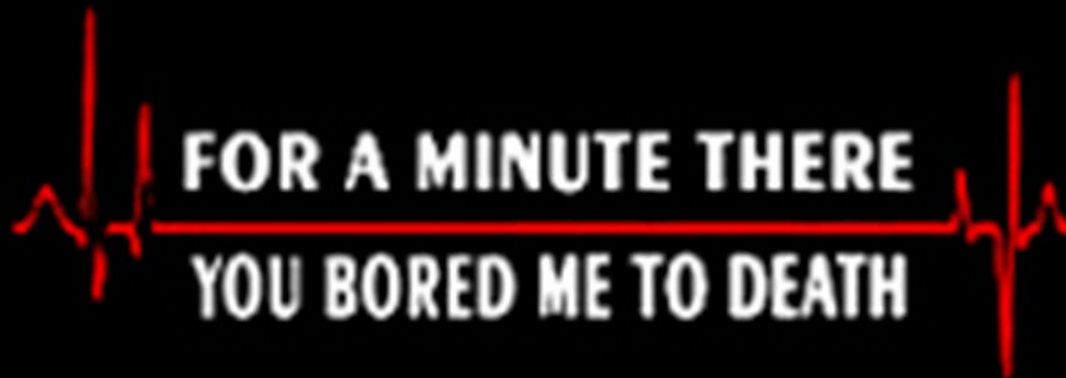
Consider other diseases

- Pulmonary hypertension
- Pulmonary thromboembolism
- Non-cardiogenic pulmonary edema
- Pneumonia

You might think being a
Respiratory Therapist
Is easy... 
But It's **S'NOT**

Arrhythmia?

- **Atrial fibrillation or atrial tachycardia**
- **Ventricular tachycardia**
- **Occasional VPCs or APCs**
- **Remember to avoid B blockers with CHF**



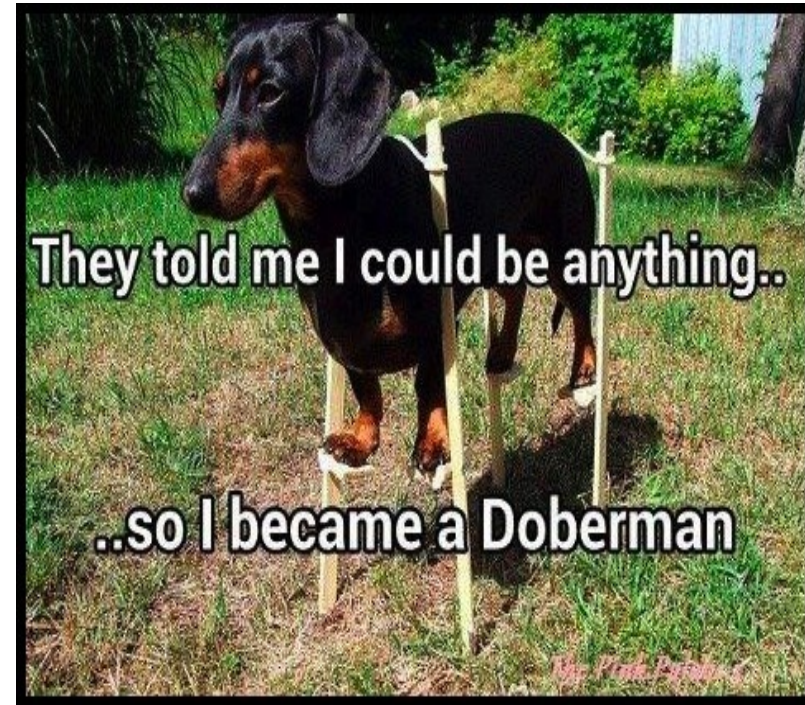
Reduce Afterload

- Amlodipine PO
 - Arterial > venous
 - Cannot titrate
 - 0.2-0.4mg/kg PO q24
- Hydralazine PO
 - Arterial > venous
 - 0.5mg/kg (initial dose), then titrate to 0.5-2mg/kg PO q12
- Nitroprusside IV CRI
 - Arterial + venous
 - Can titrate or discontinue
 - 1-5 mcg/kg/min, max out at 10
 - expensive



Increase Output

- Pimo may not be enough
- Dobutamine IV CRI
 - B1 agonist, mild B2 and α 1 agonist
 - 1-5mcg/kg/min, max out at 10
- Milrinone IV CRI
 - Inodilator, PDE3 inhibitor
 - 50mcg/kg IV slow bolus (10min)
 - 0.5mcg/kg/min
 - Only NaCl
 - Phlebitis
- Telemetry
 - Dobutamine & milrinone arrhythmogenic



Discharge



Discharge Meds

- Furosemide
 - 2mg/kg PO q12
- Pimobendan
 - 0.25 – 0.3mg/kg PO q12
- +/- Potassium supplement
- +/- Anti-arrhythmics
 - Diltiazem 1-3mg/kg PO q8
 - Mexiletine 4-8mg/kg PO q8
- Note: no ACEi or spironolactone

Recheck

- When?
 - ~1-2 weeks typically
- What?
 - Thoracic radiographs
 - Bloodwork – kidneys and electrolytes
 - BP
 - +/-ECG
- Therapy adjustments?
 - Benazepril 0.5mg/kg PO q12
 - Spironolactone 1-2mg/kg PO q12



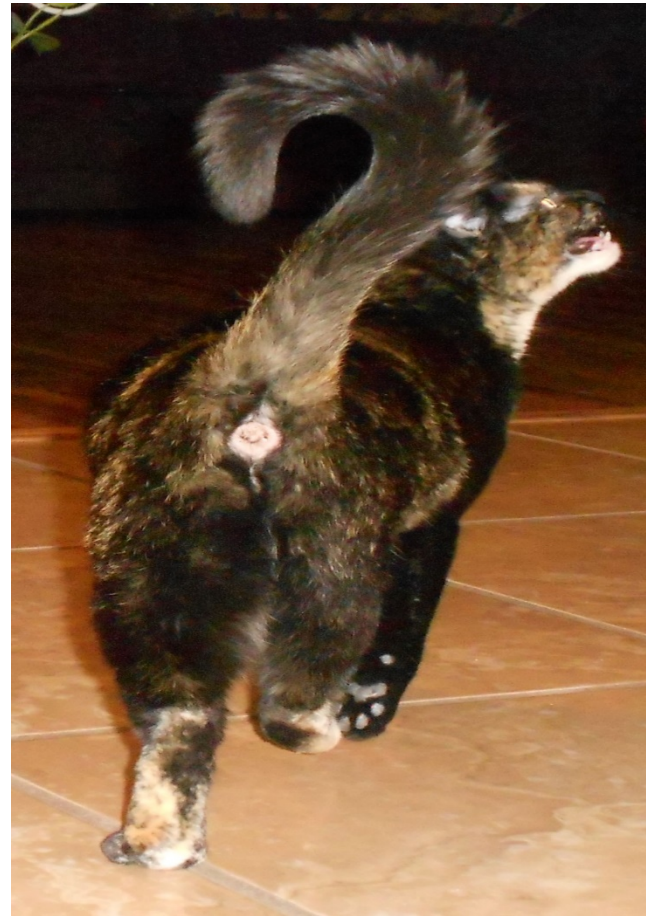
Take Home Points

- PE and radiographs are important diagnostic tools
 - Murmur + crackles on PE does not equal CHF
 - Big LA + B lines on ultrasound does not equal CHF
- Every case of CHF is unique
 - Not cookie cutter
 - Monitoring and response guide tx



The End

Questions?



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