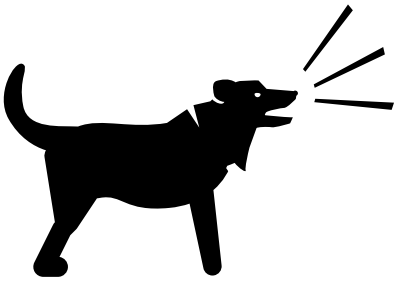
MITRAL VALVE DISEASE

PART 1: Diagnosis and Staging

VetVault CLINICAL Small Animal Medicine

With Dr Clint Yudelman



THE COUGHING DOG THAT HAS A HEART MURMUR:

- Is this dog in congestive heart failure and do we need to focus on treating that?
- Does it have a cardiac cough, but not due to congestive heart failure?
- Does it have a primary airway (non-cardiac) cause for cough?

DIFFERENTIATING CARDIAC COUGH FROM NON-CARDIAC COUGH

3 QUESTIONS FOR THE OWNERS

1. **What is the sleeping respiratory rate?**
   - If the sleeping respiratory rate is **under 30 - unlikely to have congestive heart failure**
2. **What is the nature of the cough?**
   - Can provide a lot of guide to the clinician as to whether it could be pulmonary oedema. **Your typical pulmonary edema cough is a wet** or soft and moist cough.
   - If pulmonary edema causes the coughing, the coughing receptors are really only in the larger airways like the trachea and the main stem bronchus, so for pulmonary oedema to be causing the cough it has to be pretty significant congestive heart failure.
   - Expect those dogs to have severe tachypnoea and dyspnoea as well.
3. **Does the cough worsen at night?**
   - Congestive heart failure coughing typically worse at night.

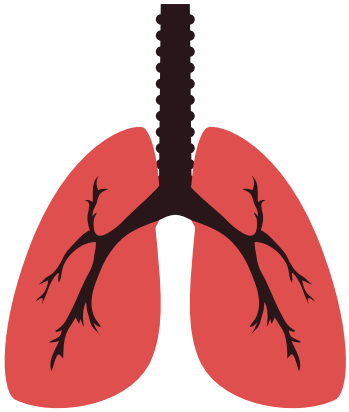
NOTE:

Bear in mind that a **non-congestive heart failure, but still cardiac causes of coughing** (common in older dogs) are things like **pulmonary hypertension and left atrial induced main stem bronchiolar compression.**

LEFT ATRIAL INDUCED MAINSTEM BRONCHIOLAR COMPRESSION

- The trachea is quite squishy.
- As the atrium gets bigger and bigger it starts to put pressure on the trachea.
- These dogs might have underlying bronchomalacia.
- Physical irritation of the airways will generally trigger a dry cough - **a goose honk,** almost **like a tracheal collapsed type of cough**, with typically **a normal sleeping respiratory rate.**
- Diagnostic tools: combination of x-rays, fluoroscopy and sometimes even bronchoscopy to assess the compression of the mainstem bronchus; also to do a lung wash to see if there is concurrent inflammatory infiltrates,as these dogs might have chronic bronchitis.

Lung wash is the last option in terms of diagnostics. We prefer to do something like fluoroscopy.



When to consider lung wash?

- Do a treatment trial.
- If the dog doesn't respond appropriately consider scope and lung wash.

PULMONARY HYPERTENSION

- Literature reports the prevalence of pulmonary hypertension in mitral valve disease around 50% of cases.
- Defined as when tricuspid regurgitation velocity or maximum velocity is 2.75 m/sec or more
- If left untreated, pulmonary hypertension can worsen the clinical signs and can hasten the disease and shorten survival time.
    - Worsened signs: coughing, syncope, dyspnoea, exercise intolerance

> *Usually, once I get above **3 m/sec** that's when I start to think about treating them.*

NOTE:

big overlap of clinical signs with congestive heart failure

> *This is where I feel like echocardiography is probably superior than x-rays.*

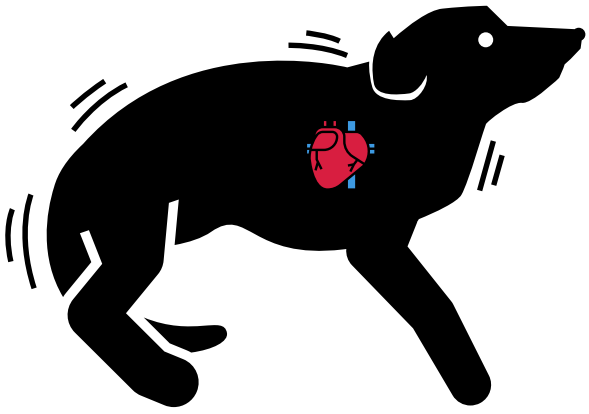
NOTE: The term 'mitral valve disease' is a bit misleading and inaccurate:

- Yes, the mitral valve is the main valve involved, but the tricuspid valve is extremely commonly involved too
- Should rather be called **myxomatous valvular disease or chronic valvular disease**

> *I see about up to 90% of dogs with mitral valve involvement have a tricuspid valve involvement.*

DOES THE TREATMENT FOR CONGESTIVE HEART FAILURE REDUCE THE PRESSURE IN THE LUNGS?

- Yes and No
- Pimobendan being a phosphodiesterase inhibitor can actually be used to treat the really mild cases of pulmonary arterial hypertension on its own.
  - mild cases -- pressure of velocity across the tricuspid valve now is around 2.75 to low 3
- Some cardiologists typically don't treat pulmonary hypertension until dogs are actually clinical, eg syncope, or a cough that's not responding to treatment.



> *Part of the pathophysiology and my rationale for treating fairly early pulmonary hypertension is you get a lot of irreversible changes that you can't change or revert back to normal. And a lot of that comes from the arterial remodeling in the pulmonary tree, which becomes less distensible, hypertrophic and thickened.*
>
> *The sooner you can implement treatment to prevent more irreversible damage, the better response to treatment you're going to get, and the slower the disease will track along*
>
> *My rationale is a little bit different because there is irreversible vessel damage and the treatment itself is relatively well tolerated in dogs and cats.*

ULTRASOUND VS XRAY

- Ideally do both

ECHOCARDIOGRAPHY

- Echocardiography is gold standard to diagnose mitral valve disease or myxomatous valve disease
    - gives us a diagnosis of the type of disease that's going on in the heart
    - more accurately stages it compared to an Xray
    - able to diagnose pulmonary hypertension

NOTE:

If you had to choose one test for that dog with a cough of potentially cardiac nature, you'd probably get more out of an echo.

X-RAY

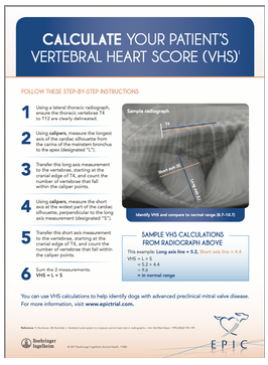
- Has the benefit of all the global perspective of the lungs and the heart and all the other structures within the thorax
- Look for clues of congestive heart failure, because you might see pulmonary venous distension and perihilar alveolar infiltrate

STAGING

- Working up the dog that comes in for vaccination and you pick up a murmur, but no a history of a cough or CHF:

Imaging

- If doing an x-ray, we're probably going to look at a combination of **vertebral heart score or the vertebral left atrial score (V-las)**



Measuring VHS: https://www.epictrial.com/download/Guidelines-for-calculating-VHS.pdf

Measuring V-las: https://www.imv-imaging.co.uk/veterinary-learning/journal-club/vertebral-left-atrial-score-vlas/

Imaging

- If doing an echo measurement of the left atrium compared to the aortic diameter

Measuring LA:AO ratio
https://www.animalultrasoundassociation.org/left-atrium-in-veterinary-echocardiography/

NOTE: An echo does an excellent job in staging heart failure.

STAGES OF HEART FAILURE

STAGE	DESCRIPTION
STAGE A	basically means an at-risk breed - cavalier or a small breed dog
STAGE B1	dog with a murmur with no left atrial enlargement and no left ventricular dysfunction
STAGE B2	the dog with a murmur, not yet in congestive heart failure, but has cardiac remodeling
STAGE C	congestive heart failure
STAGE D	congestive heart failure end-stage

NOTE: Stages B1 and B2 are non-clinical
(Remember: C = clinical, D = death's door!)

- *ACVIM consensus guidelines, differentiate stage C to stage D often based on Furosemide dose*
  - *dogs on more than 8 mg/kg/day of Frusemide are considered stage D*