



Echo Case Challenges for Advanced Practitioners Mini Series

**Session One: HCM & When HCM is
not HCM**

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Echo Case Challenges: a problem-oriented approach
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Session 1: 'HCM & When HCM is not HCM'

Hypertrophic cardiomyopathy (HCM) is the most common myocardial disease in cats and affects approximately 15% of cats. It is characterized by a hypertrophied and non-dilated left ventricle (LV) in the absence of abnormal loading conditions (other cardiac or systemic disease) capable of producing similar degree of hypertrophy. Therefore the diagnosis of HCM is not only based on a typical echocardiographic phenotype, but as well in the systematic exclusion of systemic diseases capable of causing left ventricular hypertrophy (LVH). Several diseases/conditions may cause increased left ventricular wall thickness mimicking HCM. Therefore, a thick ventricle on echo is not always HCM! and is of paramount importance to recognize and exclude diseases that look like HCM, as the prognosis and treatment may be quite different.

In feline cardiology the following conditions have been shown to cause an HCM phenotype:

- Abnormal loading conditions: aortic stenosis and systemic hypertension
- Endocrine disorders: hyperthyroidism, acromegaly
- Pseudohypertrophy: dehydration/hypovolemia
- Infiltrative disease: lymphoma
- Transient myocardial thickening (TMT): myocarditis?

There are several steps one should take until a final diagnosis of HCM is reached.

1. Left ventricular hypertrophy on echo:
 - a. Aortic stenosis? (rare in cats!!) Assess aortic valve motion, thickness, left ventricular outflow tract velocities= thick aortic valve, reduced motion, increased aortic flow velocities (without SAM)= aortic valve stenosis
 - b. Hyperthyroidism? Cat >9yrs of age? measure T4
 - c. Systemic hypertension? Measure systemic blood pressure, if systolic blood pressure > 180 mmHg, LVH may be 2nd to systemic hypertension.
 - d. Young cat? Measure cardiac troponin I, if >3-5ng/ml highly suspicious for myocarditis, may run titers for Bartonella and Toxoplasma gondii

- e. Diabetic cat? Consider acromegaly, measure IGF-1
- f. Dehydration? If a cat is dehydrated/hypovolemic the left ventricle may appear thicker than normal, so called pseudo-hypertrophy. In such cases the left atrium is always normal! The left ventricular wall thickness should normalise once the cat is rehydrated

Several factors make HCM phenotyping particularly challenging in both humans and cats, namely age-dependent expression of LVH, a wide range of phenotypic variation in the LV pattern of hypertrophy and absence of clear diagnostic cut-off values in cats. There is no consensus among cardiologists of what is the best cut-off to diagnose HCM, considering that the large majority of cats will have wall thickness $<5\text{mm}$, we consider that $>5.5\text{mm}$ is indicative of left ventricular hypertrophy. But more important that diagnosing HCM *per se* is to assess the risk of a cat developing serious complications associated with this disease, namely congestive heart failure (CHF) and thromboembolism (ATE). The risk of CHF and ATE is related to left atrial size, so in any echocardiographic examination besides assessing left ventricular wall thickness one must assess left atrial size! The bigger the LA the higher the risk of complications. A left atrium $>16\text{mm}$ (long-axis) or $\text{LA}/\text{Ao}>1.6$ (short-axis) is dilated and the cat is at risk of CHF or ATE.