Biomarkers and hypertrophic cardiomyopathy in breeding cats

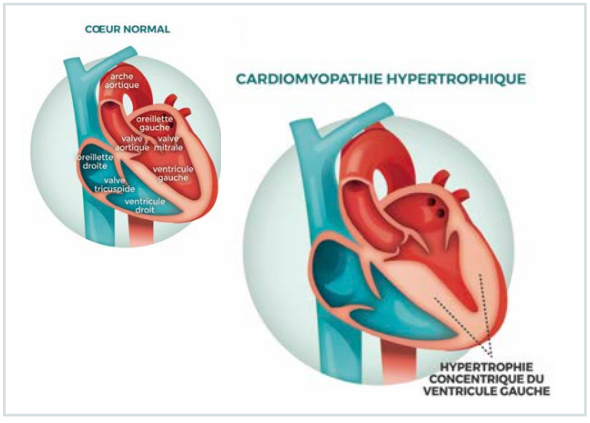
Article by

Dr. Catherine Bélanger

Dr. Jean-Sebastien Boileau

Hypertrophic cardiomyopathy (HCM) is the most commonly diagnosed cardiac disease in cats. It is a sneaky cardiac disease that shows varying symptoms over a long period of time, meaning it can be detrimental to the cat's health before it is even properly identified. HCM can lead to heart failure as well as arterial thromboembolism.

Unfortunately, a simple cardiac auscultation in cats is not always as helpful as it is in dogs. Here is why: the fact that a cat has a murmur does not necessarily mean they have a heart disease and the absence of a murmur doesn't exclude the possibility of them not having a disease either. Veterinarians have access to complementary testing in order to help with diagnosing cardiac disease in cats (graphic 1).

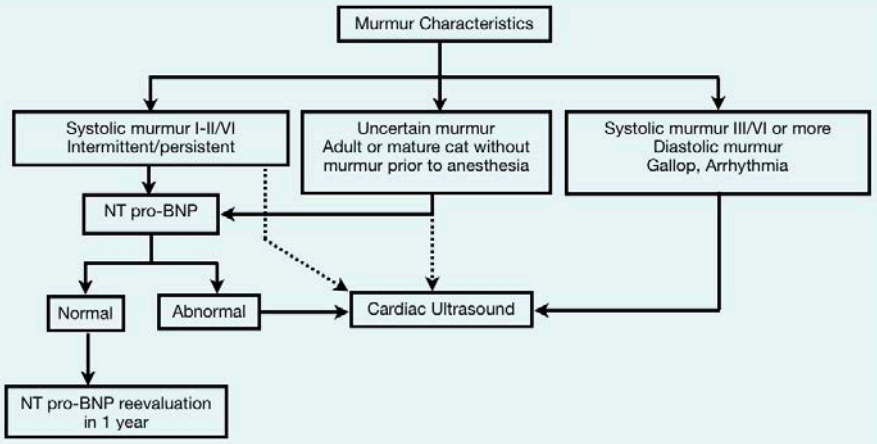


For more information:

evetmobile1@gmail.com

www.evetmobile.com

Graphic 1 : Murmur Management in Cats



As illustrated, an cardiac ultrasound along with the use of cardiac biomarkers such as NT pro-BNP are helpful tools to help detect cardiac disease in cats.

- A *cardiac ultrasound* is the most efficient and detailed test which is why it is **the best test option**.
- *Biomarkers* can also be helpful. *However*, it is important to remember that it cannot determine the type cardiac disease present or its severity. Therefore, biomarkers **cannot replace a cardiac ultrasound**.
  - The most commonly used biomarkers are NT pro-BNP and cardiac Troponin-I.

DID YOU KNOW....

In **human medicine**, HCM is the most commonly diagnosed cardiac disease in family genetics. It is often caused by a mutation of the sarcomeric gene with over 1400 different mutations on an average of 11 sarcomeric genes or myofilaments identified in humans.

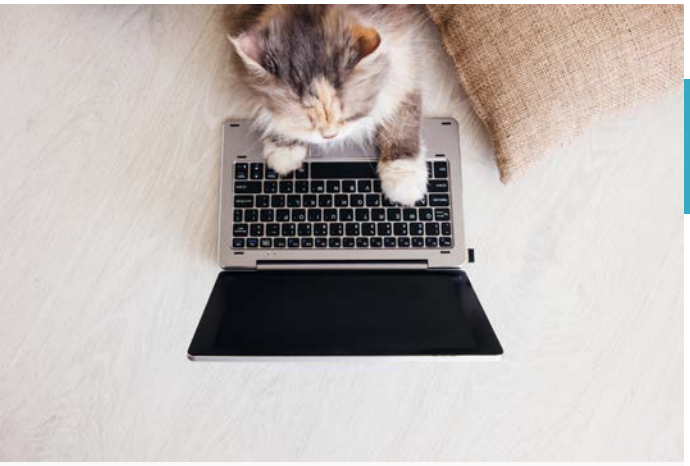
HOW TO MANAGE BREEDING CATS?

Breeding cats represent a tiny portion of the feline population, but their management is complex due to the impact that a patient in the pre-clinical stage could have within the animal husbandry.

In cats, HCM is **suspected** as a hereditary disease in the following breeds: American shorthair, Norwegian Forest, Sphynx, Persian and Bengal. HCM is **confirmed** as a genetically hereditary disease in the Main Coon and Ragdoll.

Respectively, the genetic mutation markers in these breeds are MyBPC3-A31P and MyBPC3-R820W. The identification of these mutations helped in understanding HCM, it is however known that only around **34%** of Main Coons and Ragdolls diagnosed with HCM are carriers of this genetic mutation. **Based on these findings and the number of mutations found in humans, many other mutations have yet to be identified.**

These findings are important to remember because **it implies that not just one simple genetic test is enough to identify all the patients with HCM.**



CMH... In short !

- A heart murmur in a cat is not always an indicator for heart disease, nor does the absence of one exclude the presence of heart disease. **Therefore a cat with HCM, even severe, could have no heart murmur.**
- Unfortunately, all cats are at risk of getting HCM… even domestic and mixed breed cats.
- Louder systolic murmurs are more likely to be associated with HCM..
- The dynamic obstruction of the right outflow tract (DRVOTO) can be seen in patients with obstructive or non obstructive HCM.
- Older patients are at a higher risk of heart failure.

HCM SCREENING RECOMMENDATIONS:

- Cardiac ultrasound screening starting at the **age of 12 months**.
- **Annual** follow-up during the whole breeding period.
- Ideally the screenings should continue even after breeders are no longer used for breeding purposes (in order to identify the disease in a more advanced age).
- Screening **is not recommended** in pregnant or lactating female due the hemodynamic changes that occur during those stages.

Physical examination, x-ray, ECG and biomarkers are not sensitive enough for proper screening of occult or mild HCM. The key element to remember is that HCM, even though mild, could have a huge impact in the breeding pool.

When screening for HCM, three results are possible:

1 Normal	2 Équivocal	3 Abnormal
Cat with no evidence of disease	HCM can't be completely ruled out because the heart muscle measures in the grey zone or because of the presence of a left outflow tract obstruction.	Patient found to have heart disease (HCM or other) The parents, siblings and offsprings should be tested and monitored closely and be bred in a secure manner.
Can be used for breeding	Should temporarily not be bred	Should not be use for breeding
Annual follow-up	Follow-up in 6-12 months	Follow-up: depends on the cardiacfindings