

HYPERTROPHIC CARDIOMYOPATHY IN CATS

(TYPE OF HEART MUSCLE DISEASE)

BASICS

OVERVIEW

- “Hypertrophic” refers to hypertrophy; “hypertrophy” is an increase in size of a tissue or organ that is not due to formation of a tumor; “cardiomyopathy” is a disease of heart muscle
- The heart of the cat is composed of four chambers; the top two chambers are the right and left atria and the bottom two chambers are the right and left ventricles; the left ventricle pumps blood into the aorta (the main artery of the body) and thus, into the body
- “Hypertrophic cardiomyopathy” is a disease characterized by inappropriate enlargement or thickening of the heart muscle of the left ventricle; the disease occurs independently of other heart or generalized (systemic) disorders
- Also known as “HCM”

GENETICS

- Some families of cats have been identified with a high number of cases of hypertrophic cardiomyopathy, and the disease appears to be inherited as an autosomal dominant trait in Maine coon cats, where a mutation (“MyBPC”) has been identified in at least one large family
- Genetics have not been determined definitively in other families or breeds

SIGNALMENT/DESCRIPTION of ANIMAL

Species

- Cats

Breed Predispositions

- A familial (runs in certain families or lines of animals) association has been documented in Maine coon cats, American shorthairs, and Persians

Mean Age and Range

- Most common in cats 5 to 7 years of age, with reported age range of 3 months to 17 years
- Most often a disease of young to middle-aged cats
- Unexplained murmurs in senior cats more likely are associated with increased levels of thyroid hormone (known as “hyperthyroidism”) or high blood pressure (known as “hypertension”) than with hypertrophic cardiomyopathy

Predominant Sex

- Male

SIGNS/OBSERVED CHANGES in the ANIMAL

- Difficulty breathing (known as “dyspnea”)
- Lack of appetite (known as “anorexia”)
- Exercise intolerance
- Vomiting
- Collapse
- Sudden death
- Coughing is uncommon in cats with disease of the heart muscle (cardiomyopathy) and usually suggests lung disease
- Abnormal heart sounds when listening to the heart with a stethoscope (examples include gallop rhythm, heart murmurs)
- Muffled heart sounds, lack of chest compliance, and difficulty breathing (dyspnea) characterized by rapid, shallow breathing may be associated with fluid build-up in the space between the lungs and chest wall (known as “pleural effusion”)
- Short, rough snapping breath sounds (known as “crackles”) may be heard when listening to the chest with a stethoscope, if fluid build-up in the lungs (known as “pulmonary edema”) is present
- Weak femoral pulse
- Sudden (acute) hind-limb paralysis with cold limbs, absence of femoral pulse and bluish discoloration (known as “cyanosis”) of the pads and nailbeds in animals with blood clots in the aorta (known as “aortic thromboembolism”)
- Irregular heart beat (known as an “arrhythmia”) in some animals

CAUSES

- Usually unknown—multiple possible causes exist
- Genetics: MyBPC mutation in some cats with hypertrophic cardiomyopathy

RISK FACTORS

- Offspring of animals with familial (runs in certain families or lines of animals) mutation of MyBPC

TREATMENT

HEALTH CARE

- Cats with congestive heart failure should be hospitalized for initial medical management; congestive heart failure is a condition in which the heart cannot pump an adequate volume of blood to meet the body's needs
- Minimize stress
- Oxygen, if cat is having difficulty breathing (dyspnea)
- Warm environment, if cat has low body temperature (known as "hypothermia")

ACTIVITY

- Restricted

DIET

- Sodium restriction in cats with congestive heart failure; congestive heart failure is a condition in which the heart cannot pump an adequate volume of blood to meet the body's needs

MEDICATIONS

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive.

Diltiazem

- Beneficial effects may include slower heart rate, resolution of irregular heart beats (arrhythmias), improved relaxation of the heart muscle during the "rest" phase of the heart beat (known as "diastolic relaxation"), enlargement of heart blood vessels (known as "coronary vasodilation"), enlargement of blood vessels in the body (known as "peripheral vasodilation"), platelet inhibition
- May reduce enlargement (hypertrophy) of the heart muscle in some cats
- Superior to propranolol and verapamil, according to one small study
- Role in patients without clinical signs is unresolved

Beta Blockers

- [Atenolol](#)
- Beneficial effects may include slowing of heart rate, correcting irregular heart beats (arrhythmias), platelet inhibition
- More effective than diltiazem in controlling blockage of blood flow as the left ventricle pumps blood into the aorta, the main artery of the body (condition known as "dynamic outflow tract obstruction")
- Role in patients without clinical signs is unresolved, but authors generally use if dynamic outflow obstruction and enlargement (hypertrophy) of the heart muscle are present
- Should not be used in cases of congestive heart failure; congestive heart failure is a condition in which the heart cannot pump an adequate volume of blood to meet the body's needs

Aspirin

- Decreases crowding or massing together (aggregating) of platelets, hopefully minimizing the risk of blood clots (thromboembolism); however, blood clots can still develop despite aspirin administration

Furosemide (Medication to Remove Excess Fluid from the Body {Diuretic})

- Animals with critical difficulty breathing (dyspnea) often require high dosage to stabilize them; indicated to treat fluid build-up in the lungs (pulmonary edema), in the space between the lungs and chest wall (pleural effusion), and in the abdomen (known as "ascites")
- Cats are sensitive to furosemide and prone to dehydration, excess levels of urea and other nitrogenous waste products in the blood (known as "uremia" or "azotemia"), and low levels of potassium in the blood (known as "hypokalemia")
- Once fluid build-up in the lungs (pulmonary edema) resolves, the dosage should be tapered (as directed by your cat's veterinarian) to the lowest dose that controls fluid build-up (edema)

Nitroglycerin Ointment

- Often used in stabilization of cats with severe fluid build-up in the lungs (pulmonary edema) or in the space between the lungs and chest wall (pleural effusion)
- When used intermittently, it may be useful for long-term management of cases that do not respond well to medical treatment

Angiotensin-Converting Enzyme (ACE) Inhibitors

- Enalapril or benazepril
- Indications in cats with hypertrophic cardiomyopathy not well-defined—may be used in cases with congestive heart failure; congestive heart failure is a condition in which the heart cannot pump an adequate volume of blood to meet the body's needs

Spirolactone (Medication to Remove Excess Fluid from the Body {Diuretic})

- Used in conjunction with furosemide in cats with congestive heart failure; congestive heart failure is a condition in which the heart cannot pump an adequate volume of blood to meet the body's needs

Warfarin (Medication to Prevent Blood Clotting)

- Used sometimes in cats at high risk for developing blood clots (thromboembolism)

Dalteparin (Fragmin®)

- Alternative to warfarin that may eliminate need for patient monitoring for those at high risk of blood clots in the aorta (aortic thromboembolism)

Clopidogrel (Plavix®)

- Platelet function inhibitor, superior to aspirin in people; studies currently under way to evaluate effectiveness in preventing blood clots in the aorta (aortic thromboembolism) in cats

Beta Blocker Plus Diltiazem

- Cats that continue to have a rapid heart rate (known as “tachycardia”) on a single medication can be treated cautiously with a combination of a beta blocker and diltiazem; these cats should be monitored closely for slow heart rate (bradycardia) and low blood pressure (hypotension)

FOLLOW-UP CARE

PATIENT MONITORING

- Observe closely for difficulty breathing (dyspnea), sluggishness (lethargy), weakness, lack of appetite (anorexia), and painful hind-limb weakness or paralysis
- If treating with warfarin, monitor blood work (prothrombin time) to evaluate effectiveness of drug in decreasing likelihood of blood clot and to determine appropriate dose to avoid bleeding
- If treating with an ACE inhibitor or spironolactone, monitor kidney function and electrolytes
- Repeat echocardiogram (use of ultrasound to evaluate the heart and major blood vessels) in 6 months to assess effectiveness of treatment for hypertrophic cardiomyopathy and to evaluate the need for more aggressive treatment to prevent blood clots in the aorta (aortic thromboembolism)

PREVENTIONS AND AVOIDANCE

- Avoid stressful situations that might lead to congestive heart failure; congestive heart failure is a condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs

POSSIBLE COMPLICATIONS

- Heart failure
- Blood clot in the aorta (aortic thromboembolism) and hind-limb paralysis
- Irregular heart beats (arrhythmias)/sudden death

EXPECTED COURSE AND PROGNOSIS

- Prognosis varies considerably, probably because multiple causes exist for hypertrophic cardiomyopathy; in one study, cats living at least 24 hours after presentation to a veterinarian had the following survival times:
 - Asymptomatic cats (that is, no clinical signs of hypertrophic cardiomyopathy): median survival time of 563 days (range: 2 to 3778 days)
 - Cats with fainting (known as “syncope”): median survival time of 654 days (range: 28 to 1505 days)
 - Cats with congestive heart failure: median survival time of 563 days (range: 2 to 4418 days)
 - Cats with blood clots in the aorta (aortic thromboembolism): median survival time of 184 days (range 2 to 2278 days)
- Older age of the cat and larger left atrium predicted shorter survival time

KEY POINTS

- Many cats diagnosed while not showing signs of disease eventually develop congestive heart failure and may develop blood clots in the aorta (aortic thromboembolism) and die suddenly; congestive heart failure is a condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs
- If cat is receiving warfarin to control the formation of blood clots, minimize potential for trauma and subsequent bleeding