

Hypertrophic Cardiomyopathy

ABOUT THE DIAGNOSIS

CAUSE: Hypertrophic cardiomyopathy is a type of heart disease in which the heart muscle tissue becomes unnecessarily and excessively thickened. Hypertrophy is normally a good thing with muscle (as evidenced by the muscles of athletes), but unnecessary and unwanted thickening of the heart's walls makes the walls rigid and unable to move properly, and crowds out the space normally reserved for blood, limiting the heart's ability to sufficiently fill and pump effectively. The body may initially compensate for this "crowding" effect of hypertrophy, and no symptoms are seen, thanks to selective constriction of blood vessels in the body, retention of sodium that would otherwise be lost in urine, and so on. Over time, however, if cardiac hypertrophy continues to worsen, the body's ways of controlling this problem become inadequate, the circulation can be compromised, and as a result, part of the fluid portion of blood weeps into surrounding tissues and can flood the lungs, a potentially serious condition called congestive heart failure.

Hypertrophic cardiomyopathy is a disease that frequently affects cats (it is the most common heart disease of the domestic cat) and virtually never affects dogs. It is thought to be of genetic origin, which explains why it is so widespread and difficult to eliminate or cure.

Hypertrophic cardiomyopathy can be detected in one of four specific contexts:

- A heart murmur (abnormal sound of the heartbeat) is heard with a stethoscope during the veterinarian's routine examination for other reasons. There are no symptoms caused by the hypertrophic cardiomyopathy, even though the extent of hypertrophy may be mild to moderate. This is the most common situation for first finding hypertrophic cardiomyopathy in cats. A similar situation where hypertrophic cardiomyopathy is an incidental (unexpected) finding is the detection of cardiac enlargement on a radiograph (x-ray) of the chest or on an electrocardiogram/EKG.
- The fluid retention caused by hampered circulation compresses the lungs or partially fills them with fluid. A cat in this situation is usually brought to the veterinarian's because labored breathing and/or signs of "not feeling well" (lethargy, hiding, loss of appetite) are present.
- The distortion of the shape of the heart, a result of the cardiac hypertrophy, causes stagnation of blood in one or more of the cardiac chambers. This sluggish blood flow allows a blood clot to form inside the heart, which can then travel into the circulation in an instant, blocking off blood flow to all the organs and tissues "downstream" from the blockage. This very serious form of hypertrophic cardiomyopathy (>50% mortality) usually produces immediate, severe limping or paralysis of the hindlimbs because the blood clot commonly travels to the arteries that supply the back legs (aortic thromboembolism, or "saddle thrombus"). These symptoms can be very painful, and an immediate visit to the veterinarian is warranted if you see a sudden inability to use one or both hind legs or a front leg in your cat.
- Genetic screening (blood test) identifies the genetic mutation for hypertrophic cardiomyopathy in a cat. There may or may not be any signs of heart problems, and the test simply indicates that the cat carries the potential for having—and transmitting to its future generations—hypertrophic cardiomyopathy.

DIAGNOSIS: If your cat has any of these situations described above, your veterinarian will likely suspect hypertrophic cardiomyopathy as a possible explanation. Your veterinarian will perform a thorough physical examination and take a complete medical history regarding your cat, asking you questions in particular concerning any of the symptoms described above, your cat's past medical history, indoor versus outdoor lifestyle, current medications, and so on. Chest x-rays are usually essential since they can show the presence of fluid retention in the lung tissue or chest cavity (pulmonary edema and pleural effusion, respectively) and help to evaluate the possibility of other, completely different ("impostor") problems with symptoms that mimic the symptoms of hypertrophic cardiomyopathy. A urinalysis and blood work, including a complete blood count (CBC), blood chemistry profile, and blood thyroid hormone level, may indicate problems with other organs; blood pressure measurement is also appropriate. It is important to have these results before establishing a treatment plan, to make sure preexisting conditions are not present to interfere with medications. A blood biomarker test (NT-proBNP) measures circulating levels of substances produced by the heart muscle tissue, and these can be elevated in cats with hypertrophic cardiomyopathy. Your veterinarian may use this as an intermediate step because low levels mean it is very unlikely that a cat has hypertrophic cardiomyopathy, whereas very high levels are strongly indicative of a heart condition (although not specific for hypertrophic cardiomyopathy, meaning not a replacement for an echocardiogram). An echocardiogram, commonly called cardiac ultrasound, is the definitive test for hypertrophic cardiomyopathy. It might require shaving a bit of hair from each side of the cat's chest but is otherwise like a human ultrasound: noninvasive, painless, and not needing general anesthesia. It shows the structure of all parts of the heart (walls, valves), blood flow through the heart (Doppler ultrasound), and gives an accurate depiction of cardiac function.

In some situations, cardiac hypertrophy may in fact be caused by a disease outside the heart, but which drives the heart to work harder (and become hypertrophied as a result). These nongenetic diseases, such as hyperthyroidism or hypertension/high blood pressure, are also screened for by your veterinarian. This is because it is possible to reverse and sometimes completely eliminate excessive cardiac hypertrophy if a nongenetic, generalized disorder is found and corrected.

LIVING WITH THE DIAGNOSIS

Cats that are found to have hypertrophic cardiomyopathy simply as a result of the unexpected finding of a heart murmur, cardiac enlargement on x-rays, or on a genetic test, generally do not require medications. A definitive answer to this question is determined from the results of the tests described above. A minority of these cats goes on to develop congestive heart failure or blood clots, whereas the majority does not and instead have a normal lifespan without symptoms. This is important because hypertrophic cardiomyopathy is not automatically a life-threatening disease. Rather, most cats that have mild or moderate hypertrophic cardiomyopathy are unaware of having it, and simply benefit from having certain medications or treatments (or certain types of anesthetics) avoided, in order to put the least degree of excess strain on the heart in the future.

Cats with hypertrophic cardiomyopathy that has triggered fluid retention (congestive heart failure) or a blood clot to the legs

(aortic thromboembolism) are in need of medications to survive. These medications usually need to be given for the rest of the cat's life, and often an in-hospital stay (possibly in intensive care) is necessary for the first few days if the condition is very serious or critical. The outlook for these cats is more guarded; some respond well to treatment and live comfortable lives for months to a few years on average, whereas others do poorly even with the most intense and comprehensive treatment. In most cases, the response (or lack thereof) to treatment starts to become apparent in the first 48-72 hours after the beginning of treatment.

After hospitalization for congestive heart failure or aortic thromboembolism, allow your cat to rest and recover at home, and be sure to give medication exactly as directed. It is important to understand that there is no cure for hypertrophic cardiomyopathy, since it is a disease of genetic origin, but that medication can control some symptoms and improve your cat's quality of life. As the disease process continues and the degree of hypertrophy worsens, medication may need to be increased or changed. Understand the possible side effects of all medication being given so that you know what is normal and abnormal. You can ask your veterinarian for specific details in this regard since they vary depending on the medications used. Some diagnostic tests may be repeated periodically to monitor the worsening (if any) of the hypertrophic cardiomyopathy and to assess medication effects.

Once hypertrophic cardiomyopathy is known to exist in your cat, it is important to avoid stressful situations for your cat. These can strain the heart excessively and cause the return of symptoms. Limiting physical activity to a minimum is a good idea. The behavior of cats often includes their own spontaneous physical activity and exertion (e.g., nighttime hyperactivity) that cannot be controlled, but at least situations that **create** more activity (such as playing fetch to the point of exhaustion) should be avoided. A very serious symptom of oxygen shortage in the body is a sudden change from pinkish to bluish discoloration of the oral mucous membranes (entire surface of the gums), and if you see this abnormality, called cyanosis, you should stop all activity and bring your cat to the veterinarian's immediately if the blue color does not disappear on its own with rest in a few minutes.

TREATMENT

Although there is no cure, cats that are asymptomatic require no treatment, and cats showing symptoms caused by hypertrophic cardiomyopathy can be treated with medications that help control or eliminate those symptoms. If symptoms are severe, your cat may need to be hospitalized and given oxygen and injections of medications, such as diuretics (to evacuate fluid quickly from the lungs) and a sedative (to reduce the intense adrenaline surge that places a great deal of strain on the heart). These more serious cases have a very variable outcome. Some cats respond very well to the medications, and their condition improves within a day or two of admission to the hospital, whereas some others (less commonly) may worsen despite intensive treatment.

Other medications are available that affect the heart's contraction (calcium channel blockers, beta-adrenergic blockers) and prevent blood vessel constriction (angiotensin-converting enzyme inhibitors). However, these have not been consistently effective in treating cats with this disease, and their use is only appropriate in certain cases. Your veterinarian will tailor a treatment specifically for your cat.

DOs

- Go to your veterinarian or the local veterinary emergency clinic immediately if your cat has difficulty breathing (labored, rapid,

or open-mouth breathing) and/or a sudden onset of weakness or inability to use one or more legs, as these symptoms may be caused by several potentially serious disorders, one of which is hypertrophic cardiomyopathy.

- Realize that hypertrophic cardiomyopathy has an extremely wide range of extent, and the statements described above are generalities. Having additional information, like information obtained through the tests described above, enables your veterinarian to answer questions regarding "impostor" diseases (masquerading as hypertrophic cardiomyopathy but actually different), possible treatments, and an outlook on lifespan and possible complications.
- Remember that symptoms (heart murmur, labored breathing, etc.) are only clues that **might** indicate hypertrophic cardiomyopathy. They might also indicate any of several other kinds of very different lung, bronchial, bloodstream, or heart valve diseases. Therefore, the recommended testing is meant to confirm the diagnosis for accurate treatment and prognosis (assessing the likely outcome).
- Inform your veterinarian if your cat has ever been diagnosed with a medical condition and is taking medication, since this can influence the treatment plan. For example, medications with additive effects may be beneficial or harmful depending on the circumstances, so your veterinarian needs to know what your cat is receiving (including supplements and alternative therapies).
- Give medication exactly as directed by your veterinarian, and if you are concerned about possible negative effects, discuss them with your veterinarian immediately rather than simply discontinuing the treatment.
- Take advantage of second opinions. Veterinary cardiologists exist in many large cities and veterinary schools and are known as Diplomates of the American College of Veterinary Internal Medicine (Specialty of Cardiology). Directories: www.acvim.org and www.ecvim-ca.org.

DON'Ts

- Do not postpone visiting your veterinarian if you observe any symptoms that are compatible with hypertrophic cardiomyopathy. Prompt diagnosis and treatment can be lifesaving.
- Do not give medication that you have at home that has been prescribed for human use; some of these may interfere with treatment or cause even more severe problems.
- Do not assume that having hypertrophic cardiomyopathy means your cat's lifespan or quality of life will be compromised. Hypertrophic cardiomyopathy may be a serious heart problem in some cases, but in a majority of cases (asymptomatic cats), it produces no discomfort or problem and warrants only a conservative monitoring approach. None of the four contexts described above is hopeless, and treatment that may produce a positive response is available for all symptoms arising from hypertrophic cardiomyopathy.

WHEN TO CALL YOUR VETERINARIAN

- If your cat is open-mouth breathing. Remember that dogs often pant to control their body temperature, but panting is not normal in a resting cat (emotional panting, such as during a car ride, is an exception). Rather, panting in a cat indicates severe shortness of breath and requires evaluation, even if it disappears on its own in a few minutes.
- If your cat's appetite declines; loss of appetite in cats can cause other, severe complications.
- If you cannot keep a scheduled appointment.
- If you are unable to give medication as directed.

SIGNS TO WATCH FOR

- Watch for general signs of illness, which include vomiting, diarrhea, decreased appetite, and changes in behavior such as lethargy/sluggishness or hiding more than usual. These can occur as part of hypertrophic cardiomyopathy, or as part of an unrelated disorder. Regardless of the cause, if these or other symptoms seem out of the ordinary for your cat, you should contact your veterinarian to determine whether a recheck visit is warranted.
- Watch for signs of hypertrophic cardiomyopathy, which include weakness, inactivity, difficulty breathing (dyspnea), rapid breathing (tachypnea), and sudden inability to use a forelimb (front leg) or one or both hindlimb (back legs).

ROUTINE FOLLOW-UP

- Hypertrophic cardiomyopathy may deteriorate to a severe, life-threatening disease in a minority of cases. Follow-up appointments are important to monitor progress and to determine if treatment should be adjusted. The interval at which those

appointments are necessary is different with each case and needs to be discussed with your veterinarian.

Other information that may be useful: "How-To" Client Education Sheet:

- How to Count Respirations and Monitor Respiratory Effort

Practice Stamp or Name & Address