

RESTRICTIVE CARDIOMYOPATHY IN CATS

(A TYPE OF HEART-MUSCLE DISEASE)

BASICS

OVERVIEW

- The heart of the cat is composed of four chambers; the top two chambers are the left and right atria and the bottom two chambers are the left and right ventricles; heart valves are located between the left atrium and the left ventricle (mitral valve); between the right atrium and the right ventricle (tricuspid valve); from the left ventricle to the aorta (the main artery of the body; valve is the aortic valve); and from the right ventricle to the main pulmonary (lung) artery (pulmonary valve)
- “Cardiomyopathy” is the medical term for disease of the heart muscle; “restrictive cardiomyopathy” is a disease in which the muscle is “stiff” and does not expand, such that blood cannot fill the ventricles normally
- “Restrictive cardiomyopathy” in cats is characterized by abnormal filling of the chambers of the heart (known as “diastolic dysfunction”), severe atrial enlargement, normal left ventricular wall thickness and variable abnormal pumping of the heart (known as “systolic dysfunction”)
- Scar tissue of the heart muscle layer may be present; in addition, other changes or damage in the muscle may be associated with other heart-muscle disorders, including inflammatory or immune-mediated diseases

SIGNALMENT/DESCRIPTION of ANIMAL

Species

- Cats

SIGNS/OBSERVED CHANGES in the ANIMAL

If Cat Does Not Have Congestive Heart Failure (condition in which the heart cannot pump an adequate volume of blood to meet the body's needs)

- Some cats have no clinical signs
- Sluggishness (lethargy)
- Poor appetite and weight loss
- Fainting (known as “syncope”)—rare; usually indicates serious irregular heart beats (known as “arrhythmias”)
- Weakness or paralysis (signs of blockage of blood flow secondary to the presence of a blood clot in the artery [condition known as “arterial thromboembolism”])
- Depression
- Extreme weight loss with muscle wasting (known as “cachexia”)
- Rapid heart rate (known as “tachycardia”)
- Irregular heart beats (arrhythmias)
- Sequence of three heart sounds (known as a “gallop rhythm”), when listening to the heart with a stethoscope; heart beat sounds like a galloping horse instead of normal “lub-dub”
- May have a heart murmur

If Cat Has Congestive Heart Failure (condition in which the heart cannot pump an adequate volume of blood to meet the body's needs), cat has signs as previously described, plus the following:

- Difficulty breathing (known as “dyspnea”)
- Rapid breathing (known as “tachypnea”)
- Panting
- Open-mouth breathing
- Bluish discoloration of the skin and moist tissues (known as “mucous membranes”) of the body caused by inadequate oxygen levels in the red-blood cells (known as “cyanosis”)
- Abdominal swelling or distention
- Enlarged liver (known as “hepatomegaly”) or fluid build-up in the abdomen (known as “ascites”), with enlargement or distention of the jugular veins (located on either side of the neck)
- Short, rough snapping sounds (known as “crackles”) heard when listening to the chest with a stethoscope
- Muffled heart or lung sounds heard when listening to the chest with a stethoscope, if the cat has fluid build-up in the space between the chest wall and lungs (known as “pleural effusion”)
- Weakness or paralysis with loss of femoral pulses; one or more extremities may be cold and painful (signs of blockage of blood flow secondary to the presence of a blood clot in the artery [condition is “arterial thromboembolism”])

CAUSES AND RISK FACTORS

- True cause(s) unknown (so called “idiopathic disease”); often no “predisposing” disease can be documented
- Suspected initiating causes include inflammation of the heart muscle (known as “myocarditis”); inflammation of the inner muscle layer of the heart (known as “endomyocarditis”); infiltration of eosinophils (a type of white-blood cell) into the heart muscle (known as “eosinophilic myocardial infiltration”); disease characterized by inappropriate enlargement or thickening of the heart muscle of the left ventricle (known as “hypertrophic cardiomyopathy”) with sudden lack of blood supply to the heart

muscle that leads to death of tissues (known as “myocardial infarction”); widespread (diffuse) “small blood vessel disease;” and other causes of abnormal blood flow and resulting lack of oxygen to the heart muscle

TREATMENT

HEALTH CARE

- Patients with sudden (acute), severe congestive heart failure are hospitalized for emergency care; “congestive heart failure” is a condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs
- Animals that do not have clinical signs or have mild signs can be treated with outpatient medical management
- Animals with severe difficulty breathing (severe dyspnea) should receive oxygen via oxygen cage, nasal cannula, or mask (beware of stress to patient)
- Life-threatening fluid build-up in the space between the chest wall and lungs (pleural effusion) is reduced via tapping and draining the chest (known as “thoracocentesis”)
- Treat associated conditions (such as dehydration or low body temperature [hypothermia])
- Low sodium fluids administered cautiously if dehydration occurs (beware of worsening congestive heart failure)
- Heating pad may be necessary for patients with low body temperature (hypothermia)

ACTIVITY

- Maintain a low stress environment to decrease patient anxiety (such as cage rest, minimize handling)

DIET

- Low-salt diet may decrease fluid retention, but strict adherence to dietary changes should be avoided in sudden (acute) congestive heart failure in order to maintain food intake
- Hand feed, as necessary

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.

Sudden (Acute) Congestive Heart Failure (condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs)

- Medication to remove excess fluid from the body (diuretic) administered by injection—furosemide
- Dobutamine (drug to increase contraction of the heart muscle) to increase function of the heart
- Nitroglycerin ointment, applied to the skin
- Oxygen delivered by cage, mask, or nasal tube
- Tapping and draining the chest (thoracocentesis), as necessary to relieve difficulty breathing (dyspnea) due to fluid build-up in the space between the chest wall and lungs (pleural effusion)
- Severe irregular heart beats originating above the ventricles (supraventricular arrhythmias) may be treated with diltiazem
- Rapid ventricular heart rate (ventricular tachycardia) may resolve with resolution of congestive heart failure; treatment for sudden occurrence of ventricular tachycardia may include lidocaine
- Beta-blockers (such as propranolol or atenolol) may be used to treat irregular heart beats that originate above or in the ventricles (supraventricular or ventricular arrhythmias), but not until congestive heart failure is treated

Long-Term (Chronic) Therapy

- Medication to remove excess fluid from the body (diuretic)—furosemide, gradually decreased to lowest effective dose
- Long-term (chronic) therapy with diltiazem decreases heart rate and improves irregular heart beats that originate above the ventricles (supraventricular arrhythmias) and may improve heart function
- Beta-blockers may be used to slow heart rate and treat irregular heart beats that originate above or in the ventricles (supraventricular or ventricular arrhythmias)
- Angiotensin-converting enzyme (ACE) inhibitors may reduce fluid retention and decrease need for medications to remove excess fluid from the body (diuretics); examples of ACE inhibitors are enalapril and benazepril
- **Digoxin** (a heart medication) may be used if heart-muscle contraction is impaired or atrial fibrillation (rapid, irregular heart rhythm involving the top two chambers of the heart [atria]) is present
- **Aspirin** may be administered to prevent blood clots (known as “thromboembolism”), but effectiveness is questionable; administer aspirin only under the direction of your cat’s veterinarian
- **Warfarin** may be administered to prevent blood clots (thromboembolism), but is not recommended unless close monitoring and repeated measurement of prothrombin time (a blood test to evaluate clotting) are feasible

FOLLOW-UP CARE

PATIENT MONITORING

- Frequent serial physical examinations (minimal stress to patient) to assess response to treatment and resolution of fluid build-up in the lungs (pulmonary edema) and fluid build-up in body cavities (known as “effusions”)
- Frequent assessment of hydration and kidney function is important in first few days of therapy to avoid removal of too much fluid from the body (known as “over diuresis”) and development of excessive levels of urea and other nitrogenous waste products in the blood (known as “uremia” or “azotemia”)
- Repeated tapping and draining the chest (thoracocentesis) may be necessary to maintain the amount of fluid build-up in the space between the chest wall and lungs (pleural effusion) at a comfortable level
- “Hands-off” hourly assessment of breathing rate in first 12 to 24 hours can be used to monitor efficacy of congestive heart failure therapy
- Chest X-rays may be repeated in 12 to 24 hours
- Blood work (especially creatinine and potassium) should be monitored closely during the first 3 to 5 days of therapy to detect dehydration, kidney failure, and low levels of potassium in the blood (known as “hypokalemia”)—caused by medications to remove excess fluid from the body (diuretics); or high levels of potassium in the blood (known as “hyperkalemia”), if angiotensin-converting enzyme (ACE) inhibitors are administered
- Repeat physical examination and blood work (especially electrolyte analysis) after approximately 10 to 14 days of treatment
- Electrocardiograms (“ECGs,” recordings of the electrical activity of the heart) and X-rays may be repeated, as your cat’s veterinarian feels necessary
- Stable patients are reevaluated every 2 to 4 months, or more frequently if problems occur

POSSIBLE COMPLICATIONS

- Congestive heart failure
- Death

EXPECTED COURSE AND PROGNOSIS

- Highly variable, based on presentation of disease and clinical signs
- Most cats with restrictive cardiomyopathy and congestive heart failure live 3 to 12 months; some live 2 years

KEY POINTS

- “Restrictive cardiomyopathy” is a disease in which the heart muscle is “stiff” and does not expand, such that blood cannot fill the ventricles normally
- Patients with sudden (acute), severe congestive heart failure are hospitalized for emergency care; “congestive heart failure” is a condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs
- Animals that do not have clinical signs or have mild signs can be treated with outpatient medical management
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