Lake Shore Pet Hospital

Atrioventricular Valve (Myxomatous) Endocardiosis

Basics

OVERVIEW

- "Atrioventricular valve" refers to the heart valves between the top chamber (known as the "atrium") and the bottom chamber (known as the "ventricle") of the heart; two atrioventricular valves are present in the heart—one on the right side of the heart and one on the left side of the heart
- "Endocardiosis" is the medical term for long-term (chronic) formation of excessive fibrous tissue of the atrioventricular valves
- The heart of the dog or 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; heart valves are located between the right atrium and the right ventricle (tricuspid valve); between the left atrium and the left ventricle (mitral valve); from the right ventricle to the main pulmonary (lung) artery (pulmonary valve); and from the left ventricle to the aorta (the main artery of the body; valve is the aortic valve)
- The atrioventricular valves are the tricuspid valve (right side) and the mitral valve (left side); "myxomatous" refers to accumulation in the connective tissue component in the valve of substances (glycosaminoglycans, mucopolysaccharides) that leads to distortion, weakening, and degeneration of the valve
- "Myxomatous atrioventricular valve endocardiosis" is a long-term (chronic) disease characterized by a decline in the function or structure of the tricuspid and/or mitral valves, leading to inability of the valves to work properly (known as "valvular insufficiency") and 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

GENETICS

- Age of onset appears to have an inherited component (polygenic threshold trait; means multiple genes influence the trait, and a certain threshold needs to be reached before the disease develops)

SIGNALMENT/DESCRIPTION OF PET

Species

- Mainly dogs, extremely rare in cats

Breed Predilections

- Typically smaller-breed dogs (dogs that weigh less than 20 kg [44 lbs]); seen less frequently in larger dogs
- Highest prevalence—Cavalier King Charles spaniel, Chihuahua, Miniature schnauzer, Maltese, Pomeranian, Cocker spaniel, Pekingese, Poodles, and others

Mean Age and Range

- Onset of congestive heart failure at 8–12 years of age, although may detect a murmur several years earlier; Cavalier King Charles spaniels typically affected much earlier (6–8 years of age); congestive heart failure is a condition in which the heart cannot pump an adequate volume of blood to meet the body's needs

Predominant Sex

- Males likely to have the disease, myxomatous atrioventricular valve endocardiosis develop at a younger age than are females

SIGNS/OBSERVED CHANGES IN THE PET

Asymptomatic Valve Disease (Pet Has No Clinical Signs of Heart-Valve Disease), belonging to a risk group (Stage A)

- No heart murmur, normal physical examination

Patients without Overt Signs (Stage B)

- Heart murmur (systolic click)
- As the disease progresses, the heart murmur typically gets louder and radiates more widely
- Initially pet will have no obvious changes on x-rays (radiographs) or on an echocardiogram (use of ultrasound to evaluate the heart and major blood vessels); as the disease progresses, changes indicating heart enlargement (known as "cardiomegaly") will be seen

Patients with Clinical Signs, or Stabilized by Congestive Heart Failure Therapy (Stages C, D)

- Loud heart murmur (usually)
- Fast heart rate (known as "tachycardia")
- Loss of regular heart rhythm (known as "arrhythmia")
- Pulse rate deficiency (known as "pulse deficits") or weak pulses

If decompensated failure:

- Coughing; may be pink, frothy fluid in back of the mouth or from nostrils (if failure severe) from lung congestion and edema
- Pale discoloration of the skin and moist tissues (known as "mucous membranes") if low output failure
- Exercise intolerance
- Fast breathing (known as "tachypnea"); difficulty breathing (known as "dyspnea"); harsh respiratory sounds due to fluid (known as "crackles") when the veterinarian is listening with a stethoscope
- Occasionally fainting (known as "syncope")
- Profound weakness
- Abdominal swelling or distention due to fluid (known as "ascites") if right-sided failure
- Standing with the elbows away from the body in an attempt to increase lung capacity (known as "orthopnea")
- 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 (condition known as "cyanosis")

CAUSES

- Primary inciting factor is unknown; disease is influenced by genetic factors in affected breeds

Treatment

HEALTH CARE

- Treat pets that need oxygen support as inpatients; if stable, pets may be treated at home, where they may be less stressed
- Oxygen therapy as needed for low levels of oxygen in the blood (known as "hypoxemia")

- Monitor resting/sleeping respiratory rates at home, contact the veterinarian if it exceeds the threshold set
- Consistent dosing of indicated medications is important

ACTIVITY

- Absolute exercise restriction for pets with clinical signs
- Stable pets receiving medical treatment—restrict exercise to leash walking; avoid sudden, intense exercise

DIET

- Prevent extreme weight loss with muscle wasting due to heart disease (known as "cardiac cachexia") by ensuring adequate calorie intake—primary objective in dietary management of pets with long-term (chronic) heart-valve disease
- Avoid high salt (sodium chloride) foods

SURGERY

- Surgical heart-valve replacement and purse-string suture techniques to reduce the area of the opening of the mitral valve have been used; experience with these techniques is limited, but surgical repair may be an option when access to a cardiovascular surgeon and heart-lung bypass (known as "cardiopulmonary bypass") are available

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

- Recommended treatment depends on stage of the disease

ASYMPTOMATIC PETS (PET HAS NO CLINICAL SIGNS OF HEART-VALVE DISEASE-STAGE B)

- No treatment may be needed, if the pet has no indication of heart enlargement identified through diagnostic tests

LONG-TERM (CHRONIC) CONGESTIVE HEART FAILURE (STAGES C, D)

- Usually outpatient
- Medications will be customized to the patient based on severity and signs
- Medications to remove excess fluid from the body (diuretics)—example, furosemide (lifelong)
- Heart medications, such as ACE inhibitors (examples are enalapril, ramipril, and benazepril), pimobendan, digoxin, and medications to control irregular heartbeats (medications known as "antiarrhythmics")
- Spironolactone, while typically used for its diuretic effect in combination with other diuretics (such as hydrochlorothiazide), has been shown to have a positive influence as heart disease progresses
- Sildenafil if high lung vessel pressure (known as "pulmonary hypertension") is present

SUDDEN (ACUTE) CONGESTIVE HEART FAILURE (STAGES C, D)

- Often inpatient
- Oxygen—administered in an oxygen cage or through a nasal catheter
- Medications to remove excess fluid from the body (diuretics)—furosemide, torsemide, bumetanide
- Pimobendan
- Antiarrhythmics as needed
- Dobutamine, dopamine as needed
- If severe fluid buildup in the abdomen, removal by needle may be required (known as "abdominal paracentesis")
- Nitroglycerin ointment or injectable; isosorbide
- Medications to dilate blood vessels (known as "vasodilators") if severe fulminant failure, include hydralazine; sodium nitroprusside

- Vasodilators to enlarge the arteries in the lungs (known as “pulmonary arterial vasodilators”), such as sildenafil, should be considered if high blood pressure in the lungs (known as “pulmonary hypertension”) is present

Follow-Up Care

PATIENT MONITORING

- frequency of follow up examinations depends on severity of the valve disease and any associated heart failure
- Take a baseline echocardiograph (ultrasound) when a heart murmur is first detected and every 6–12 months thereafter to document progressive enlargement of the heart; a baseline X-ray may be useful as well
- After an episode of congestive heart failure (condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs), the veterinarian will check pet after one to two weeks of treatment; may repeat chest x-rays (radiographs) and an electrocardiogram (ECG, a recording of the electrical activity of the heart), blood tests at the first, or subsequent visits, if any changes are seen on physical examination; thereafter every 3-6 months if stable; more severe cases may require more frequent monitoring
- Monitoring of blood work (blood urea nitrogen [BUN] and creatinine) when medications to remove excess fluid from the body (diuretics) and ACE inhibitors are used in combination
- Monitor serum potassium levels when spironolactone (another diuretic) and ACE inhibitors are used together, especially when combined with digoxin

POSSIBLE COMPLICATIONS

- Pets without signs can develop congestive heart failure, or it may recur in pets that have had a previous crisis
- Inflammation of the lining of the heart (known as “endocarditis”) because bacteria infecting the diseased mitral valve may be possible
- High pressure in the lung blood vessels (pulmonary hypertension)
- Fluid around heart or lungs (pericardial or lung effusion)
- Heart rhythm disturbances (arrhythmia)
- Heart muscle damage (tears, ruptures)

EXPECTED COURSE AND PROGNOSIS

- Progressive deterioration (degeneration) of valve changes and heart-muscle function occurs, necessitating increasing drug dosages
- Long-term prognosis depends on response to treatment and stage of congestive heart failure (condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs)

Key Points

- Atrioventricular valve (myxomatous) endocardiosis is a progressive disease
- It is important to dose all medications consistently and to provide exercise management
- Prevent extreme weight loss with muscle wasting due to heart disease (cardiac cachexia) by ensuring adequate calorie intake—primary objective in dietary management of pets with long-term (chronic) heart-valve disease; discuss type and amount of food to be fed with your pet’s veterinarian
- Monitor your pet’s appetite carefully
- Monitor your pet’s breathing rate and heart rate while sleeping or resting to detect changes that may suggest developing or recurring congestive heart failure
- If the pet develops worsening clinical signs or experiences unexpected changes in condition, notify the veterinarian immediately