

Atrioventricular Valve Dysplasia

Basics

OVERVIEW

- The heart of the dog or 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)
- The mitral valve and the tricuspid valves are the “atrioventricular valves”; that is, they are the valves between the left atrium and ventricle and between the right atrium and ventricle, respectively
- In order to pump blood to the lungs and body, the heart must work in a coordinated fashion; the normal control or “pacemaker” of the heart is the sinoatrial (SA) node, which starts the electrical impulse to begin the coordinated contraction of the heart muscles—the electrical impulse causes the atria to contract, pumping blood into the ventricles; the electrical impulse moves through the atrioventricular (AV) node and into the ventricles, causing the ventricles to contract and to pump blood to the lungs (right ventricle) and the body (left ventricle)
- “Dysplasia” is the medical term for abnormal development of a tissue
- “Atrioventricular valve dysplasia” is a congenital (present at birth) malformation of the mitral or tricuspid valve; may be referred to as “mitral valve dysplasia” or “tricuspid valve dysplasia” to indicate which valve is affected
- It is not uncommon for mitral and tricuspid valve dysplasia to occur together in the same pet



GENETICS

- Tricuspid valve dysplasia is inherited as an autosomal recessive trait in Labrador retrievers
- Heritability and pattern of inheritance has not been established in other breeds

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs
- Cats; one of the most common congenital (present at birth) heart defects in cats; less frequently diagnosed in dogs

Breed Predispositions

- Mitral valve dysplasia—bull terriers, Newfoundland, Great Danes, Labrador retrievers, Golden retriever, Dalmatians, and Siamese cats; perhaps the most common congenital (present at birth) heart defect of cats
- Mitral valve malformations often are noted in cats with hypertrophic cardiomyopathy (disease characterized by inappropriate enlargement or thickening of the heart muscle of the left ventricle)
- Tricuspid valve dysplasia—Labrador retrievers, German shepherd dogs, Great Pyrenees, possibly Old English

sheepdogs; common in cats

Mean Age and Range

- Variable
- Signs most often seen within the first few years of life

Predominant Sex

- Males are more likely than females to have signs of heart failure

SIGNS/OBSERVED CHANGES IN THE PET

- Exercise intolerance is the most common problem in dogs and cats with atrioventricular valve dysplasia
- Abdominal swelling or distention, weight loss, and stunting of growth may be observed with severe tricuspid valve dysplasia
- Labored breathing is common in dogs or cats with mitral valve dysplasia
- Fainting (known as “syncope”) and collapse, if critical mitral or tricuspid valve narrowing (known as “stenosis”), or if blood flow through the valves is blocked (known as “outflow obstruction”), or if the pet has irregular heartbeats (known as “arrhythmias”), or the pet has congestive heart failure (CHF) from poor functioning of the abnormal heart valve; “congestive heart failure” is a condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs

Mitral Valve Dysplasia (Involves the Valve between the Left Atrium and the Left Ventricle)

- Heart murmur; with severe disease, may be able to feel vibrations caused by abnormal blood flow (known as “thrills”) when placing hand against the chest wall, or may hear a sequence of three heart sounds (known as a “gallop rhythm”) when listening to the heart with a stethoscope; heartbeat sounds like a galloping horse instead of normal “lub dub”
- Evidence of left-sided congestive heart failure—pets with severe defects may have rapid breathing (known as “tachypnea”); increased breathing efforts; rough snapping sounds (known as “crackles”) may be heard when listening to the chest with a stethoscope; and bluish discoloration of the skin and moist tissues (mucous membranes) of the body caused by inadequate oxygen levels in the red blood cells (known as “cyanosis”); congestive heart failure is a condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs

Tricuspid Valve Dysplasia (Involves the Valve between the Right Atrium and the Right Ventricle)

- Heart murmur; with severe disease, may be able to feel vibrations caused by abnormal blood flow (thrills) when placing hand against the chest wall or may hear a sequence of three heart sounds (gallop rhythm), when listening to the heart with a stethoscope; heart beat sounds like a galloping horse instead of normal “lub dub”
- The external jugular veins (located on either side of the neck) may be enlarged or distended and may have a pulse
- Evidence of right-sided congestive heart failure—fluid buildup in the abdomen (known as “ascites”), and, more rarely, fluid buildup in the tissues, especially the legs and under the skin (known as “peripheral edema”) in pets with severe malformations of the tricuspid valve

CAUSES

- Congenital (present at birth) malformation of the mitral or tricuspid valve

Treatment

HEALTH CARE

- Inpatient treatment required for congestive heart failure

ACTIVITY

- Restricted in accordance with severity of clinical signs

DIET

- Sodium-restricted diet, if in or likely to develop congestive heart failure

SURGERY

- Heart valve repair or replacement surgery is available in a few centers

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

- Mitral or tricuspid dysplasia with insufficiency—medications to remove excess fluid from the body (known as “diuretics,” such as furosemide), heart medications (such as angiotensin converting enzyme [ACE] inhibitors), and pimobendan for pets in or likely to develop congestive heart failure; furosemide and enalapril used to control congestion; digoxin to control rapid heart rhythms (known as “supraventricular tachyarrhythmias”);
- Mitral or tricuspid narrowing (stenosis)—medications to remove excess fluid from the body (diuretics, such as furosemide) to control fluid buildup (known as “edema”); heart rate will be maintained near 150 beats per minute, using digoxin, a calcium channel blocker (such as diltiazem), or a beta-receptor blocking drug (such as atenolol)
- Dynamic blockage of blood flow through the valves (known as “dynamic outflow tract obstruction”)—beta-receptor blocking drug (such as atenolol) to decrease severity of outflow obstruction; a “dynamic” process is one in which the lumen of the chambers changes with the movements of the heart (relaxation and contraction)

Follow-Up Care

PATIENT MONITORING

- Recheck yearly, if no signs of congestive heart failure
- Recheck at a minimum of every 3 months, if signs of congestive heart failure—chest x-rays (radiographs), electrocardiogram (ECG, a recording of the electrical activity of the heart), and echocardiography (use of ultrasound to evaluate the heart and major blood vessels)

PREVENTIONS AND AVOIDANCE

- Do not breed affected pets

POSSIBLE COMPLICATIONS

- Congestive heart failure—left-sided with mitral valve dysplasia; right-sided with tricuspid valve dysplasia; congestive heart failure is a condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs
- Collapse or fainting (syncope) with exercise
- Sudden onset (known as “paroxysmal”) supraventricular tachycardia or atrial fibrillation with severe disease; “supraventricular tachycardia” is a rapid heart rate caused by electrical impulses that originate from a site other than the sinoatrial node, the normal pacemaker of the heart; “atrial fibrillation” is a rapid, irregular heart rhythm involving the top two chambers of the heart (atria)

EXPECTED COURSE AND PROGNOSIS

- Depends on severity of underlying defect
- Prognosis is guarded to poor with serious defects

Key Points

- “Atrioventricular valve dysplasia” is a congenital (present at birth) malformation of the mitral or tricuspid valve. Potentially an inherited disorder; affected pets should not be used for breeding