

# PULMONIC STENOSIS

## BASICS

### OVERVIEW

- 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)
- “Pulmonic” refers to pulmonary; “pulmonary” refers to the lung(s); “pulmonic stenosis” is a condition characterized by narrowing of the pulmonary valve in the heart, which is the valve from the right ventricle to the main pulmonary artery
- “Stenosis” is the medical term for narrowing
- “Pulmonic stenosis” is a congenital (present at birth) narrowing at some point in the area through which blood flows out of the right ventricle, through the pulmonary valve, and into the main pulmonary artery (main artery of the lungs); this area is known as the “right ventricular outflow tract;” the narrowing blocks or obstructs the flow of blood from the right ventricle to the pulmonary artery
- Defect can be at the valve itself (known as “valvular pulmonic stenosis”), below the valve (known as “subvalvular pulmonic stenosis,” or above the valve, just inside the pulmonary artery (known as “supravalvular pulmonic stenosis”); valvular pulmonic stenosis is the most common form

### GENETICS

- Inherited defect in beagles; multiple genes probably are involved (known as a “polygenic mode of transmission”)

### SIGNALMENT/DESCRIPTION of ANIMAL

#### *Species*

- Dogs and cats

#### *Breed Predislection*

- English bulldog, Scottish terrier, wirehair fox terrier, miniature schnauzer, West Highland white terrier, Chihuahua, Samoyed, mastiff, cocker spaniel, beagle, boxer

#### *Mean Age and Range*

- Present from birth and may be detected as a heart murmur in puppies
- If a heart murmur is not detected, affected animals may not be identified until clinical signs develop later in life

#### *Predominant Sex*

- Males are more likely than females to have pulmonic stenosis in English bulldogs and possibly other breeds

### SIGNS/OBSERVED CHANGES in the ANIMAL

- Mild narrowing (stenosis)—usually no clinical signs
- Severely affected patients—may develop congestive heart failure (condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs), fainting with exertion (known as “exertional syncope”), or sudden death
- Abdominal swelling or distension
- Difficulty breathing (known as “dyspnea”)
- Exercise intolerance
- Heart murmur
- May be able to feel vibrations caused by abnormal blood flow (known as “thrills”) when placing hand against the chest wall (generally associated with more severe narrowing [stenosis])
- Irregular heart beats (known as “arrhythmias”)
- Rapid heart rate (known as “tachycardia”) may occur if pet is in congestive heart failure (condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs)
- Other signs of congestive heart failure include fluid build-up in the abdomen (known as “ascites”), enlargement of the jugular veins in the neck, and rapid breathing (known as “tachypnea”)

### CAUSES

- Congenital (present at birth) heart defect

## TREATMENT

### HEALTH CARE

- Most managed as outpatients
- Initial hospitalization of those pets with severe 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

• Rarely, fluid build-up in the space between the lungs and chest wall (known as “pleural effusion”) may need draining; fluid build-up in the abdomen (ascites) usually is treated medically

#### **ACTIVITY**

- Exercise should be restricted in pets with fainting (syncope) or congestive heart failure (condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs)
- Excessive exertion should be avoided in pets with severe narrowing (stenosis) that do not have clinical signs

#### **DIET**

- Low-salt diets may benefit those pets with fluid build-up in the abdomen that does not respond to medical treatment (known as “refractory ascites”)

#### **SURGERY**

- Balloon dilation (procedure in which an instrument with an expandable balloon is inserted into the area of the narrowing [stenosis] and the balloon is expanded to open the narrowing) of the outflow tract, performed during heart catheterization
- Alternative surgical techniques include cutting through the narrowed pulmonary valve to relieve blockage to blood flow (procedure known as a “valvulotomy”) or patch-graft procedures; mortality rates tend to be higher than with balloon dilation

#### **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.

- If pet has signs of congestive heart failure, treat fluid build-up in the abdomen (ascites) with medications to remove excess fluids from the body (known as “diuretics”), such as furosemide or spironolactone (used as an additional diuretic in cases that do not respond to medical treatment); treat atrial fibrillation (rapid, irregular heart rhythm involving the top two chambers of the heart [atria]) with digoxin
- Medications to enlarge or dilate blood vessels (known as “vasodilators,” such as hydralazine) may cause low blood pressure (known as “hypotension”) without relieving the narrowing (stenosis) and are best avoided

#### **FOLLOW-UP CARE**

##### **PATIENT MONITORING**

- Use serial follow-up echocardiograms (use of ultrasound to evaluate the heart and major blood vessels)

##### **PREVENTIONS AND AVOIDANCE**

- Do not breed affected animals

##### **POSSIBLE COMPLICATIONS**

- Right-sided 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
- Irregular heart beats (arrhythmias)
- Exercise intolerance
- Fainting with exertion (exertional syncope)
- Sudden death

##### **EXPECTED COURSE AND PROGNOSIS**

- Mildly affected animals may remain without clinical signs and have normal life spans
- Severely affected animals have a guarded prognosis because they may develop congestive heart failure (condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs) or sudden death
- Clinical signs generally are more common in animals over 1 year of age

#### **KEY POINTS**

- Mildly affected animals may lead normal lives
- Moderately to severely affected patients may benefit from treatment interventions (such as balloon catheter dilation or surgery); improved clinical signs and survival have been associated with successful balloon procedures
- Prognosis is guarded once signs of congestive heart failure develop; “congestive heart failure” is a condition in which the heart cannot pump an adequate volume of blood to meet the body’s needs
- Do not breed affected animals.