

Pulmonic Stenosis in Dogs

What is pulmonic stenosis?

Pulmonic stenosis (PS) is a congenital cardiac anomaly, or an abnormality in the heart that is present at birth, rather than beginning later in life. Specifically, PS is characterized by a narrowing (also called a *stenosis*) in the region of the pulmonic valve, where blood leaves the right side of the heart to enter the pulmonary artery and then the lungs. This causes an obstruction to forward blood flow at this location. As a result, the chamber of the heart responsible for pumping blood into the pulmonary artery (the right ventricle) must become stronger and must generate abnormally high pressure in order to push blood forward.

If the stenosis is severe, any or all of the following complications may develop: 1) The obstruction to forward flow may be so great that blood backs up, leading to buildup of fluid around the lungs or in the abdominal cavity. This is called *congestive heart failure*. 2) Poor forward flow may result in periods during which the brain does not receive enough oxygen, resulting in transient weakness or fainting episodes. 3) Thickening of the heart muscle in order to pump more strongly may damage the electrical system that runs through the muscle, resulting in arrhythmias (abnormalities in the electrical activity of the heart). This causes the heart to become inefficient and can lead to weakness, fainting, or even sudden death.

How is PS diagnosed?

A congenital heart condition is often first suspected following detection of a heart *murmur* during routine **physical examination**. This is an abnormal “whooshing” sound associated with the normally crisp heart sounds, heard while listening to the heart with a stethoscope. The murmur is described according to its loudness and where it is best heard on the chest wall. Although many conditions may result in the presence of a heart murmur, the location where the murmur is loudest and the breed of dog may raise suspicion for PS in particular.

Diagnosis of PS is confirmed by performing an **echocardiogram**. This is an ultrasound examination of the heart, during which information is collected about the size and function of the heart. This information is used to confirm the presence of PS, determine its severity, and decide whether or not specific therapy is necessary. Specific echocardiographic findings in dogs with PS may include narrowing at or near the pulmonic valve, thickening of the *cusps* that comprise the valve, and turbulent blood flow past the valve. There may also be enlargement of the right ventricle due to its increased workload as described above.

Chest x-rays are used to obtain a “big picture” view of the heart and to look for evidence of congestive heart failure. An **electrocardiogram** is performed to identify and characterize arrhythmias that may be present, and to guide antiarrhythmic therapy if necessary. Blood work may be recommended as well. Some of these tests may need to be repeated periodically in order to monitor progression of the condition and its response to therapy.

How is PS treated?

Dogs with mild forms of PS, such as those that exhibit no symptoms (discussed further below) and have only mild abnormalities on their echocardiogram, may not require any specific therapy. For dogs with moderate to severe forms of PS based on presence of symptoms or echocardiographic abnormalities, medical therapy is recommended and typically consists of a “beta blocker.” This is a medication that allows the heart to spend more time relaxing, and decreases the tendency for the heart walls to become abnormally thickened. Depending on the specific appearance of the narrowing, some dogs may benefit from a procedure known as *balloon valvuloplasty*, during which a balloon is advanced into the location of the narrowing and temporarily distended with fluid. The goal of this procedure is to widen the narrowed area, making blood flow through the pulmonic valve easier. Still more invasive surgical procedures may be appropriate in individual cases for dogs with severe PS that are not candidates for balloon valvuloplasty.

Dogs that develop congestive heart failure require medications that remove excessive fluid from the body and facilitate forward blood flow through the body’s blood vessels. If fluid accumulates in spite of medical therapy, fluid may need to be removed from a body cavity directly using a needle and syringe. This is called *thoracocentesis* when fluid is removed from the chest cavity, and *abdominocentesis* when fluid is removed from the abdominal cavity. If an arrhythmia is detected, an antiarrhythmic medication may be prescribed depending on the severity of the rhythm disturbance.

What is the prognosis? What should I watch for?

Dogs with mild forms of PS may remain asymptomatic, with the only evidence of the condition being the heart murmur detected during physical examination. Those with more severe forms of PS may develop symptoms, the nature and severity of which are variable and depend upon how the condition progresses. **Exercise intolerance** or **lethargy** may be noted. If congestive heart failure develops, **abdominal distension** may be seen if fluid accumulates in the abdominal cavity. **Loss of appetite** may also occur due to discomfort associated with the distended abdomen. If fluid accumulates in the chest cavity, **rapid** or **labored breathing** may be observed, and the tongue or gums may take on a **blue** color. If blood flow forward is severely obstructed or if arrhythmias develop, **weakness** or **fainting** may occur. Finally, potential side effects of the medications used to treat PS and congestive heart failure may overlap with those already discussed, such as loss of appetite, lethargy, weakness, and less often fainting.

Some of the medications used to treat PS should not be discontinued suddenly. Therefore, changes in medication administration should always be discussed first with a doctor. If any of the above symptoms are noted, or if you have any questions or concerns, please call your veterinarian or Dr. Marshall at the Veterinary Specialty Services immediately to discuss an appropriate plan. Problems that are caught early are more easily corrected and less likely to require a visit to the hospital. If you feel that the problem should not wait and requires immediate attention, then an emergency visit is warranted.