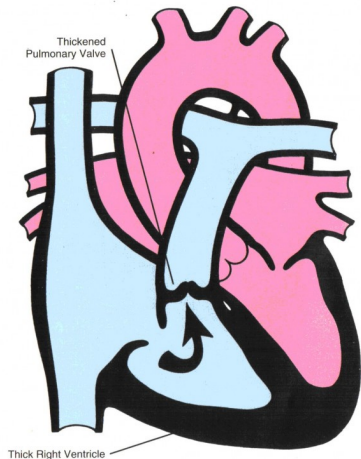
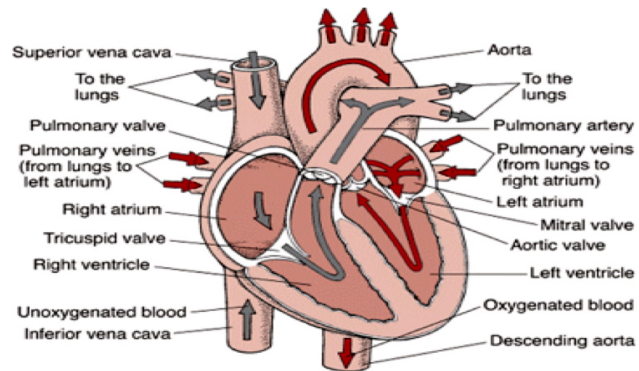




PULMONIC STENOSIS



Heart with Pulmonic Stenosis



Outline of a normal heart

Your dog has been diagnosed with Pulmonic Stenosis (PS). The term pulmonic stenosis usually implies that there is *valvular* pulmonic stenosis; however, *supravalvular* and *subvalvular* pulmonic stenosis share the same pathophysiology and are often used to describe the same disorder. Valvular PS is the most common type of PS and is most amenable to correction. Valvular PS is a congenital defect where the pulmonic valve leaflets open incompletely in the contraction phase (systole) of the cardiac cycle. Supravalvular PS is when there is a ring or ridge of tissue above the pulmonic valve causing obstruction of outflow while subvalvular PS refers to obstruction below the pulmonic valve. The rest of this discussion will focus on valvular PS but the pathophysiology is the same for all three types. It is commonly heritable so the breeder of your puppy should be notified if possible.

In order for you to understand how this disease may affect your dog, it is important to understand how blood travels through the heart. The venous blood from the body drains into the right atrium, through the tricuspid valve, and into the right ventricle. The right ventricle then pumps this un-oxygenated blood to the lungs through the *pulmonic valve* into the pulmonary artery. Moving through capillaries, the blood picks up oxygen from the lungs. This blood then drains through large pulmonary veins into the left atrium, through the mitral valve and into the left ventricle where it is pumped through the aorta and back to the body.

Dogs with PS have partial fusion of the valve leaflets that causes an acceleration of blood flow as it crosses the valve. The abnormal blood flow is what causes the heart murmur that was auscultated by your veterinarian. Because the outflow tract is abnormally narrowed, the pressure in the right ventricle must overcome in order to pump blood into the pulmonary artery is elevated. This change in pressure is termed the pressure gradient – the degree of elevation of the pressure gradient is how PS is classified. The right ventricular muscle thickens in order to overcome the increase in pressure. The thickened muscle is inadequately perfused by the coronary circulation and becomes damaged.

This damaged heart muscle can cause rhythm disturbances and also eventually lead to congestive heart failure.

In healthy dogs, the pressure gradient across the pulmonic valve is less than 20mmHg. In dogs with mild PS, the pressure gradient is between 20 and 50mmHg. Dogs with moderate PS have a pressure gradient between 50 and 80mmHg and dogs with severe PS have a pressure gradient greater than 80mmHg.

An echocardiogram is used to make the diagnosis of PS and to classify its severity. It is also important to evaluate for concurrent defects. Many dogs with PS also have a patent foramen ovale (abnormal connection between the right and left atria) as well as a malformed tricuspid valve.

Dogs with mild PS have a good prognosis and generally live a full life. Dogs with moderate PS also have a good prognosis – a small percentage may go on to develop muscle failure late in life. In dogs with moderate PS that have concurrent tricuspid valve dysplasia or a patent foramen ovale, therapy should be considered. Dogs with severe PS are at risk for sudden death, fainting, as well as eventual muscle failure.

Therapeutic options for valvular pulmonic stenosis include balloon valvuloplasty (BV) as well as surgical valvulotomy. BV is the preferred treatment as it is minimally invasive and offers a good outcome. It is performed by a cardiologist in a catheterization laboratory. Surgical valvulotomy is performed by a surgeon and entails a thoracotomy (incision into the thoracic cavity). Supra or subvalvular obstructions are less amenable to balloon valvuloplasty. Surgery is indicated in cases where the obstruction is severe. Few institutions are able to provide this option.

With therapy, the prognosis for severe PS is good. Some dogs require lifelong therapy of a beta blocker while others can be maintained on no medication. Lifelong monitoring with echocardiograms is warranted in all cases of moderate or severe PS.

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