



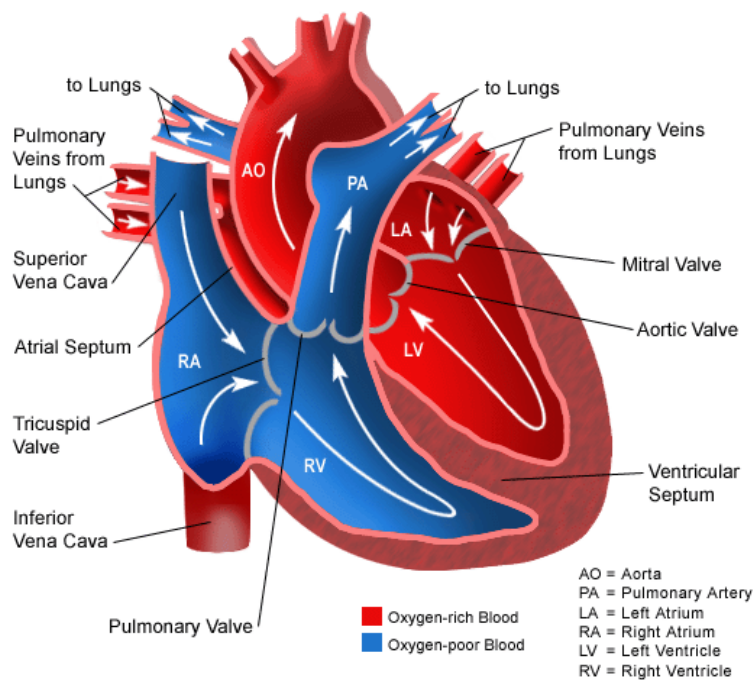
Ventricular Septal Defect (VSD)

BRIEFLY, HOW DOES THE HEART WORK?

The heart has four chambers. The upper chambers are called atria. One chamber is called an atrium, and the lower chambers are called ventricles. In addition to the upper and lower chambers, the heart is also considered to have a right and left side.

Blood flows from the body into the right atrium. It is stored there briefly, then pumped into the right ventricle. The right ventricle pumps blood into the lungs, where it receives oxygen. It flows from the lungs into the left atrium; it is held here briefly before going into the left ventricle. The left ventricle contains the largest muscle of the heart so the blood can be pumped out to all parts of the body.

Movement of blood results from electrical impulses that are transmitted from the brain to the heart. The impulses not only direct the heart to beat but also to maintain a steady, regular rhythm.



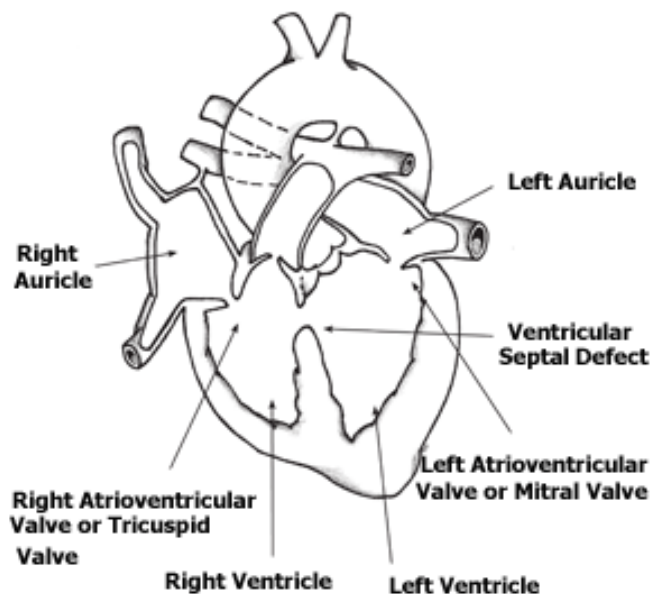


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WHAT IS A VENTRICULAR SEPTAL DEFECT?

A Ventricular Septal Defect (VSD) is a hole (or defect) in the muscular wall of the heart (the septum) that separates the right and left ventricles.

In the developing embryo, the heart initially has four chambers that are not separated from one another. As the heart develops, muscular walls form to divide it and occasionally the walls separating the heart chambers develop incompletely. This congenital birth defect is sometimes referred to as a 'hole in the heart'. In reality there is no hole in the heart, but rather a gap between the chambers, most commonly between the right and left ventricles, hence the name ventricular septal defect.



In a normal functioning heart, the pressure in the left ventricle is roughly five times greater than the pressure in the right ventricle as it has to pump blood around the entire body, whereas the right ventricle only has to pump blood to the lungs.





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In a typical VSD, blood is shunted from the left side of the heart to the right due to the higher pressures of the left ventricle, and creates a volume overload. If the right ventricular pressures then increase to a point where it exceeds the left ventricular pressures, blood will shunt right to left, thereby bypassing the lungs and providing an inadequate supply of oxygenated blood to the body.

Additionally, if extra stress is placed on the heart it can lead to congestive heart failure.

HOW COMMON IS A VENTRICULAR SEPTAL DEFECT?

This disorder occurs sporadically in many breeds, although the English bulldog, the keeshond and the springer spaniel all have a predilection, and therefore, an increased risk of VSD.

WHAT ARE THE CONSEQUENCES OF A VENTRICULAR SEPTAL DEFECT?

The extent to which an animal will be affected depends on the size and location of the defect within the ventricular wall.

Many dogs have small defects and these can occasionally close spontaneously in dogs as old as two years, though this is rare and should not be anticipated. A small defect may not cause any clinical effects, whereas large defects will produce signs of left-sided heart failure (a backing up of fluid into the lungs), or in cases that develop pulmonary hypertension (increased pressures in the lungs) right-sided heart failure (a backing up of fluid in the abdomen).

WHAT ARE THE SIGNS OF A VENTRICULAR SEPTAL DEFECT?

Often, as with most heart defects, the first indication of a problem is when your veterinarian hears a heart murmur on your pup's first physical exam. In some cases there may have been a noted exercise intolerance or respiratory difficulty, but this is usually in an older dog or a young pup with a large defect where congestive heart failure has already developed.





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Signs to look out for may include;

- Increased or laboured respiration at rest (normal sleeping respiratory rate is less than 30 breaths per minute)
- Change in heart rate or rhythm (heart murmur/arrhythmia)
- Exercise intolerance/reluctance to move
- Lethargy/weakness or fainting spells
- Distended/bloated abdomen
- Decreased appetite
- Decreased perfusion (pale/grey gum colour)
- Retarded growth rate

DOES THAT MEAN THAT HEART FAILURE WILL OCCUR SOON?

Signs associated with this disorder may develop within months or years, depending on the significance of the defect. Congestive heart failure begins when the heart is not able to pump blood with adequate oxygen to the tissues. Without adequate oxygen, the body's cells become desperate and trigger a series of responses. Various hormones are released by several organs in an attempt to correct the problem. These hormones conserve fluid in an effort to increase blood volume and the output of oxygenated blood by the heart.

For a variable period, these compensatory responses help the situation. However, increased fluid retention eventually becomes harmful. More and more fluid leaks out of the capillaries, causing fast and laboured breathing, possible coughing and reduced stamina. Fluid may collect in the abdominal cavity and body tissues. Fluid in the lungs is called pulmonary oedema, fluid below the skin is called peripheral or limb oedema, and fluid in the abdomen is called ascites (dropsy). Congestive heart failure is common cause of these signs.





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HOW IS A VENTRICULAR SEPTAL DEFECT DIAGNOSED?

The best way to diagnose a ventricular septal defect is to perform an echocardiogram (heart ultrasound). This gives the most accurate determination of the size of each heart chamber, the thickness of heart walls, a visual on valves and a look at the direction and velocity of blood flow through the chambers. An echo may even allow us to visualize the defect and measure its severity.

Occasionally a chest xray and ECG (electrocardiogram) may be recommended. These give us the best look at the lungs and an assessment of the electrical activity of the heart.

The combination of all of these tests gives us our best evaluation of the animal's heart function, however if cost considerations prohibit us performing all of them, two or three will provide much valuable information.

IS THERE TREATMENT FOR A VENTRICULAR SEPTAL DEFECT AND HEART FAILURE?

If your pet has a sudden onset of heart failure, rapid administration of the proper medications is essential to survival.

There are several drugs that can help to relieve clinical signs of degenerative valve disease. The cardiologist may prescribe diuretics (furosemide) to help reabsorb fluid from the lungs. Other medications that may improve the ability of the heart to contract (pimobendin) may also be recommended. Some patients will need to have fluid physically removed from the abdomen or chest cavity.

It is helpful to keep a record of your pet's sleeping respiratory rate so that your veterinarian can identify any changes in your pet's normal breathing pattern.

A VSD can be surgically corrected in some cases by 'patching the defect' but this requires open heart surgery and is extremely risky.





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HOW MUCH LONGER WILL MY PET LIVE?

There are many factors that must be considered before this question can be answered. The results of the tests are important, and the response that occurs within the first few days is another indicator.

If response does not occur within a few hours to days, the prognosis is not good. However, most animals that stabilize quickly will live for a period of a few months to many months, but the long-term prognosis is not good. It can be difficult to generate an accurate estimate for life-expectancy when an animal has heart disease because many variables impact on survival, not least of which is the animal's activity levels.

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