

Atrial Septal Defects in Dogs

What is an atrial septal defect?

An atrial septal (ASD) is a congenital cardiac anomaly, or an abnormality in the heart that is present at birth, rather than beginning later in life. Specifically, an ASD is a hole in the septum that divides the thinner “top” portion of the heart into two chambers, the left atrium and right atrium. These chambers are normally completely separated from one another by this septum.

The left side of the heart is responsible for pumping blood to the entire body, with the exception of the lungs. The right side of the heart pumps blood only to the lungs and is required to generate lower pressure than the left side. For this reason, when an ASD is present, blood tends to flow through the defect from the left atrium to the right atrium under most conditions.

If an ASD is small, then the correspondingly small amount of blood *shunting* through it may not cause a problem. If it is large, however, then the large amount of blood passing from the left atrium to the right atrium puts a strain on the right side of the heart. Eventually, this overload can lead to *right-sided congestive heart failure*, characterized by fluid accumulation inside the abdominal cavity or chest, or more rarely inside tissues such as the skin (called *edema*).

How is an ASD diagnosed?

A congenital heart condition is often first suspected following detection of a heart *murmur* during routine **physical examination** in a young dog. 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 heard best on the chest. If congestive heart failure is already present at the time of first examination, other findings may include abdominal distension, rapid or labored breathing, or subcutaneous edema.

Diagnosis of an ASD 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, as well as blood flow through its chambers. In the case of an ASD, observation of blood flow through a hole in the atrial septum leads to this specific diagnosis. Evaluation of the size of the ASD as well as the size of the right atrium and right ventricle (the pumping chamber just downstream of the right atrium) allow assessment of the overall significance of the defect.

Chest x-rays are used to obtain a “big picture” view of the chest cavity. In particular, they allow evaluation of the lungs and the space around them and so are helpful in assessing or ruling out congestive heart failure. An **electrocardiogram** is performed to identify and characterize arrhythmias that may be present, and to guide antiarrhythmic therapy if necessary. If medications are begun or changed, blood work may be necessary in order to obtain information about kidney function and electrolytes. Some of these tests may need to be repeated periodically to monitor progression of this condition and its response to therapy.

How is an ASD treated?

A small ASD that allows only a small amount of blood to flow through it may not require any therapy. Larger ASDs resulting in enlargement of the heart and congestive heart failure require medications to reduce fluid accumulation (these agents are called *diuretics*, such as *furosemide*). Other medications used to treat heart failure may also be employed (e.g. “ACE inhibitors” like *enalapril*). In people with ASDs, synthetic devices are sometimes used to seal the defect, thereby correcting the underlying problem. While this solution has obvious appeal, there is very limited experience with it in veterinary medicine at this time.

What is the prognosis? What should I watch for?

For a dog with a small ASD, subsequent heart enlargement leading to congestive heart failure is less likely. Long-term prognosis is excellent in this case, and although periodic re-evaluation is still warranted, lifespan may be unaffected. Dogs with large ASDs have a more guarded prognosis, particularly once heart failure develops. In such cases, medical therapy is used in order to minimize symptoms of heart failure and improve quality of life for as long as possible.

Once an ASD has been diagnosed, particularly one considered to be of significant size, it is important to watch for development or worsening of heart failure. Signs may include abdominal distension, rapid or labored breathing, intolerance to activity or exercise, or less specific symptoms such as lethargy, weakness, and loss of appetite. These latter symptoms may also occur as side effects of the medications used to treat heart failure. If any of the above are noted, or if you have any questions or concerns, please call your veterinarian or the Cardiology Service at the Angell Animal Medical Center to discuss an appropriate plan. If you feel that the problem should not wait and requires immediate action, then an emergency visit is warranted.