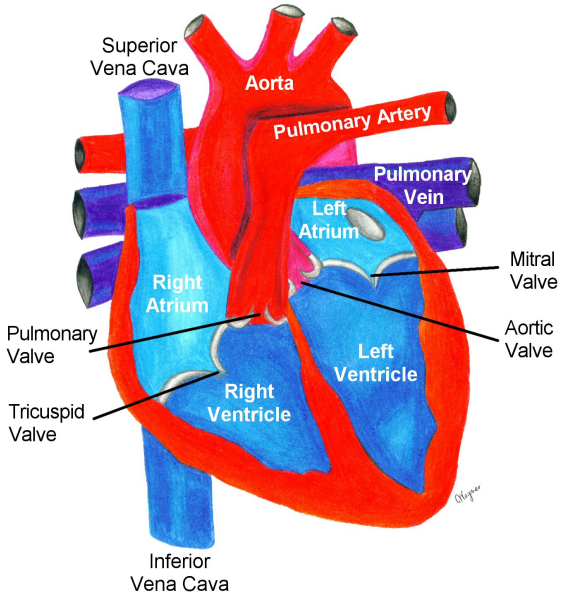
Atrial Septal Defect

An atrial septal defect (ASD) is a hole in the heart. This hole is located in the thin tissue (*septum*) which separates the two upper chambers of the heart (*right and left atrium*). We all have this hole while we are growing inside the womb. This hole is necessary for our development. A few minutes after we are born this hole normally closes. The hole closes so no blood can go between the right and left atrium.



For your heart to work efficiently, blood flow in the heart has a regular pathway. Normally, blood from the right side of the heart is pumped to the lungs where the blood is oxygenated. The oxygenated blood from the lungs is then pumped to the left side of the heart. From the left side of the heart, blood is pumped out to the rest of your body.

When an atrial septal defect occurs, your blood takes an abnormal path in the heart. The ASD allows blood from the left side of the heart (*left atrium*) to mix with blood in the right side of the heart (*right atrium*). The blood is then recirculated to the lungs and left side of the heart. In other words, the blood makes the trip twice. An ASD makes the heart work harder by increasing the amount of blood into the right side of the heart. This causes heart overload and eventually weakens the hearts ability to pump.

SYMPTOMS

- The symptoms of ASD vary depending upon the size of the hole and the amount of blood that goes into the right side of the heart (*right atrium*). These symptoms may include:
  - No symptoms at all.
  - Tiredness or fatigue.
  - Trouble breathing or shortness of breath.
  - Irregular heartbeats (*arrhythmias*).
  - Heart *murmurs* ("swishing" type heart sounds).

THERE ARE THREE LOCATIONS ON THE SEPTUM WHERE AN ASD MAY OCCUR

- The mid septum (*ostium secundum*), is the most common type. It is located in the middle of the septum.
- The lower septum (*ostium primum*), is the second most common type. It is located in the lower portion of the septum. It may be associated with a mitral valve defect.
- The upper septum (*sinus venosus*), is the least common type. It is located in the upper portion of the septum.

DIAGNOSIS

In order to diagnose ASD, tests will need to be performed. Some of the tests you may have are:

- **Electrocardiogram (EKG)**. An EKG traces the electrical activity of your heart and prints it out on paper. It may show findings that are suggestive of an enlarged right atrium and right ventricle.
- **Chest x-ray** is an imaging test which may show changes in the structure of your heart and lungs.
- **MRI** and **CT scans** are special imaging scans which provide very detailed images of the heart.
- **Nuclear medicine blood flow study** is an imaging test that shows how much blood is being passed through the ASD. This test uses a very small amount of radioactive material that is absorbed into the tissues. This helps the ASD show up better on imaging pictures. Nuclear medicine scanning is very safe. Drinking plenty of fluids after the scan will help to eliminate the radioactive material from your body.

Advanced specialized testing may include:

- **Echocardiography** uses ultrasound to obtain images of the heart. This test transmits and bounces sound

waves off the heart to produce pictures your caregiver can study. There are two types of echocardiograms:

- **Transthoracic echocardiography (TTE)**. A TTE obtains views by applying gel to your chest and then moving a probe over your chest. The gel helps transmit sound waves so images of the heart are produced. A TTE is very sensitive for detecting ostium primum or ostium secundum atrial septal defects. It is not as sensitive in detecting the third type of atrial septal defect (sinus venosus).
- **Transesophageal echocardiography (TEE)**. For this type of echocardiogram, you will need a *sedative* (a medicine to help you relax) and a numbing medicine applied to the back of your throat. A special type of probe is passed into your mouth and down your *esophagus* (the tube that goes to your stomach). By passing the probe into the esophagus, clearer pictures are obtained because it is closer to the heart. A TEE is especially helpful in patients who have a thin or *mobile* (easily moved) septum, making ASD detection more accurate.

- **Cardiac catheterization** examines the blood flow of the heart, how well the heart pumps and can also detect oxygen levels in the heart. A cardiac catheterization is a procedure where a thin plastic tube (*catheter*) is inserted into a large blood vessel in your groin (you will first receive numbing medicine in your groin). From there, the catheter is advanced to your heart and a dye is injected to look at your heart and surrounding blood vessels. ASD may be suspected if high oxygen levels are detected in the right side of the heart.

TREATMENT

- If the ASD is small, no treatment may be required if only a small amount of blood is *shunting* (moving back and forth) from the left to right atrium.
- **Nonsurgical closure** may be done depending on the type and location of the ASD. This type of procedure is done in the cardiac catheterization lab. The groin is numbed and a small plastic tube (*catheter*) is inserted into a large blood vessel in the groin. The catheter is advanced to the heart where the ASD is. A special patch resembling an umbrella is threaded up the catheter and placed in the ASD hole. The patch is then "opened up" to close off the hole.
- **Open heart surgery** may be necessary if nonsurgical closure cannot be done. If the ASD is small, the hole can be closed with stitches. If the ASD is large, a patch is sewn over the defect so the hole is closed.

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