

# Ventricular Septal Defect (VSD)

*Patient Information Series – What you should know, what you should ask.*

## What is a Ventricular Septal Defect (VSD)?

Ventricular Septal Defect (VSD) is a common birth defect of the heart. Our hearts are comprised of four chambers, two upper chambers- the right atrium and left atrium, and two lower chambers- the right and left ventricles. The right and left ventricles of the heart are separated by a wall of muscle called the ventricular septum. A hole can sometimes occur in this wall: this is called a ventricular septal defect (VSD).

The ventricles are the heart's pumping chambers. The left ventricle pumps blood rich in oxygen out through the Aorta to the body and brain, while the right ventricle pumps oxygen-poor blood out through the Pulmonary Artery to the lungs. Blood flow from the heart ventricles into the great arteries is controlled by one-way doors, called valves.

VSDs are the most common form of heart defect at birth. The size and exact position of the VSD can vary widely among fetuses with this finding. Sometimes the defect is very small, while others may be quite large. Some are positioned low on the septum, others nearer the heart valves. In some cases, more than one VSD can be present. VSD may be associated with other birth defects or it may be isolated. Many complex heart syndromes, which are made up of several heart defects, include VSD. The size, type, and number of VSDs, and whether any other birth defects are present in the fetal heart or in any other organ, are all important factors to determine the fetus's condition.

A VSD allows blood to cross between the two ventricles of the heart. Inside the womb, the right ventricle is larger and pumps harder, so blood can flow across the VSD from the right to the left ventricle. After delivery, as the baby's circulation adjusts to life outside the womb, the left ventricle begins to pump harder than the right. This causes oxygen-rich blood to flow across the VSD from the left ventricle to the right, where it mixes with the oxygen-poor blood that is pumped by the right ventricle to the lungs. This extra blood flow puts strain on the pulmonary artery, which can lead to a problem called pulmonary hypertension.

## How does a VSD happen?

There may be a genetic component in VSD, however in most cases no specific cause is determined. VSD may be associated with many different genetic problems and complex heart defects. In the very first weeks of pregnancy, as the early heart "tube" matures into the four chambered heart, partitions are formed that separate the heart chambers. The partition, or septum, between the ventricles may develop improperly, such that holes are formed.

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## **Should I have more tests done?**

You may be referred to genetic counseling and testing, such as amniocentesis or chorionic villus sampling (CVS) with chromosomal microarray or whole exome sequencing, which can help determine if the VSD is part of a genetic syndrome. This can provide essential information regarding your individual case. In addition, your caregiver may refer you to specialists in fetal heart problems, such as a maternal-fetal medicine specialist and/or a paediatric cardiologist. They can monitor your baby's progress with specialised ultrasound scans focused on the fetal heart and the blood vessels around it. Those specialized ultrasounds are called fetal echocardiography. The tests offered by your caregiver will depend on many associated factors.

## **What are the things to watch for during the pregnancy?**

Your caregiver may order serial ultrasound scans to assess whether the VSD is affecting your baby's growth and well-being. Your caregivers will advise you as the pregnancy progresses.

## **What does it mean for my baby after it is born?**

Since VSD's can vary greatly in their size, position, and number, the effect the VSD will have after your baby is born will depend on all these factors. In many cases, a small VSD will close on its own, during your pregnancy or after delivery. In other cases, the mixing of oxygen-rich and oxygen-poor blood in the heart can affect the baby's future growth. Each baby with VSD is unique. Your caregivers will evaluate your baby carefully to determine whether any intervention is necessary, and, if so, what will suit your baby best.

Most babies with VSD are without any symptoms in the first weeks of life. Many people live with VSD all their lives with no adverse effects, while other babies can develop symptoms that require surgery. After delivery, specialists such as a paediatric cardiologist and/or a paediatric cardiac surgeon, will examine the baby and consult with you to work out the optimal management approach that is best suited to you and your baby.

## **Will it happen again?**

This depends whether or not a genetic cause was found to explain the VSD, and what other problems were present, if any. All these factors affect the likelihood of having another baby with VSD. Your caregiver will likely order early targeted fetal scanning to rule out fetal heart defects in future pregnancies.

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## What other questions should I ask?

- Does this look like a severe VSD?
- How often will I have ultrasound examinations done?
- Should I have genetic counseling? What genetic testing should we consider?
- Where should I deliver?
- Where will the baby receive the best care after it is born?
- Can I meet the team of doctors that will be assisting my baby when it is born, in advance of my delivery?

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