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A human heart is roughly the size of a large fist. The heart is a muscular organ about the size of a fist, located just behind and slightly left of the breastbone. The heart pumps blood through the network of arteries and veins called the cardiovascular system.

The human heart is an organ that pumps blood throughout the body via the circulatory system, supplying oxygen and nutrients to the tissues and removing carbon dioxide and other wastes.

The human heart has four chambers: two upper chambers (the atria) and two lower ones (the ventricles), The right atrium and right ventricle together make up the "right heart," and the left atrium and left ventricle make up the "left heart." A wall of muscle called the septum separates the two sides of the heart.

The heart has four valves - one for each chamber of the heart. The valves keep blood moving through the heart in the right direction.

The mitral valve and tricuspid valve are located between the atria (upper heart chambers) and the ventricles (lower heart chambers).

The aortic valve and pulmonic valve are located between the ventricles and the major blood vessels leaving the heart. Blood flows from the right atrium into the right ventricle through the open tricuspid valve, and from the left atrium into the left ventricle through the open mitral valve.

Closed tricuspid and mitral valves

When the right ventricle is full, the tricuspid valve closes and keeps blood from flowing backward into the right atrium when the ventricle contracts (squeezes).

When the left ventricle is full, the mitral valve closes and keeps blood from flowing backward into the left atrium when the ventricle contracts.

Open pulmonic and aortic valve

As the right ventricle begins to contract, the pulmonic valve is forced open. Blood is pumped out of the right ventricle through the pulmonic valve into the pulmonary artery to the lungs.

As the left ventricle begins to contract, the aortic valve is forced open. Blood is pumped out of the left ventricle through the aortic valve into the aorta. The aorta branches into many arteries and provides blood to the body.

. Closed pulmonic and aortic valves

When the right ventricle finishes contracting and starts to relax, the pulmonic valve snaps shut. This keeps blood from flowing back into the right ventricle.

When the left ventricle finishes contracting and begins to relax, the aortic valve snaps shut. This keeps blood from flowing back into the left ventricle.

The electrical signal travels from your SA node through muscle cells in your right and left atria. The signal triggers the muscle cells that make your atria contract. The atria contract, pumping blood into your left and right ventricles.

The electrical signal travels through the network of conducting cell "pathways," which stimulates your upper chambers (atria) and lower chambers (ventricles) to contract. The signal is able to travel along these pathways by means of a complex reaction that allows each cell to activate one next to it, stimulating it to "pass along" the electrical signal in an orderly manner. As cell after cell rapidly transmits the electrical charge, the entire heart contracts in one coordinated motion, creating a heartbeat.

2. TYPES OF CONGENITAL HEART DISEASE

1. AORTIC VALVE STENOSIS

Aortic valve stenosis — or aortic stenosis — occurs when the heart's aortic valve narrows. This narrowing prevents the valve from opening fully, which reduces or blocks blood flow from your heart into the main artery to your body (aorta) and onward to the rest of your body.

When the blood flow through the aortic valve is reduced or blocked, your heart needs to work harder to pump blood to your body. Eventually, this extra work limits the amount of blood it can pump, and this can cause symptoms as well as possibly weaken your heart muscle.

Your treatment depends on the severity of your condition. You may need surgery to repair or replace the valve. Left untreated, aortic valve stenosis can lead to serious heart problems.

Aortic valve stenosis ranges from mild to severe. Aortic valve stenosis signs and symptoms generally develop when narrowing of the valve is severe. Some people with aortic valve stenosis may not experience symptoms for many years. Signs and symptoms of aortic valve stenosis may include:

* Abnormal heart sound (heart murmur) heard through a stethoscope
* Chest pain (angina) or tightness with activity
* Feeling faint or dizzy or fainting with activity
* Shortness of breath, especially when you have been active
* Fatigue, especially during times of increased activity
* Heart palpitations — sensations of a rapid, fluttering heartbeat
* Not eating enough (mainly in children with aortic valve stenosis)
* Not gaining enough weight (mainly in children with aortic valve stenosis)

The heart-weakening effects of aortic valve stenosis may lead to heart failure. Heart failure signs and symptoms include fatigue, shortness of breath, and swollen ankles and feet.

1. CONTRACTION OF THE AORTA

Coarctation (ko-ahrk-TAY-shun) of the aorta — or aortic coarctation — is a narrowing of the aorta, the large blood vessel that branches off your heart and delivers oxygen-rich blood to your body. When this occurs, your heart must pump harder to force blood through the narrowed part of your aorta.

Coarctation of the aorta is generally present at birth (congenital). The condition can range from mild to severe, and might not be detected until adulthood, depending on how much the aorta is narrowed.

Coarctation of the aorta often occurs along with other heart defects. While treatment is usually successful, the condition requires careful lifelong follow-up.

Symptoms

Coarctation of the aorta symptoms depend on the severity of the condition. Most people don't have symptoms. Children with serious aortic narrowing may show signs and symptoms earlier in life, but mild cases with no symptoms might not be diagnosed until adulthood. People may also have signs or symptoms of other heart defects that they have along with coarctation of the aorta.

Babies with severe coarctation of the aorta may begin having signs and symptoms shortly after birth. These include:

* Pale skin
* Irritability
* Heavy sweating
* Difficulty breathing
* Difficulty feeding

Left untreated, aortic coarctation in babies might lead to heart failure or death.

Older children and adults with coarctation of the aorta often don't have symptoms because their narrowing may be less severe. If you have signs or symptoms that appear after infancy, you most commonly will have high blood pressure (hypertension) measured in your arms. However, your blood pressure is likely to be lower in your legs. Signs and symptoms might includ:

* High blood pressure
* Headache
* Muscle weakness
* Leg cramps or cold feet
* Nosebleeds
* Chest pain

1. PANTENT DUCTUS ATERISOS

Illustration of a patent ductus arteriosus

Patent ductus arteriosus Open pop-up dialog box

Patent ductus arteriosus (PDA) is a persistent opening between the two major blood vessels leading from the heart. The opening, called the ductus arteriosus, is a normal part of a baby's circulatory system before birth that usually closes shortly after birth. If it remains open, however, it's called a patent ductus arteriosus.

A small patent ductus arteriosus often doesn't cause problems and might never need treatment. However, a large patent ductus arteriosus left untreated can allow poorly oxygenated blood to flow in the wrong direction, weakening the heart muscle and causing heart failure and other complications.

Treatment options for a patent ductus arteriosus include monitoring, medications, and closure by cardiac catheterization or surgery.

Symptoms

Patent ductus arteriosus symptoms vary with the size of the defect and whether the baby is full term or premature. A small PDA might cause no signs or symptoms and go undetected for some time — even until adulthood. A large PDA can cause signs of heart failure soon after birth.

Your baby's doctor might first suspect a heart defect during a regular checkup after hearing a heart murmur while listening to your baby's heart through a stethoscope.

A large PDA found during infancy or childhood might cause:

* Poor eating, which leads to poor growth
* Sweating with crying or eating
* Persistent fast breathing or breathlessness
* Easy tiring
* Rapid heart rate

1. EBSTEIN ANOMALY.

Ebstein anomaly is a congenital malformation of the heart that is characterized by apical displacement of the septal and posterior tricuspid valve leaflets, leading to atrialization of the right ventricle with a variable degree of malformation and displacement of the anterior leaflet.

Signs and symptoms

Patients can have a variety of symptoms related to the anatomic abnormalities of Ebstein anomaly and their hemodynamic effects or associated structural and conduction system disease, including the following:

* Cyanosis
* Fatigue and dyspnea
* Palpitations and sudden cardiac death
* Symptoms of right heart failure, such as edema and ascites

5. TETRALOGY OF FALLOT (TOF)

Tetralogy of Fallot (teh-TRAL-uh-jee of fuh-LOW) is a rare condition caused by a combination of four heart defects that are present at birth (congenital).

These defects, which affect the structure of the heart, cause oxygen-poor blood to flow out of the heart and to the rest of the body. Infants and children with tetralogy of Fallot usually have blue-tinged skin because their blood doesn't carry enough oxygen.

Tetralogy of Fallot is often diagnosed during infancy or soon after. However, tetralogy of Fallot might not be detected until later in life in some adults, depending on the severity of the defects and symptoms.

With early diagnosis followed by appropriate surgical treatment, most children and adults who have tetralogy of Fallot live relatively normal lives, though they'll need regular medical care throughout life and might have restrictions on exercise.

Symptoms

Tetralogy of Fallot symptoms vary, depending on the extent of obstruction of blood flow out of the right ventricle and into the lungs. Signs and symptoms may include:

* A bluish coloration of the skin caused by blood low in oxygen (cyanosis)
* Shortness of breath and rapid breathing, especially during feeding or exercise
* Loss of consciousness (fainting)
* Clubbing of fingers and toes — an abnormal, rounded shape of the nail bed
* Poor weight gain
* Tiring easily during play or exercise
* Irritability
* Prolonged crying
* A heart murmur

Tet spells

Sometimes, babies who have tetralogy of Fallot will suddenly develop deep blue skin, nails and lips after crying or feeding, or when agitated.

These episodes are called tet spells and are caused by a rapid drop in the amount of oxygen in the blood. Tet spells are most common in young infants, around 2 to 4 months old. Toddlers or older children might instinctively squat when they're short of breath. Squatting increases blood flow to the lungs.