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**MATRIC NO: 18/MHS07/003**

**Assignment Title:** Mediastinum and its content

**Course Title:** Gross Anatomy of Thorax, Abdomen, Pelvic & Perineum

**Course Code:** ANA 202

**Questions**

1. You will be provided with a video, watch it and use it to describe the heart and its functions

2. Write on five (5) different congenital anomalies of the heart

**Answers**

1. **DESCRIPTION OF THE HEART:**
* The heart is a muscle about the **size of a fist.** It lies behind into the left of the breast bone.
* The purpose of the heart is to pump blood through blood vessels, arteries and veins to all part of the body. The heart is divided into **4 chambers; 2 atria and 2 ventricle.**
* Ventricle receives blood from the atria and pump it into the lungs and the rest of the body.
* The chambers are separated by valves which control the direction of blood flow.
* There are **4 valves; the tricuspid valve, pulmonic valve (pulmonary valve), mitral valve and aortic valve.**
* Circulation begins at the **right side of the heart** were blood from the body goes to the right atrium. This blood passes to the right ventricle were it is pumped to the lungs to receive oxygen. Once it receives oxygen, it flows to the left atrium and then to the left ventricle where it is pumped to the aorta and the rest of the body.
* **On the right side of the heart,** the tricuspid valve separates the right atrium and right ventricle, allowing blood to enter the ventricle but not flow backwards to the atrium. Blood flows through the pulmonic valve to go to the lungs.
* **On the left side of the heart,** the mitral valve separates the left atrium and left ventricle. Blood flows from the left ventricle to the sorts through the aortic valve and to the rest of the body.
* Arteries carry blood with oxygen and other nutrients through out the body while veins take blood back to the heart which pumps it to the lungs to be oxygenated.
* The heart arteries provide oxygen and nutrients to the heart muscle. **The right coronary artery** supplies blood to the bottom and back of the heart.
* **The left coronary artery** spilts into two (2) vessels; one branch supplies blood to the front of the heart while the other branch delivers blood to the left side of the heart.
* **An electric system** transmit signals throughout the heart to control its pumping. The electrical signal starts in the **Sinoatrial node (S A Node)** which is located at the upper portion of the right atrium and is known as the **“natural pacemaker of the heart”.**
* The electrical signal poses down to the lower chamber of the heart via the **Atrioventricular Node ( AV Node)** which controls the signals so the atria contracts before the ventricles.
* In the ventricles, pathways carry the signals throughout the muscles so they contract at the same time to pump blood to the lungs and to the body.

**FUNCTIONS OF THE HEART:**

* The main function of the heart is to pump blood around the body.
* Sending deoxygenated blood to the lungs to be oxygenated.
* Sending oxygenated blood to the whole body.
* Ensuring that oxygenated blood and deoxygenated blood do not mix.
* Preventing back flow of blood (valves).
1. **DIFFERENT CONGENITAL ANOMALIES OF THE HEART:**
* Atrial Septal Defect
* Atrioventricular Septal Defect
* Coarctation of the Aorta
* Pulmonary Atresia
* Total Anomalous Pulmonary Venous Return
1. **ATRIAL SEPTAL DEFECT:** An atrial septal defect is a birth defect of the heart in which there is a hole in the wall (septum) that divides the upper chambers (atria) of the heart. An atrial septal defect is one type of congenital heart defect. Congenital means present at birth. As a baby’s heart develops during pregnancy, there are normally several openings in the wall dividing the upper chambers of the heart (atria). These usually close during pregnancy or shortly after birth. If one of these openings does not close, a hole is left, and it is called an atrial septal defect. The hole increases the amount of blood that flows through the lungs and over time, it may cause damage to the blood vessels in the lungs. Damage to the blood vessels in the lungs may cause problems in adulthood, such as high blood pressure in the lungs and heart failure. Other problems may include abnormal heartbeat, and increased risk of stroke.

**Causes and risk factors:** The causes are unknown. Some babies have heart defects because of changes in their genes or chromosomes. These types of heart defects also are thought to be caused by a combination of genes and other risk factors, such as things the mother comes in contact with in the environment or what the mother eats or drinks or the medicines the mother uses.

1. **ATRIOVENTRICULAR SEPTAL DEFECT:** This is a heart defect in which there are holes between the chambers of the right and left sides of the heart, and the valves that control the flow of blood between these chambers may not be formed correctly. This condition is also called atrioventricular canal (AV canal) defect or endocardial cushion defect. In AVSD, blood flows where it normally should not go. The blood may also have a lower than normal amount of oxygen, and extra blood can flow to the lungs. This extra blood being pumped into the lungs forces the heart and lungs to work hard and may lead to congestive heart failure.

**Types:** There are two general types of AVSD that can occur, depending on which structures are not formed correctly:

* **Complete AVSD:** A complete AVSD occurs when there is a large hole in the center of the heart which allows blood to flow between all four chambers of the heart. This hole occurs where the septa (walls) separating the two top chambers (atria) and two bottom chambers (ventricles) normally meet. There is also one common atrioventricular valve in the center of the heart instead of two separate valves – the tricuspid valve on the right side of the heart and the mitral valve on the left side of the heart. A complete AVSD arises during pregnancy when the common valve fails to separate into the two distinct valves (tricuspid and mitral valves) and when the septa (walls) that split the upper and lower chambers of the heart do not grow all the way to meet in the center of the heart.
* **Partial or Incomplete AVSD:** A partial or incomplete AVSD occurs when the heart has some, but not all of the defects of a complete AVSD. There is usually a hole in the atrial wall or in the ventricular wall near the center of the heart. A partial AVSD usually has both mitral and tricuspid valves, but one of the valves (usually mitral) may not close completely, allowing blood to leak backward from the left ventricle into the left atrium.

**Causes and risk factors:** In particular, AVSD is common in babies with Down syndrome, a genetic condition that involves an extra chromosome 21 (also called trisomy 21). Congenital heart defects are also thought to be caused by the combination of genes and other risk factors, such as things the mother comes in contact with in her environment, what she eats or drinks, or certain medications she uses during pregnancy.

1. **COARCTATION OF THE AORTA:** Coarctation of the aorta is a birth defect in which a part of the aorta is narrower than usual. If the narrowing is severe enough and if it is not diagnosed, the baby may have serious problems and may need surgery or other procedures soon after birth. For this reason, coarctation of the aorta is often considered a critical congenital heart defect. The defect occurs when a baby’s aorta does not form correctly as the baby grows and develops during pregnancy. The narrowing of the aorta usually happens in the part of the blood vessel just after the arteries branch off to take blood to the head and arms, near the patent ductus arteriosus, although sometimes the narrowing occurs before or after the ductus arteriosus. The narrowing, or coarctation, blocks normal blood flow to the body. This can back up flow into the left ventricle of the heart, making the muscles in this ventricle work harder to get blood out of the heart. Since the narrowing of the aorta is usually located after arteries branch to the upper body, coarctation in this region can lead to normal or high blood pressure and pulsing of blood in the head and arms and low blood pressure and weak pulses in the legs and lower body.

**Causes and risk factors:** Some babies have heart defects because of changes in their genes or chromosomes. Heart defects, like coarctation of the aorta, are also thought to be caused by a combination of genes and other risk factors, such as things the mother comes in contact with in the environment, what the mother eats or drinks, or medicines the mother uses.

1. **PULMONARY ATRESIA:** Pulmonary atresia is a birth defect of the pulmonary valve. Pulmonary atresia is when this valve didn’t form at all, and no blood can go from the right ventricle of the heart out to the lungs. In pulmonary atresia, since blood cannot directly flow from the right ventricle of the heart out to the pulmonary artery, blood must use other routes to bypass the unformed pulmonary valve. The foramen ovale, a natural opening between the right and left upper chambers of the heart during pregnancy that usually closes after the baby is born, often remains open to allow blood flow to the lungs.

**Types:** There are typically two types of pulmonary atresia, according to whether or not a baby also has a ventricular septal defect.

* **Pulmonary atresia with an intact ventricular septum:** In this form of pulmonary atresia, the wall, or septum, between the ventricles remains complete and intact. During pregnancy when the heart is developing, very little blood flows into or out of the right ventricle (RV), and therefore the RV doesn’t fully develop and remains very small. If the RV is under-developed, the heart can have problems pumping blood to the lungs and the body. The artery which usually carries blood out of the right ventricle, the main pulmonary artery (MPA), remains very small, since the pulmonary valve (PV) doesn’t form.
* **Pulmonary atresia with a ventricular septal defect: I**n this form of pulmonary atresia, a ventricular septal defect (VSD) allows blood to flow into and out of the right ventricle (RV). Therefore, blood flowing into the RV can help the ventricle develop during pregnancy, so it is typically not as small as in pulmonary atresia with an intact ventricular septum. Pulmonary atresia with a VSD is similar to another condition called tetralogy of Fallot. However, in tetralogy of Fallot, the pulmonary valve (PV) does form, although it is small and blood has trouble flowing through it – this is called pulmonary valve stenosis. Thus, pulmonary atresia with a VSD is like a very severe form of tetralogy of Fallot.

**Causes and Risk Factors:** The causes of heart defects, such as pulmonary atresia, among most babies are unknown. Some babies have heart defects because of changes in their genes or chromosomes. Heart defects also are thought to be caused by a combination of genes and other factors, such as the things the mother comes in contact with in the environment, or what the mother eats or drinks, or certain medicines she uses.

1. **TOTAL ANOMALOUS PULMONARY VENOUS RETURN:** Total anomalous pulmonary venous return (TAPVR) is a birth defect of the heart. In a baby with TAPVR, oxygen-rich blood does not return from the lungs to the left atrium. Instead, the oxygen-rich blood returns to the right side of the heart. Here, oxygen-rich blood mixes with oxygen-poor blood. This causes the baby to get less oxygen than is needed to the body. To survive with this defect, babies with TAPVR usually have a hole between the right atrium and the left atrium (an atrial septal defect) that allows the mixed blood to get to the left side of the heart and pumped out to the rest of the body.

**Types:** There are different types of TAPVR, based on where the pulmonary veins connect:

* **Supra-cardiac:** In supra-cardiac TAPVR, the pulmonary veins come together and form an abnormal connection above the heart to the superior vena cava, which is a main blood vessel that brings oxygen-poor blood from the upper part of the body to the heart. In this type of TAPVR, a mixture of oxygen-poor and oxygen-rich blood returns to the right atrium through the superior vena cava.
* **Cardiac:** In cardiac TAPVR, the pulmonary veins meet behind the heart and connect to the right atrium. The coronary sinus, which is a vein that helps bring oxygen-poor blood from the heart muscle back to the heart, helps connect the pulmonary veins to the right atrium in this type of TAPVR.
* **Infra-cardiac:** In infra-cardiac TAPVR, the pulmonary veins come together and form abnormal connections below the heart. A mixture of oxygen-poor blood and oxygen-rich blood returns to the right atrium from the veins of the liver and the inferior vena cava, which is the main blood vessel that brings oxygen-poor blood from the lower part of the body to the heart.

 **Causes and risk factors:** The causes of heart defects, such as TAPVR, among most babies are unknown. Some babies have heart defects because of changes in their genes or chromosomes. Heart defects also are thought to be caused by a combination of genes and other risk factors, such as the things the mother or fetus come in contact with in the environment or what the mother eats or drinks or the medicines she uses.