

Mechanism Involved in Cardiac Cycle

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DESCRIPTION

The cardiac cycle is the sequence of events that occur during one heartbeat, or the contraction and relaxation of the heart. This cycle is essential for the circulation of blood throughout the body, and any disruptions in this cycle can have serious consequences for overall health.

Phases of the cardiac cycle

The cardiac cycle consists of two main phases, diastole and systole.

Diastole: During diastole, the heart is in the relaxed state, and blood flows into the heart from the veins. The atria, which are the upper chambers of the heart, are both relaxed and get filled with blood. As the atria fill, the mitral and tricuspid valves are open, allowing blood to flow from the atria into the ventricles, which are the lower chambers of the heart.

Systole: During systole, the heart contracts, and blood is pumped out of the heart into the arteries. The ventricles are contracting, and the mitral and tricuspid valves are closed to prevent backflow of blood into the atria. At the same time, the aortic and pulmonary valves are open, allowing blood to be ejected from the ventricles into the aorta and pulmonary artery, respectively.

Mechanism of the cardiac cycle

The cardiac cycle is driven by the electrical signals generated by the heart's pacemaker, the Sino Atrial (SA) node. These electrical signals cause the heart muscle to contract and relax in a coordinated manner, allowing the blood to be pumped through the heart and into the arteries.

During diastole, the SA node is inactive, and the heart is in a resting state. As the atria fill with blood, the pressure inside the

atria increases, which eventually triggers the SA node to release an electrical signal that causes the atria to contract. This contraction, called atrial systole, helps to push blood into the ventricles.

As the ventricles get filled with blood, the pressure inside the ventricles increases, causing the aortic and pulmonary valves to close. This marks the beginning of ventricular systole, during which the ventricles contract to eject blood out of the heart and into the arteries. The amount of blood that is ejected during each beat is known as the stroke volume, and it is determined by the force of ventricular contraction and the resistance in the arteries.

Once the ventricles have contracted, they begin to relax, and the pressure inside the ventricles decreases. This drop in pressure allows the aortic and pulmonary valves to open, allowing blood to flow into the arteries. As the ventricles continue to relax, the pressure inside them decreases even further, which causes the mitral and tricuspid valves to open, allowing blood to flow from the atria into the ventricles. This marks the beginning of diastole and the start of a new cardiac cycle.

The cardiac cycle plays a crucial role in the diagnosis and management of cardiovascular diseases. For example, abnormalities in the electrical signals that drive the cardiac cycle can lead to conditions such as arrhythmias, which can be detected using an Electrocardiogram (ECG).

CONCLUSION

Also some other conditions that can affect the cardiac cycle include heart failure, coronary artery disease, and valvular heart disease. In heart failure, the heart is unable to pump enough blood to meet the body's needs, which can lead to a variety of symptoms such as fatigue, shortness of breath, and fluid build-up in the lungs.

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