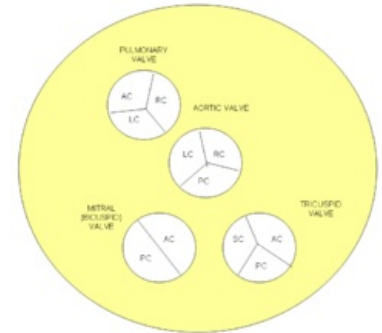


Function of cardiac valves, heart sounds

Cardiac valves are needed to compartmentalise the blood in the heart. Their main function is to prevent backflow and to ensure that the blood in the heart continues to move in one direction. The closure of the heart valves can be heard typically with a stethoscope, which can be used to diagnose pathological circumstances regarding the cardiac valves

The Cardiac Valves

- The four valves of the heart are set in orifices
- The diameter of the chamber beyond the valve (relaxed ventricle, sinus of Valsalva) is greater than that of the orifice
- **Eddy currents** are generated when fluid is forced through an orifice into a broad vessel or chamber, surrounding the valve and cusps of the valve and keep the cusps in the stream and not against the chamber wall
- This process created by the currents lead to rapid closure of the valves when a critical change in pressure occurs



The Cardiac Valves

Atrio-ventricular valves

- (Mitral = left; Tricuspid = right)
- Stops regurgitation of blood into atria, during ventricular systole
- They are composed of membranous leaflets or cusps that hang into the ventricles to form a funnel
- The free edges are attached to the papillary muscles by fine tendons (chordae tendinae), preventing the cusps from being pushed back into the atria, during systole

Aortic and Pulmonary valves

- They are present at the bases of the large arteries, preventing regurgitation into the ventricles, during diastole
- They form three crescent-shaped pockets around the opening of the vessel

Heart Sounds

- The heart sound may be altered by deformities of the valves, producing various types of **murmurs**
- If a valve is **incompetent** (insufficient/fails to close properly), blood will rush back to the proximal chamber, producing a murmur e.g. systolic murmur due to mitral insufficiency
- When valves become stenotic (narrowed), the flow of blood is hindered and murmurs occur e.g. diastolic murmur due to tricuspid valve stenosis

First Heart Sound

- It is due to the closure of the atrio-ventricular valves
- It begins with the onset of ventricular systole and is best heard over the apex of the heart
- Additional components are thought to result from vibrations of the blood in the ventricular chambers, vibration of the chamber walls and turbulent flow of blood ejected through the aortic orifice into the sinus of Valsalva

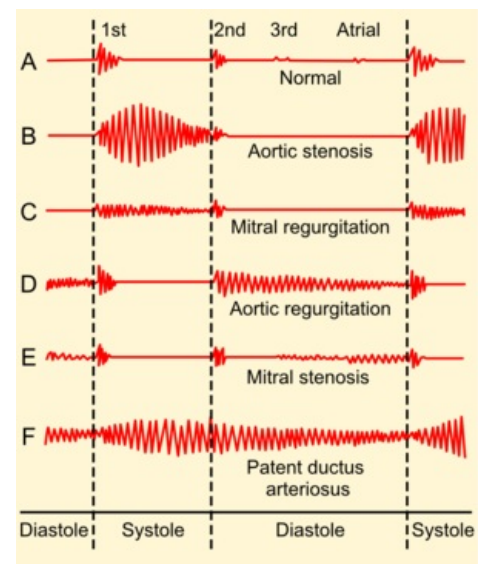
Second Heart Sound

- It is due to the closure of the aortic and pulmonary valves as well as the vibrations of the blood in the aorta
- The vibrations generated are usually of higher frequency
- As the closure of the right and left semi-lunar valves are not simultaneous, the second heart sound can be split

Third Heart Sound

- It occurs in early diastole and is due to the rapid filling of blood into the ventricle just after isometric relaxation
- It is sometimes heard in children, but is usually inaudible to the ear

Fourth Heart Sound



Normal and Abnormal Heart Sounds

- It is due to the contraction of the atrium at the start of the cardiac cycle

Links

Bibliography

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