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Lecture title: Cardiovascular System / The pericardium

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The pericardium

It's a fibro-serous sac enclosing the heart which composed of: **a. fibrous and b. serous pericardium** that covered from outside by **mediastinal pleura** which called **pericardial pleura.**

A. Fibrous pericardium:

A tough fibrous sac surrounding the serous pericardium, the heart and pericardial cavity. It is closed dorsally by its attachment to the great vessels at the base of the heart. While it is firmly attached ventrally to **the sternum** by the strong **sterno-pericardiac ligament** in cattle; while in horse and dog by a **phreno-pericardiac ligament** to **the diaphragm**.

B. Serous pericardium:

It is a closed sac which surrounded from outside by the fibrous pericardium. It is a smooth glistening pericardium which contains a small amount of clear serous fluid in the pericardial cavity. **The serous pericardium also consist of (2) layers**: 1. Parietal layer and 2. Visceral layer. The parietal layer closely attached to the fibrous pericardium. The visceral layer covers the heart and parts of the great vessels and therefore also termed epicardium.

Pericardial cavity:

A potential space between the visceral and parietal layers of serous pericardium. This space fills with fluid which is volume directly analogous to the animal size: **in rabbit (0.4-1.9 ml), in dogs (0.5-2.5 ml), and in adult humans (20-60 ml) (average 15-35 ml).** Pericardial fluid acts as a lubricant to allow the heart freedom of movement.

The heart:

It situation in thorax between the lungs and is protected by the rib cage and in some animals displaced slightly to the left side. It is powerful pump which lies within the pericardial sac. The size, shape and position of the heart vary between and within species. **In horse** the heart extend from 2nd inter costal space to the 6th inter costal space, while **in cow** the heart extend from 2nd inter costal space to the 5th inter costal space. The heart occupies the greater part of the middle mediastinal space. Its shape is **flattened cone** and attached at the base by **the great vessels**, but its apex free in the pericardium. The long axis directed ventrally and caudally.

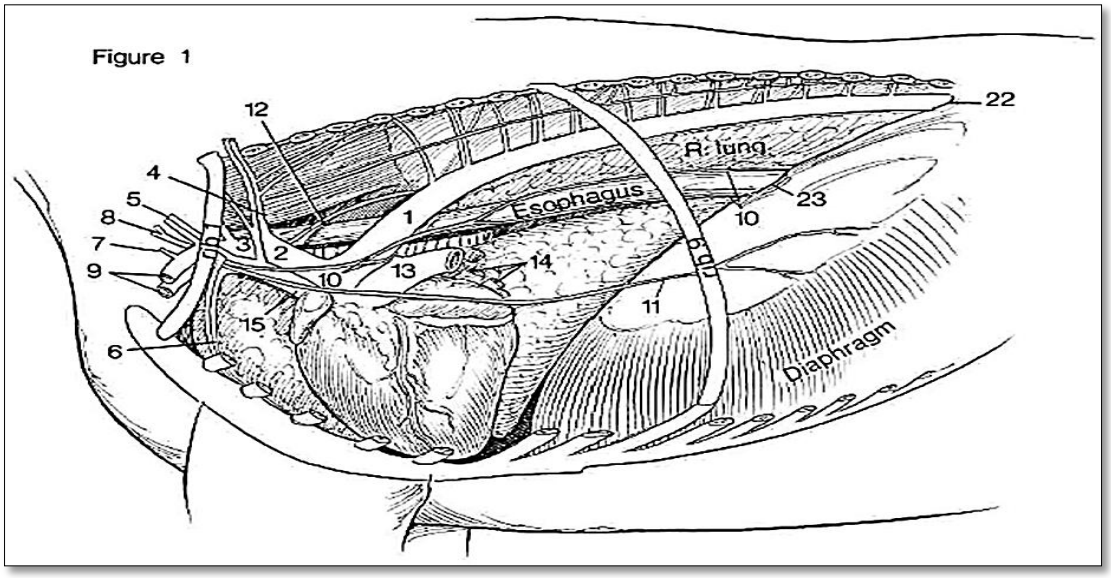

Figure 1 showing the position of the heart

The heart is considered to have an apex, base, two surfaces (parietal and visceral surfaces) and two borders (cranial (right) border is convex and caudal (left) border is shorter and vertical). The wall of the heart composed of **the three layers** from **out** to **inward:** epicardium, myocardium and endocardium.

1-Epicardium: a thin layer of mesothelium covering the surface of the heart. The epicardium is represented the visceral layer of the serous pericardium.

2-Myocardium: muscle layer madding up the majority of the thickness of the heart wall. It lies between the endocardium and epicardium.

3-Endocardium: a thin mesothelium layer lining the atria and ventricles. This layer is continuous with the endothelium layer that lining the great vessels entering and leaving the heart.

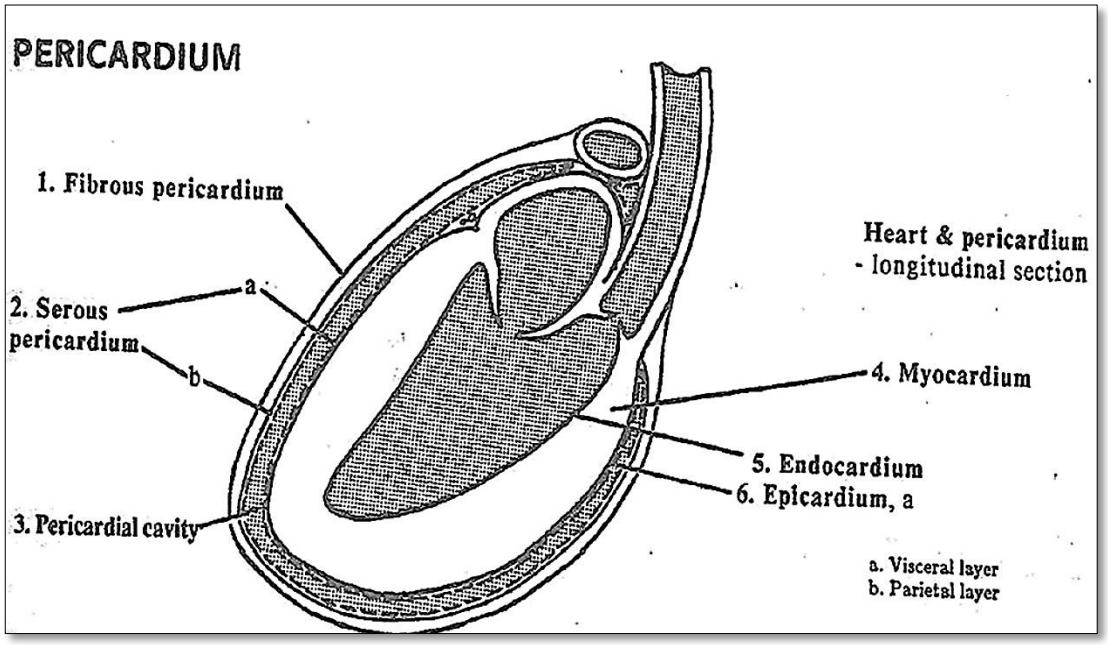

Figure 2 showing the pericardium & heart's wall layers

Fixation of the heart:

1. By large vessels (pulmonary trunk, aorta, brachiocephalic trunk).
2. By sterno-pericardium ligament (in cattle).
3. By phrenic-pericardium ligament (in horse and dog).