Surface anatomy of Cardiovascular system

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The lines cover the front, side, and back of the thorax

Midsternal line (anterior median line) & Lateral sternal borders: Runs down the midline and lateral side of the sternum. Parasternal line: midway between the lateral sternal border & midclavicular line. Right and left midclavicular lines: Run parallel with the midsternal line, passing through the midpoint of each clavicle

Anterior axillary line: Runs along the anterior axillary fold, close to the front of the thorax. Posterior axillary line: Runs parallel with the anterior axillary line along the posterior axillary fold, close to the back. Midaxillary line: Runs midway between the anterior and posterior axillary lines, starting at deepest part of the axilla. Midvertebral (posterior median) line: Runs vertically down the midpoint of the spine. Right and left scapular lines: Run parallel with the midvertebral line pass through the inferior angles of scapulae
**The nipple** in the male is situated in front of the fourth rib or a little below; vertically it lies a little external to the mid clavicular line. **Suprasternal notch** is in the middle line above the sternum. Three fingers below the suprasternal notch is a transverse ridge can be felt, which is known as the **sternal angle**.

**Sternal angle** marks the junction between the manubrium and body of the sternum; corresponds to the level of the **disc space between the 4th and 5th thoracic vertebrae**. **Sternal angle levels the second ribs junction with the sternum**, and when these are found the lower ribs can be counted.
The sternal angle: represents very important T4-5 level.

At the sternal angle,

- the 2nd costal cartilage articulates with the sternum,
- the superior mediastinum is separated from the inferior mediastinum,
- the ascending aorta ends and the arch of the aorta begins, the arch of the aorta ends and the thoracic aorta begins,
- the trachea bifurcates. Superiorly, the trachea begins at the lower border of the cricoid cartilage, at the level of C6. It is approximately 10cm long with an external diameter of 2cm. It lies in the median plane and runs almost vertically.

Sternum: The body of the sternum is palpable in the midline of the chest between the breasts. The right border of the heart lies posterior to it.
• Internal jugular and subclavian veins join to form the brachiocephalic veins behind the sternal ends of the clavicles near the sternoclavicular joints.

• **The left brachiocephalic** vein crosses from left to right behind the manubrium.

• **The brachiocephalic veins unite** to form the superior vena cava behind the lower border of the costal cartilage of the right 1\textsuperscript{st} rib.
Surfaces of the heart

the heart has 5 surfaces

1- Anterior (or sternocostal) – Right ventricle.
2- Posterior (or base) – Left atrium.
3- Inferior (or diaphragmatic) – Left and right ventricles.
4- Right pulmonary – Right atrium.
5- Left pulmonary – Left ventricle.
Borders
Separating the surfaces of the heart are its borders. There are four main borders of the heart:

1- Right border – Right atrium
2- Inferior border – Left ventricle and right ventricle
3- Left border – Left ventricle (and some of the left atrium)
4- Superior border – Right and left atrium and the great vessels
the upper limit of the heart reaches as high as the 3rd costal cartilage on the right side of the sternum and the 2nd intercostal space on the left side of the sternum (both 1.2cm from the sternal border).
The right margin of the heart extends from the right 3rd costal cartilage to near the right 6th costal cartilage (at the 6th chondro-sternal junction).
The left margin of the heart descends laterally from the 2nd intercostal space to the apex located near the midclavicular line in the 5th intercostal space.
The lower margin of the heart extends from the sternal end of the right 6th costal cartilage to the apex in the 5th intercostal space near the midclavicular line (or 9cm from the midline).
Heart valves and where to listen for heart sounds

The tricuspid valve is almost vertical and centred at the 4th intercostal space just to the right of the midline. It can be heard just to the left of the lower part of the sternum near the 5th intercostal space.
The mitral valve is oblique, running down and left, starting opposite the 4th costal cartilages and lying beneath the left side of the sternum. It can be heard over the apex of the heart in the left 5th intercostal space at the midclavicular line.
The pulmonary valve is horizontal and centered at the 3rd left chondro-sternal joint. It is heard over the medial end of the left 2nd intercostal space.
The aortic valve is oblique, running down and right, starting from the medial end of the 3rd left intercostal space. It can be heard over the medial end of the right 2nd intercostal space.
The coronary sulcus: separating the atria and the ventricles from the upper medial end of the 3rd left costal cartilage to the middle of the right 6th chondro-sternal joint.

The anterior interventricular sulcus: from the 3rd left intercostal space 2.5cm to the left of the midline to a point 1.2cm medial to the apex.
Areas that are used for auscultation of the heart:

**Aortic area:** At the 2nd intercostal space to the right of the sternum

**Pulmonic area:** At the 2nd intercostal space to the left of the sternum

**Tricuspid area:** Over the lower-left sternal border

**Mitral area:** At the left 5th intercostal space at the midclavicular line
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