Radiology Techniques

Department

The Radiological Anatomy

Lecture 2

HEART AND CORONORY ARTERIES
RADIOLOGICAL ANATOMY

By

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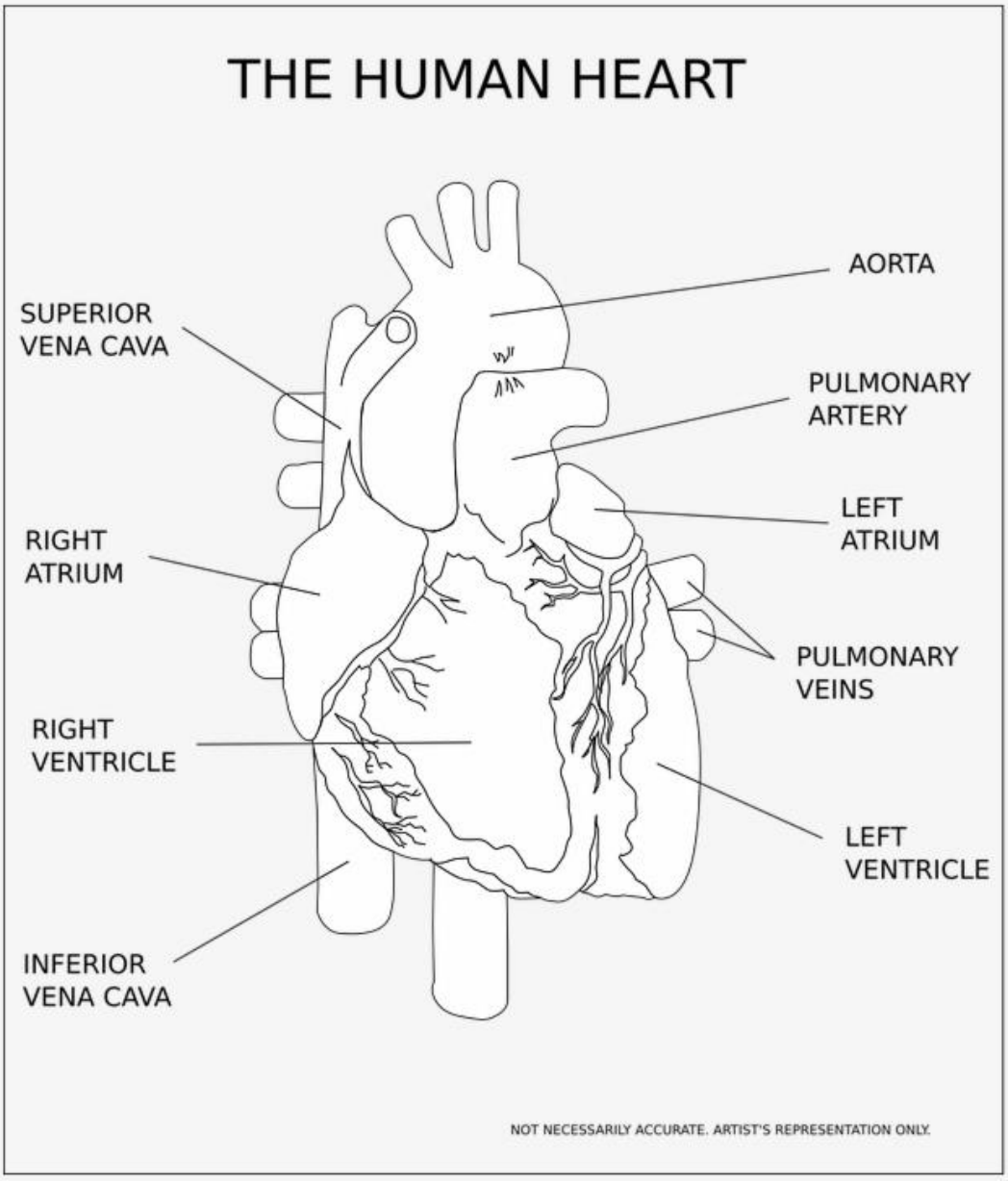
3rd Stage

THE HUMAN HEART



The Heart

Gross anatomy and orientation

The heart is pyramidal in shape and lies obliquely in the chest. Its square-shaped base points posteriorly and the elongated apex to the left and inferiorly.

The left atrium forms the base or posterior part, with the superior and inferior pulmonary veins draining into its four corners.

The right atrium forms the right border, with superior and inferior venae cava draining into its upper and lower parts.

The apex and left border are formed by the left ventricle.

The right ventricle forms the anterior part.

The inferior (diaphragmatic) part of the heart is formed by both ventricles anteriorly and a small part of right atrium posteriorly where the IVC enters this chamber.

The interatrial and interventricular septa are said to lie in the left anterior oblique plane

The plane of the valves is also inclined inferiorly and to the left.

Pericardium

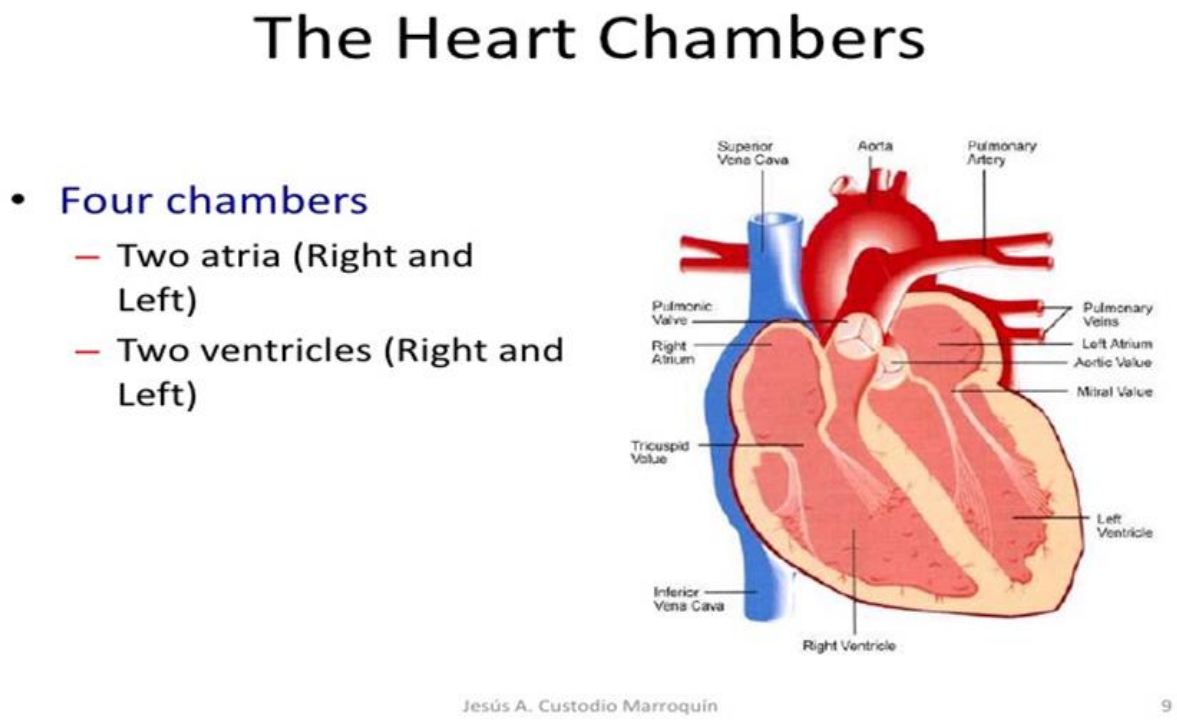
This is a closed sac consisting of parietal and visceral layers that enclose a potential space which contains 20-25 mL of serous fluid. It is draped over the heart and great vessels.

The visceral layer adheres to the myocardium and is also known as the epicardium. The parietal layer is free, except inferiorly, where it is bound to the central tendon

of the diaphragm, and superiorly where it fuses with the covering of the great vessels.

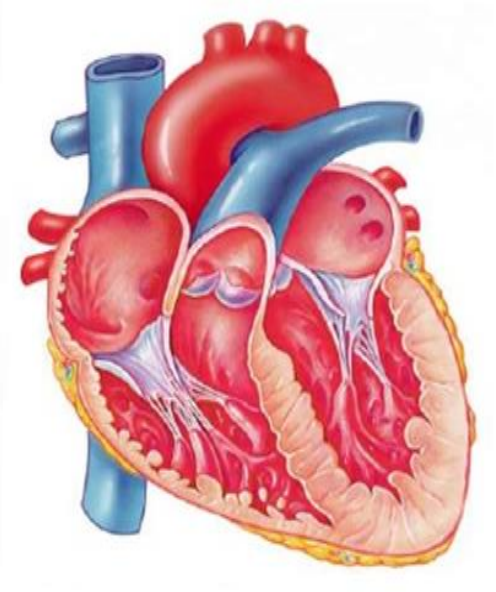
Some fat is present between the epicardium and myocardium. This increases with age. Fat is also present between the pericardium and mediastinal pleura, and it may be extensive in the anterior and lateral cardiophrenic angles, where it is known as the pericardial fat pad.

Cardiac chambers and valves



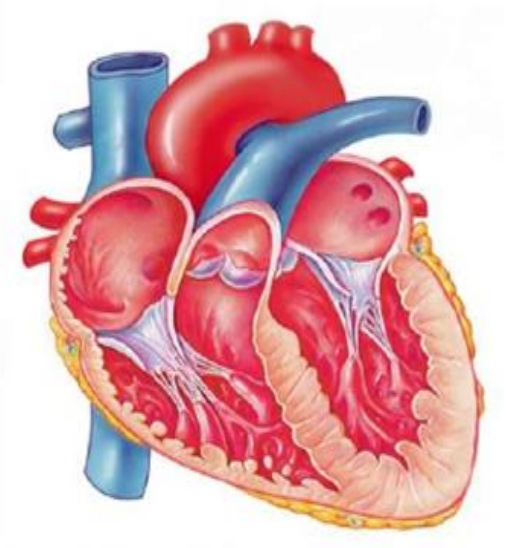
The Heart Chambers

- Atria
  - *Features*
    - small, thin-walled chambers
  - *Functions*
    - receiving chambers for blood returning to the heart from the circulation
    - push the blood into the adjacent ventricles.



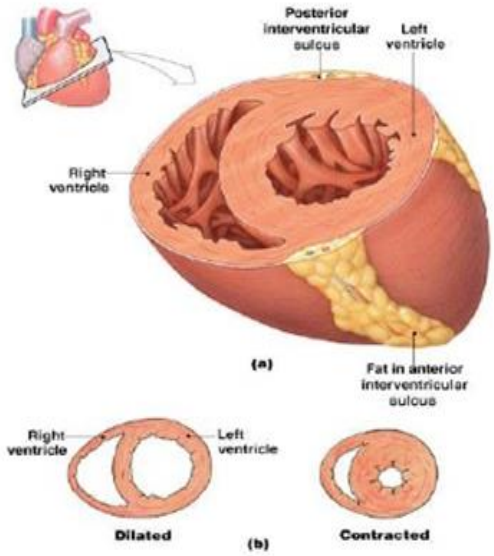
The Heart Chambers

- Atria
  - Receive blood from
    - *Right side*
      - Superior and Inferior Vena Cava
    - *Left side*
      - Pulmonary Veins



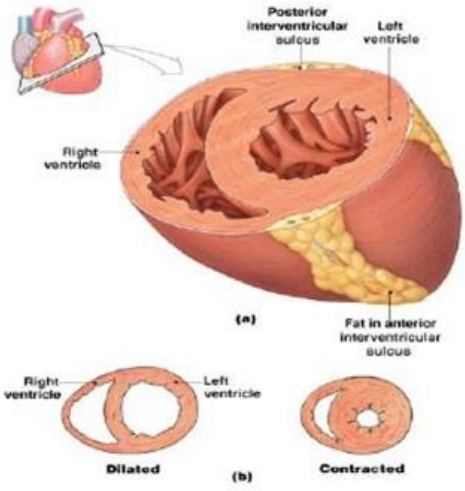
The Heart Chambers

- Ventricles
  - Features
    - make up most of the mass of the heart
    - the walls of the left ventricle are 3X thicker than those of the right



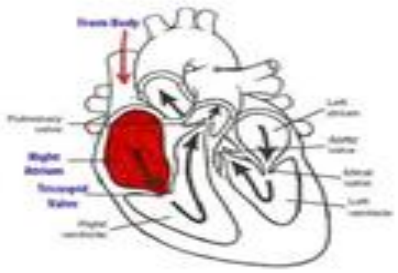
The Heart Chambers

- Ventricles
  - Functions
    - discharging chambers of the heart
    - propel blood to Pulmonary Trunk (right ventricle), Aorta (left ventricle)



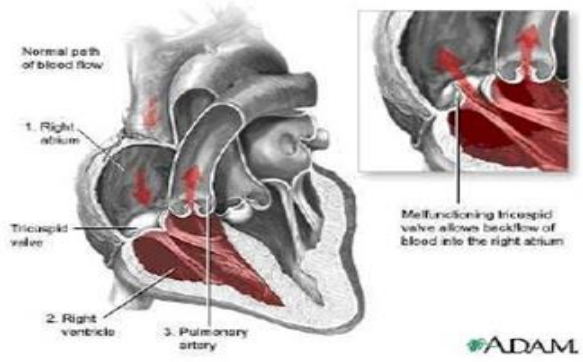
The Right Atrium

- Receives deoxygenated blood from the inferior vena cava below and from the superior vena cava above.



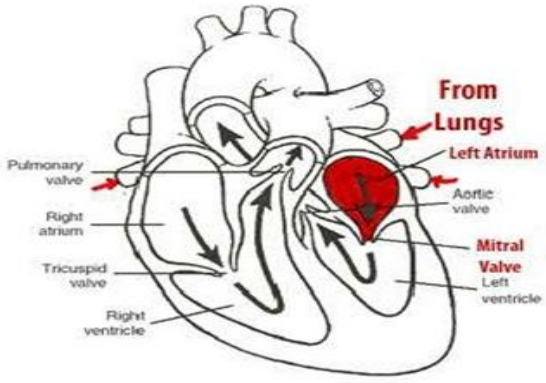
The Right Ventricle

- Receives blood from the right atrium through the **tricuspid valve** .



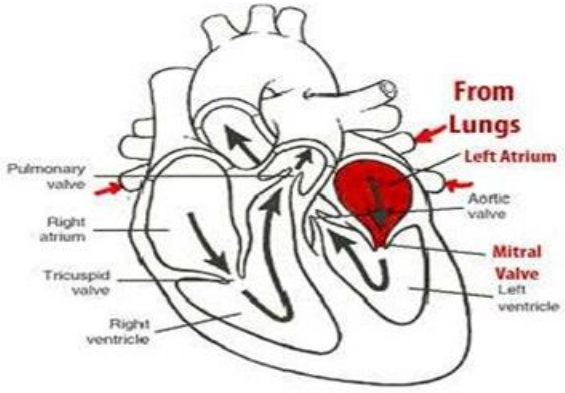
The Left Atrium

- Receives oxygenated blood from four pulmonary veins which drain posteriorly.



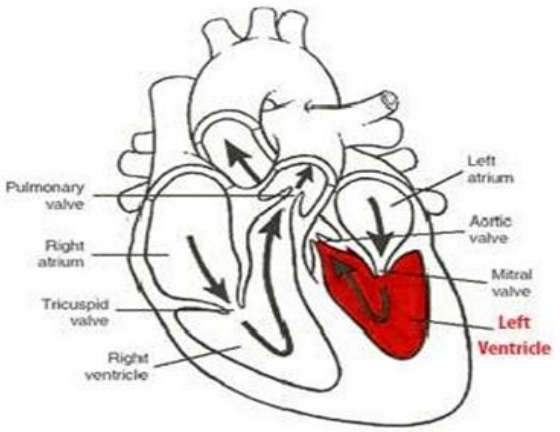
The Left Atrium

- The ***mitral*** (***bicuspid***) valve guards the passage of blood from the left atrium to the left ventricle.



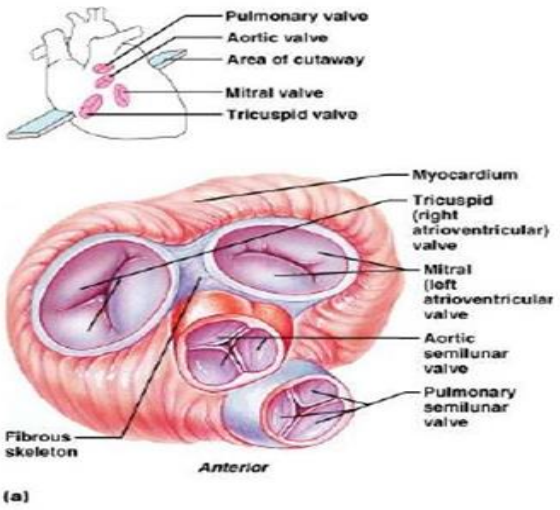
The Left Ventricle

- The wall of the left ventricle is thicker than the right ventricle but the structure is similar.
- The thick wall is necessary to pump oxygenated blood at high pressure through the systemic circulation.



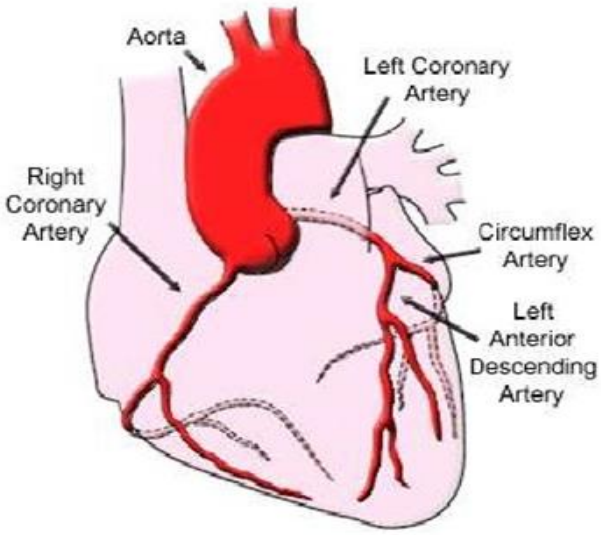
Atrioventricular (AV) Valves

- Atrioventricular (AV) valves lie between the atria and the ventricles
  - R-AV valve = tricuspid valve
  - L-AV valve = bicuspid or mitral valve
- AV valves prevent backflow of blood into the atria when ventricles contract



Arterial Supply of the Heart

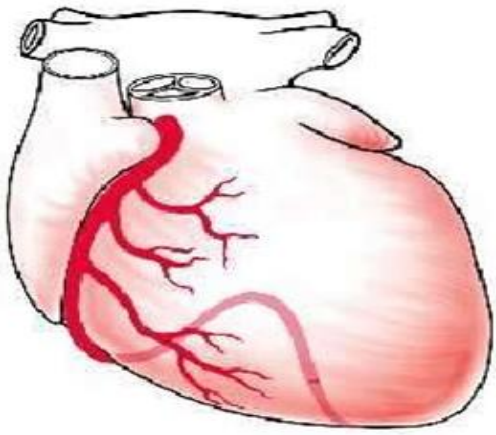
- The arterial supply of the heart is provided by the **right** and **left** coronary arteries, which arise from the **ascending aorta** immediately above the aortic valve.



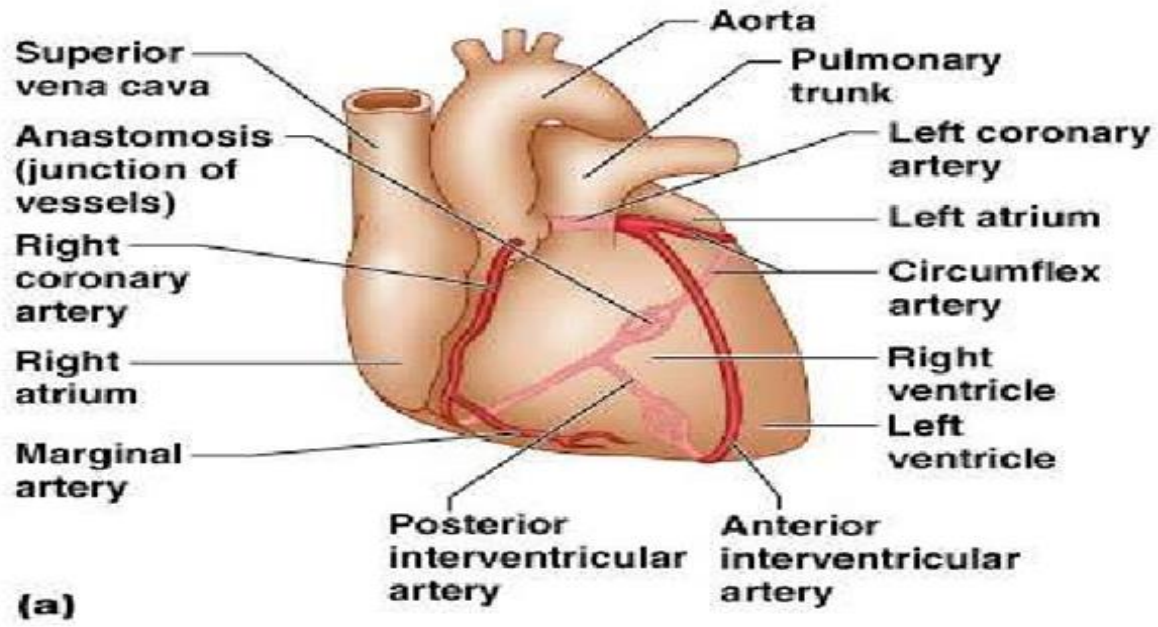
Right coronary artery

Branches

- Right marginal arteries (acute marginal artery)
- Posterior interventricular artery. (in post. IV sulcus)
- Sinoatrial nodal artery.
- Atrioventricular nodal artery.

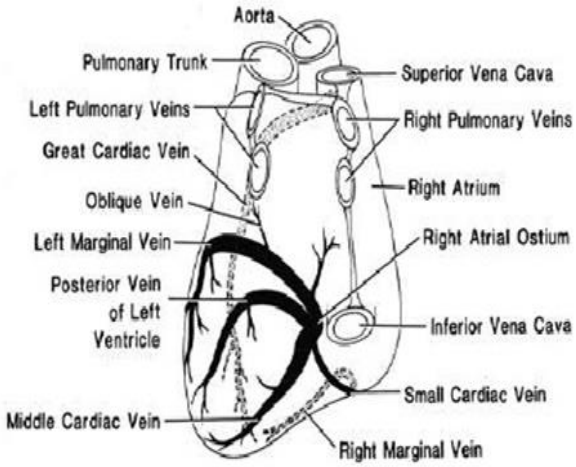


Coronary Arteries

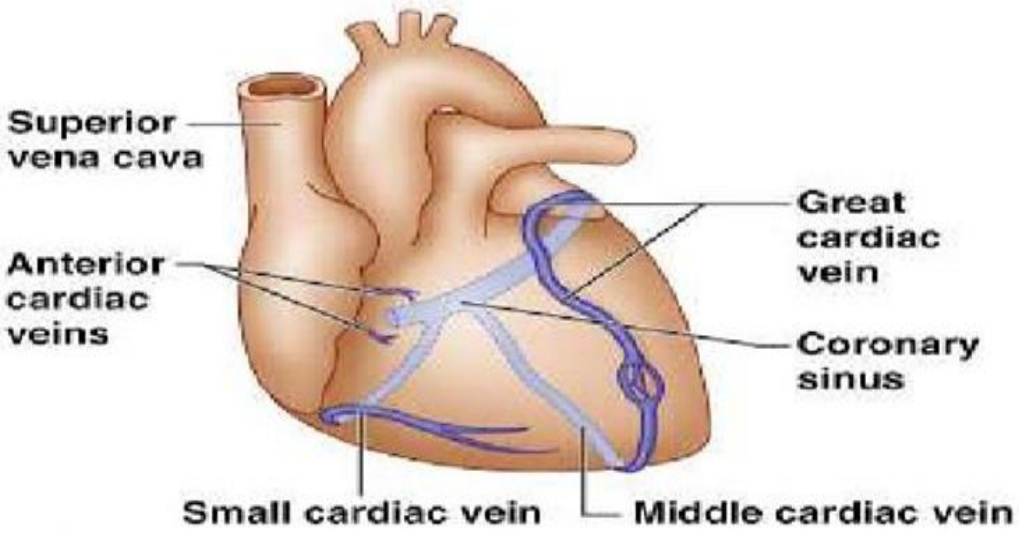


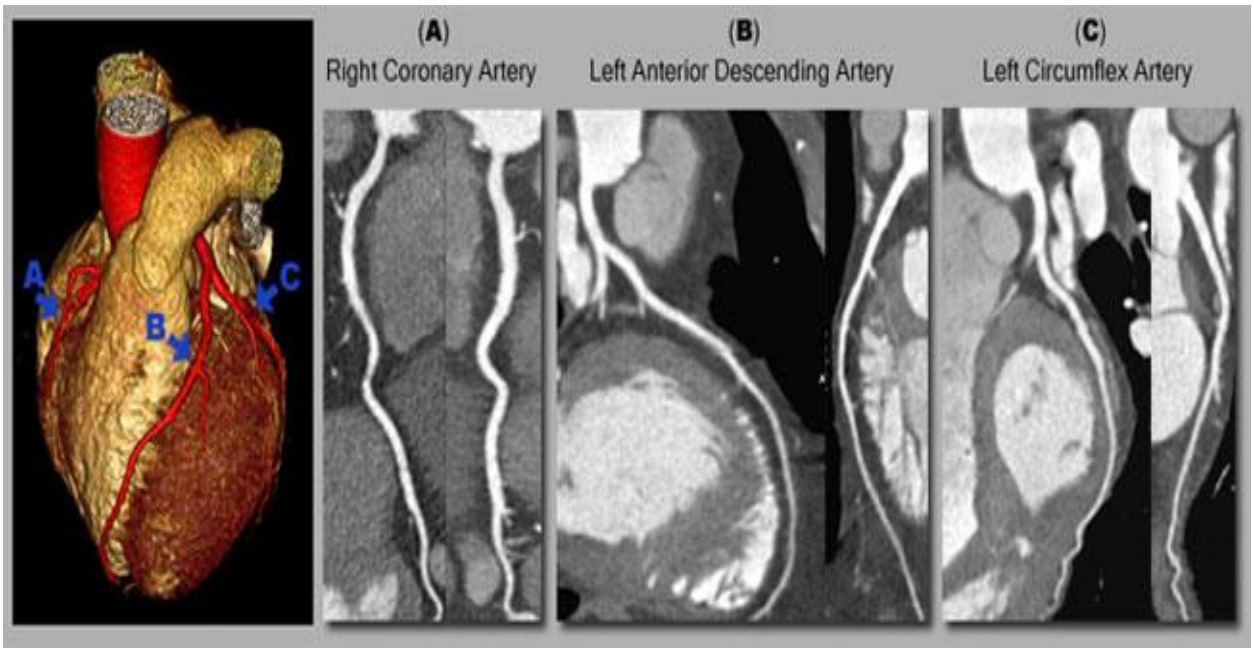
Venous Drainage of the Heart

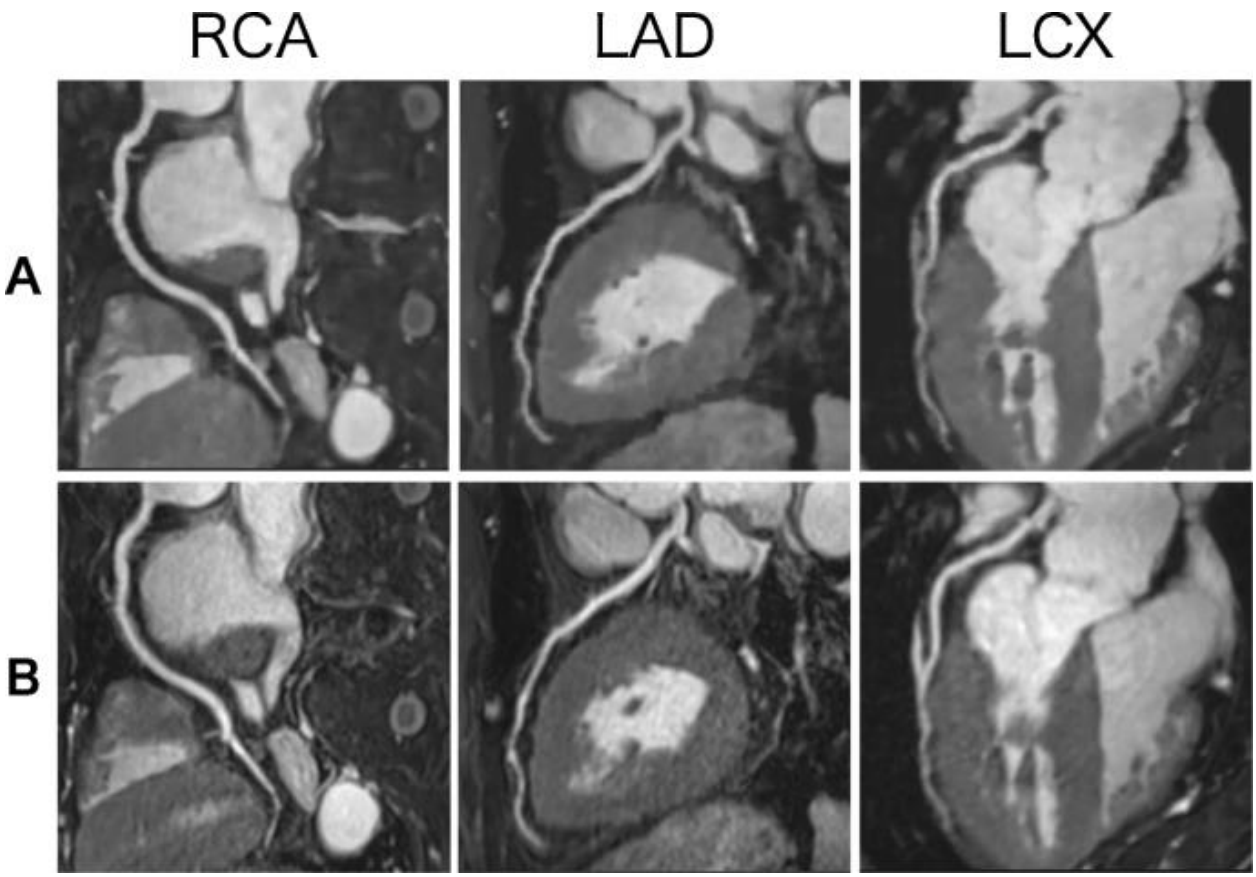
- Most blood from the heart wall drains into the right atrium through the ***coronary sinus*** ,which lies in the posterior part of the atrioventricular groove .
- It is a continuation of the ***great cardiac vein***.
- It opens into the right atrium to the left of the inferior vena cava

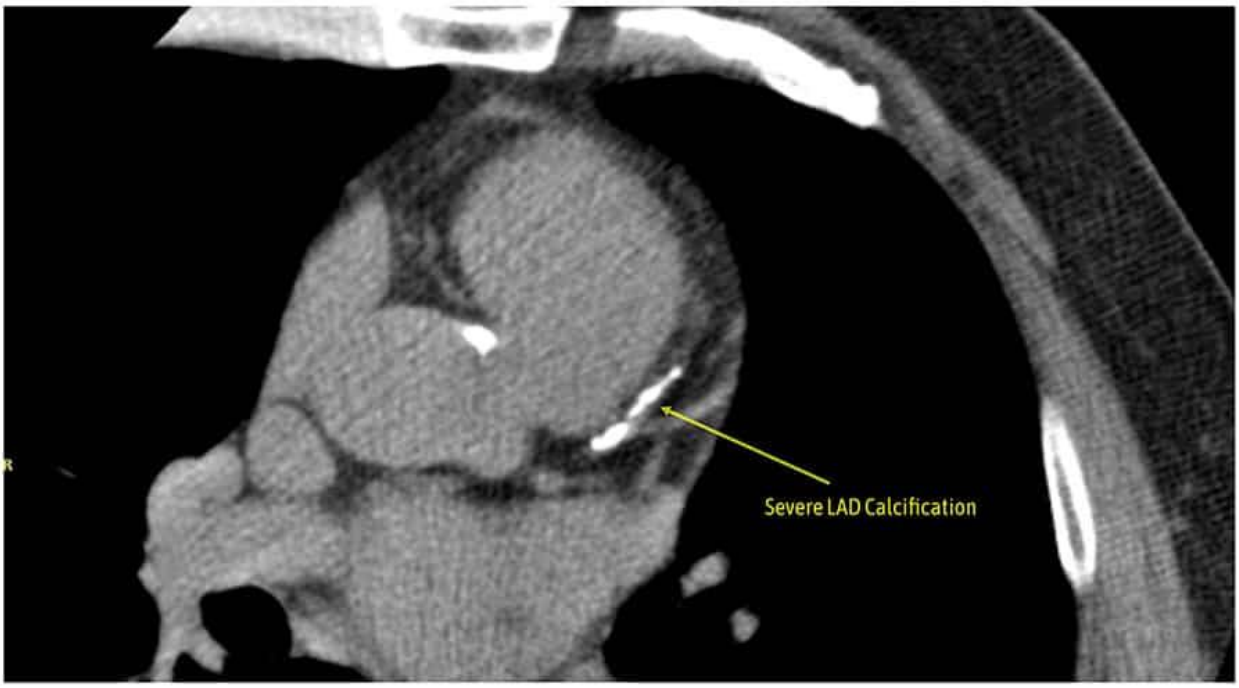


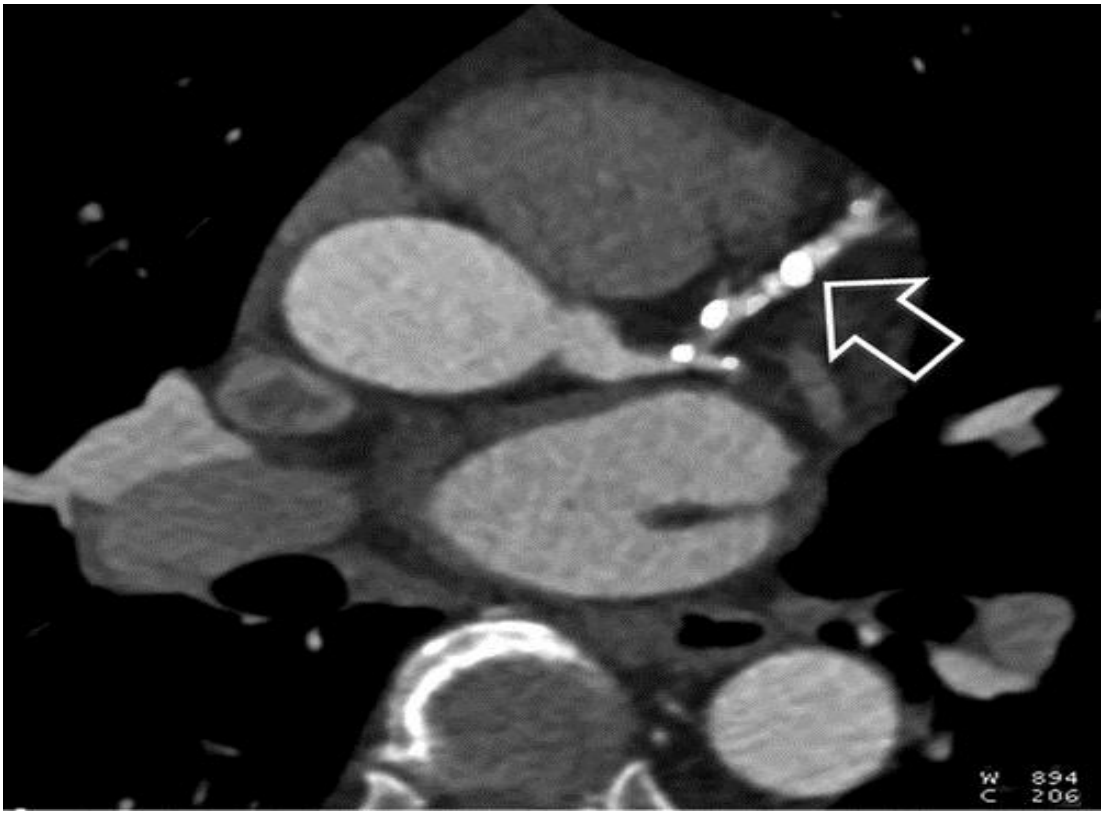
Venous Drainage of the Heart






RCA
LAD
LCX
A
B


Severe LAD Calcification


W 894
C 206


A
Calcified coronary plaques
Calcified coronary plaques
P