Cardiac Cath Lab Anatomy & Hemodynamics

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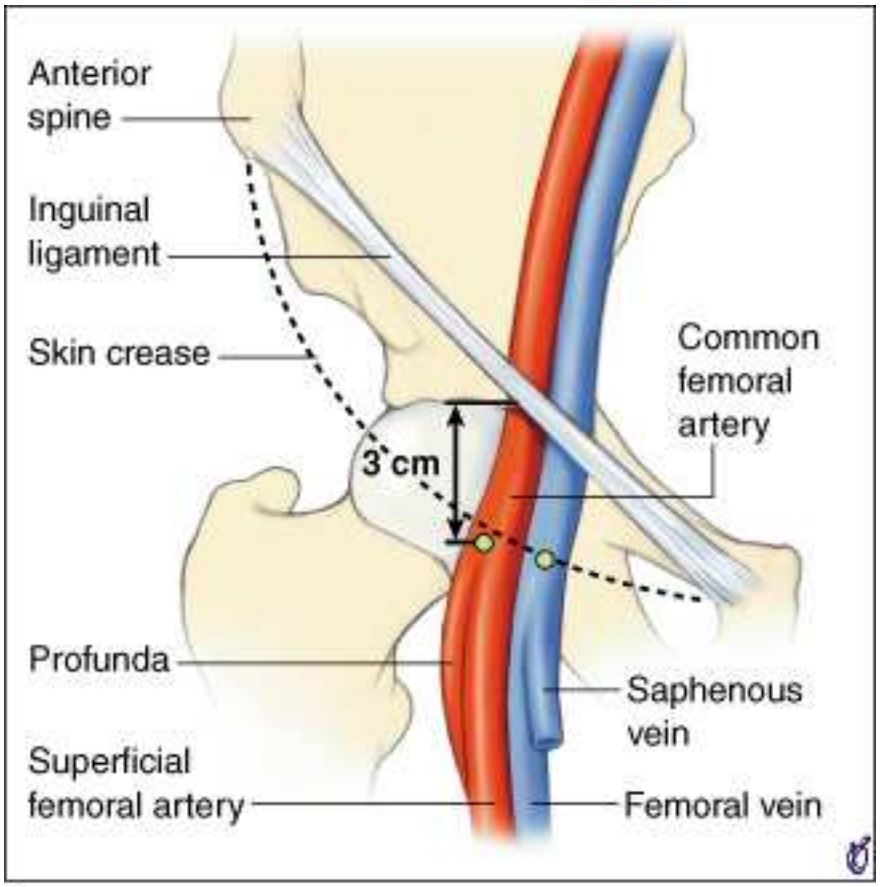
Cardiology Fellow, PGY 6



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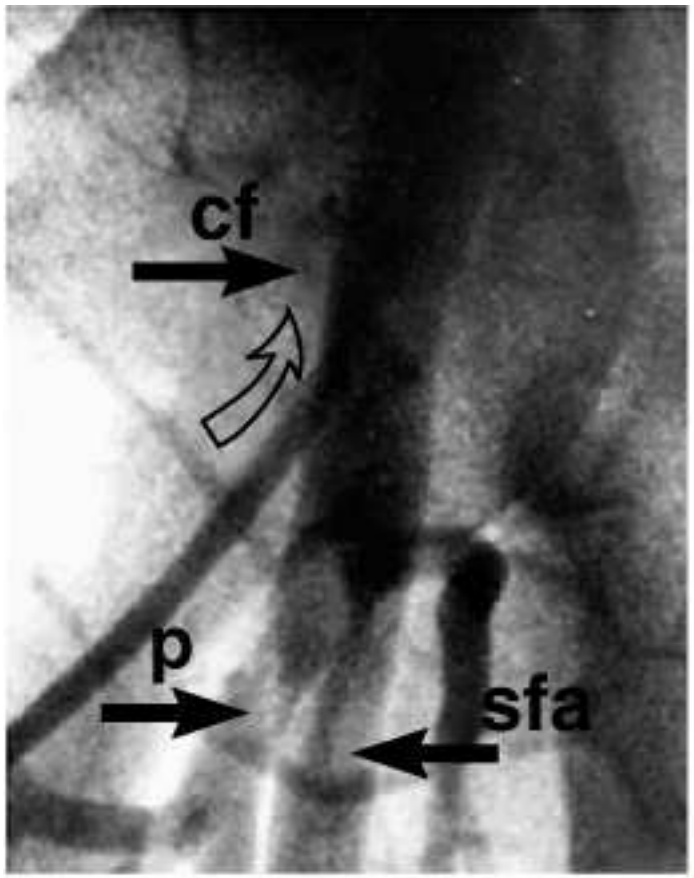

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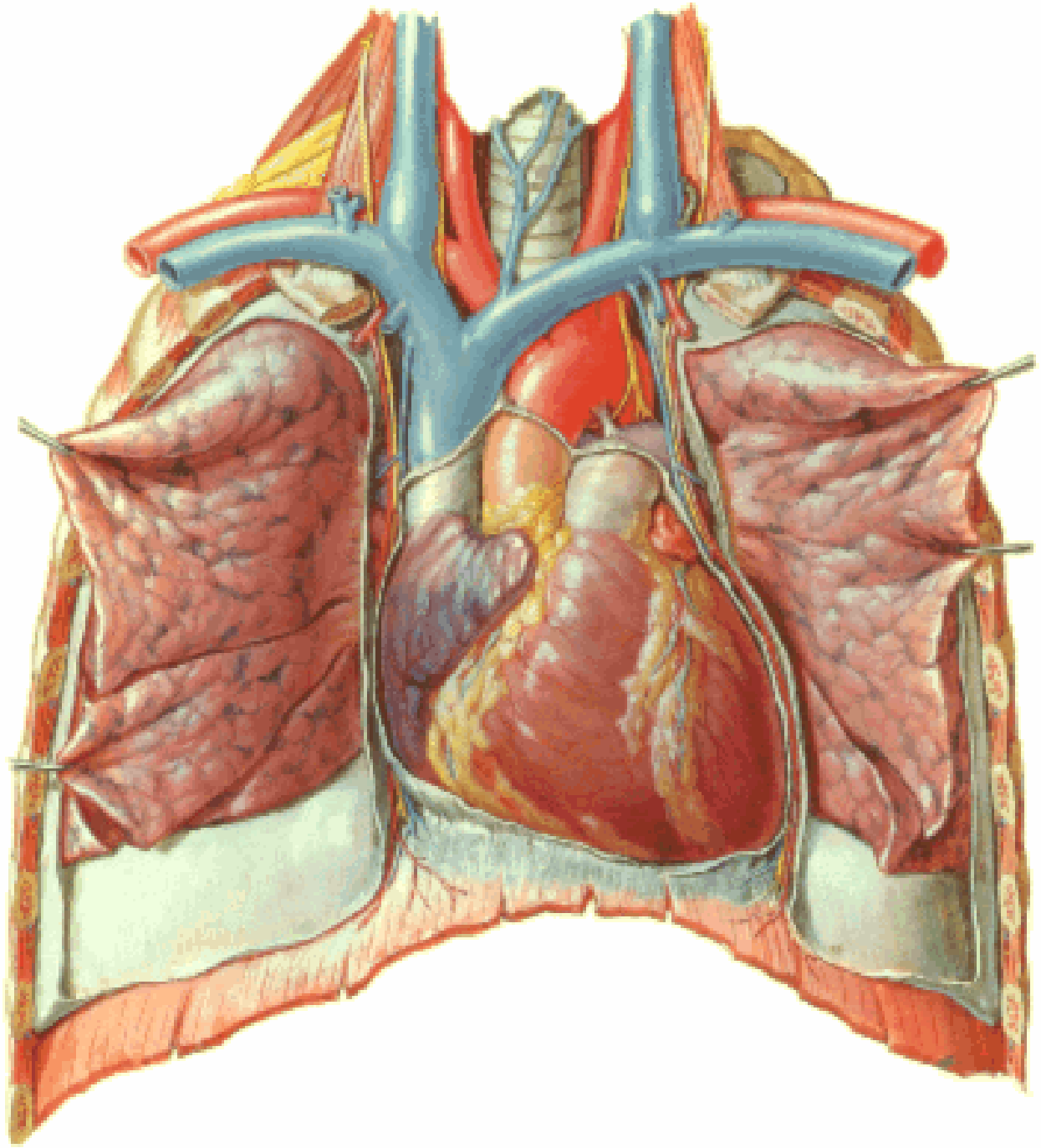
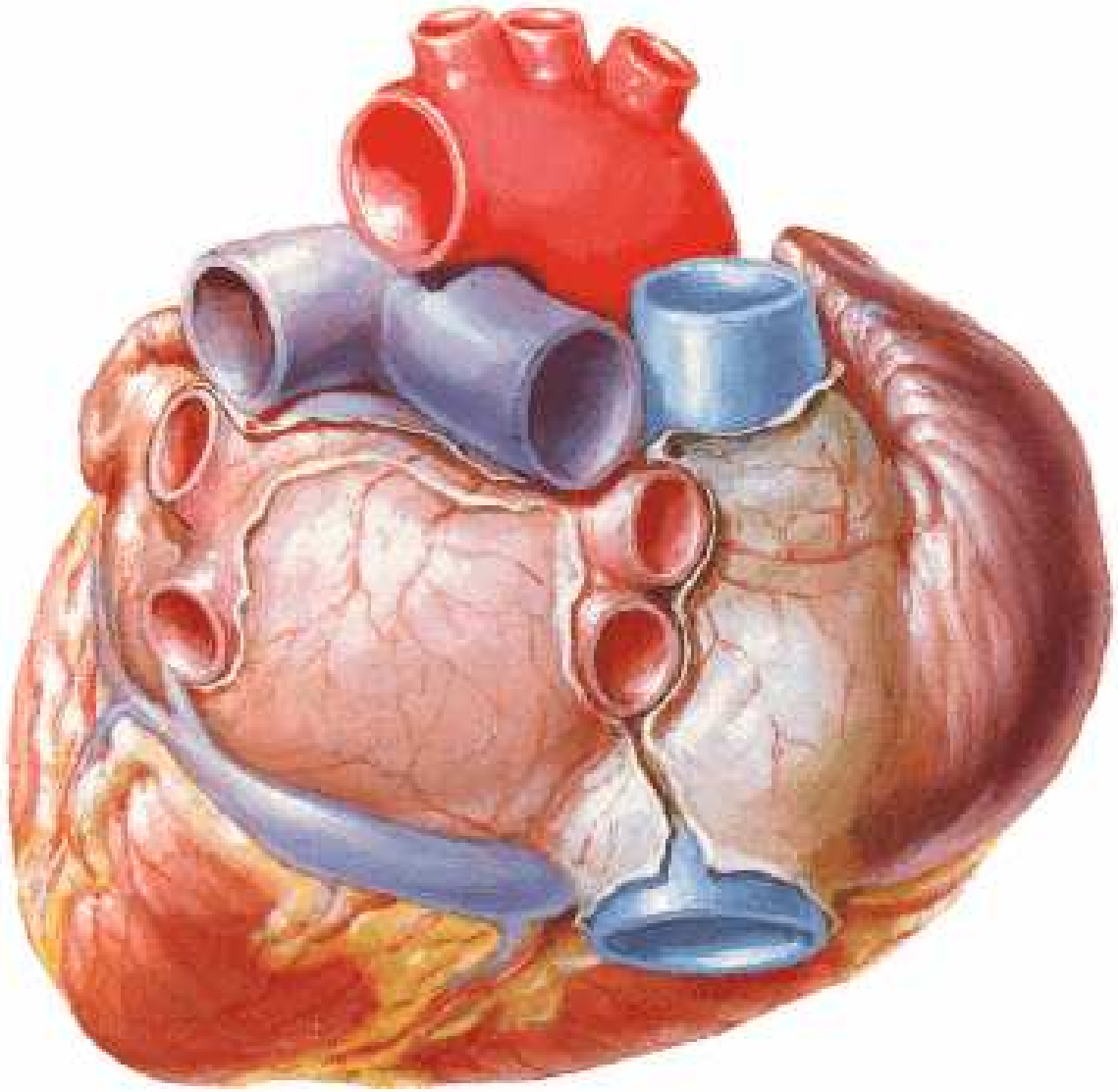


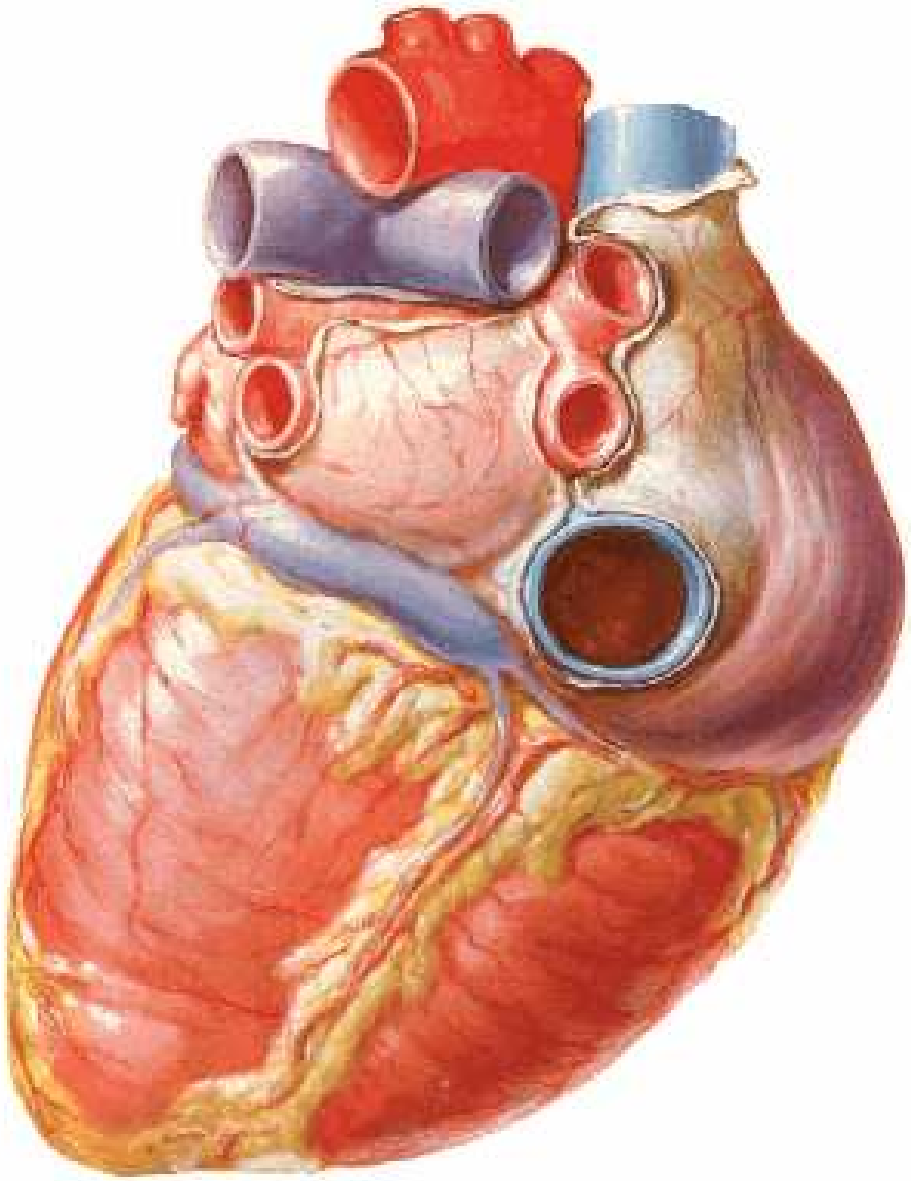
Heart - Basal Surface

Posterior View



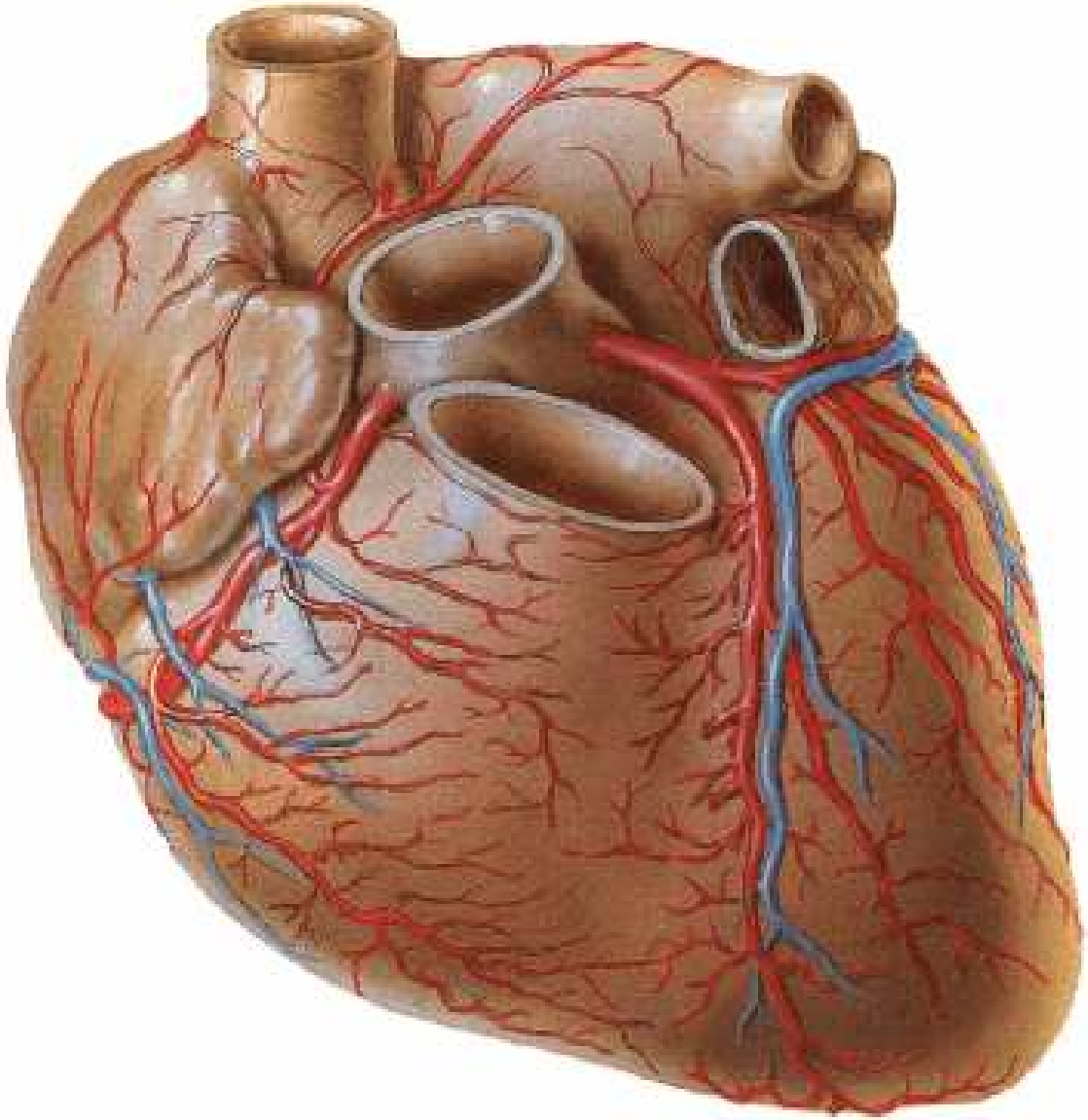
Heart - Diaphragmatic Surface

Posteroinferior View



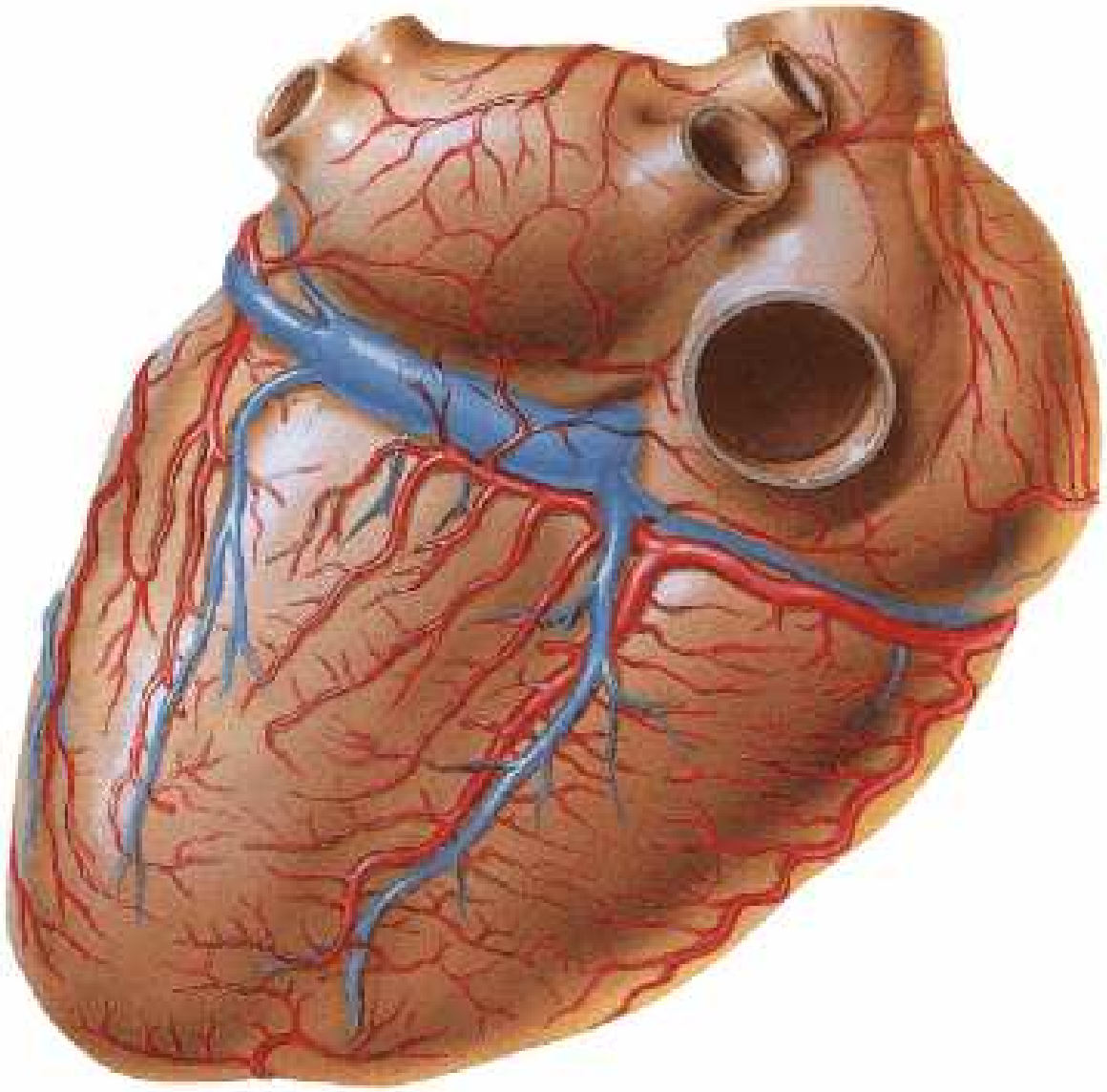
Coronary Arteries and Cardiac Veins

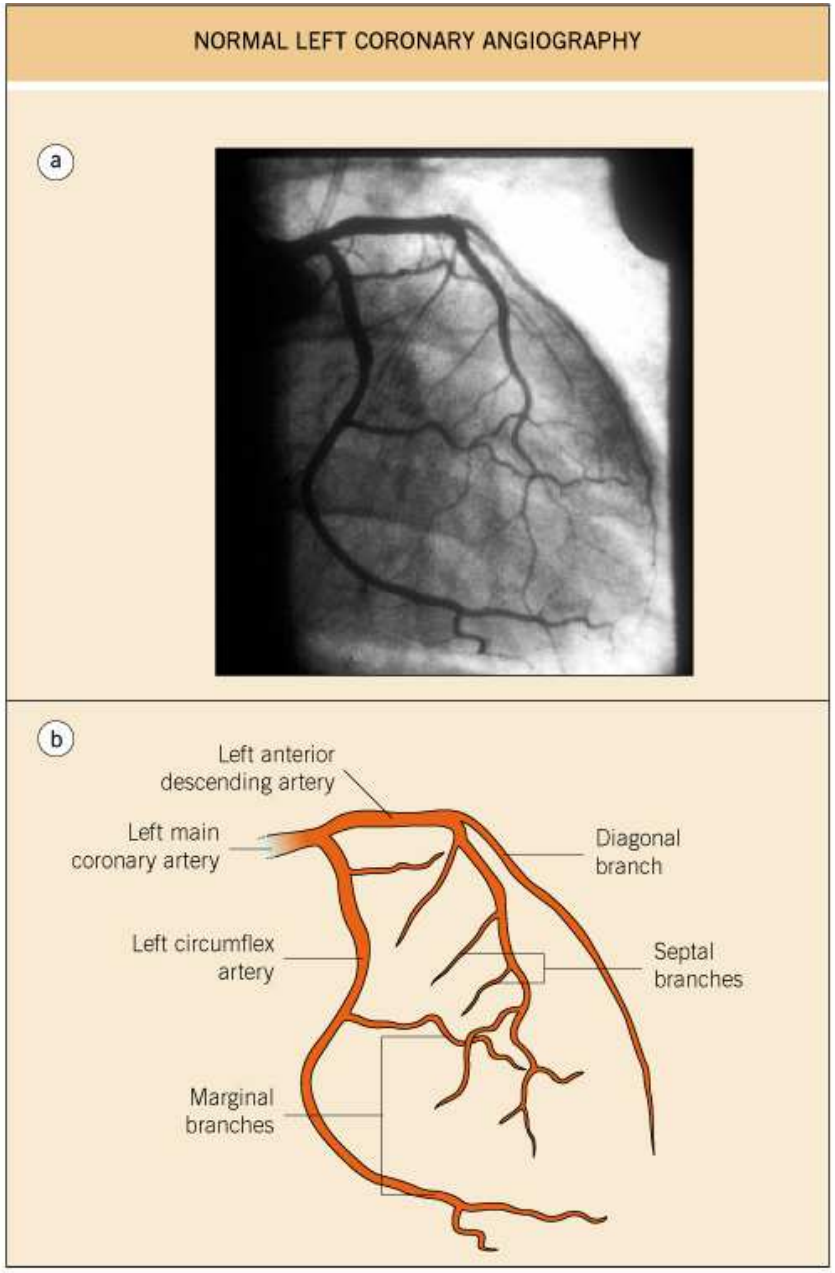
Sternocostal Surface



Coronary Arteries and Cardiac Veins

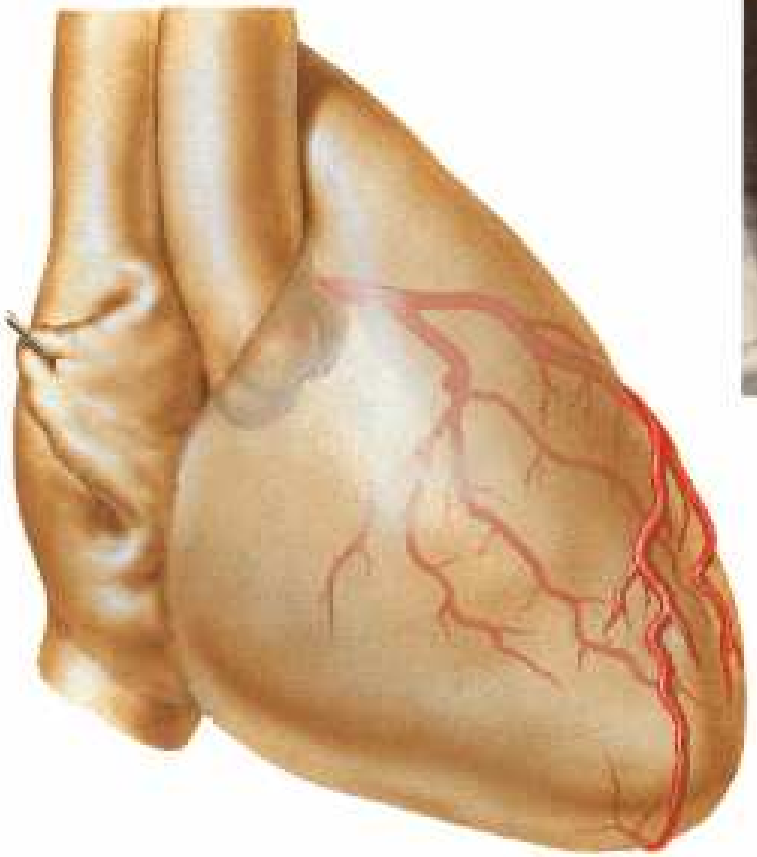
Diaphragmatic Surface

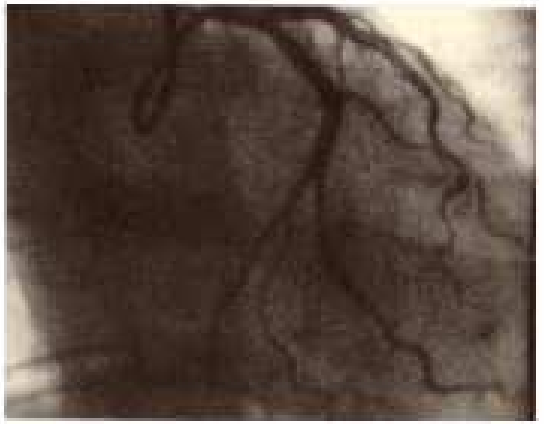




Left Coronary Artery

Arteriographic View 2

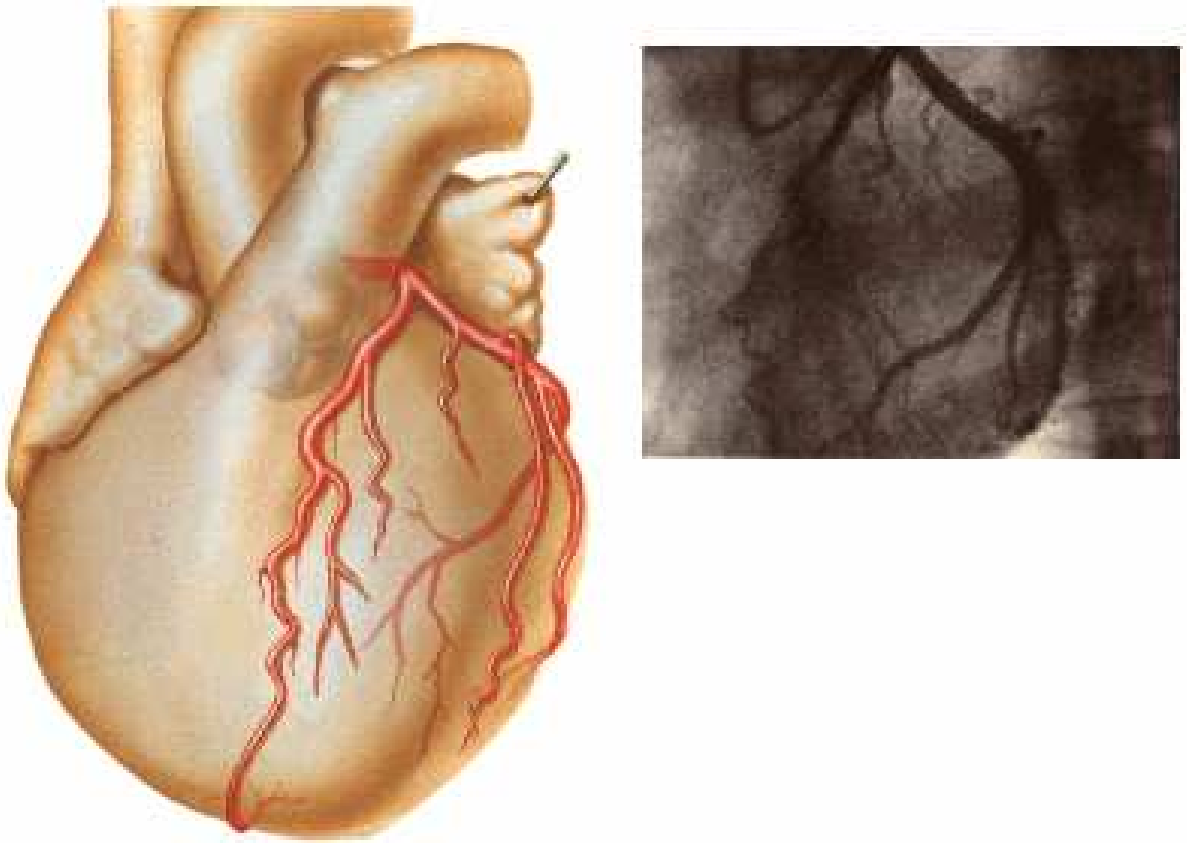




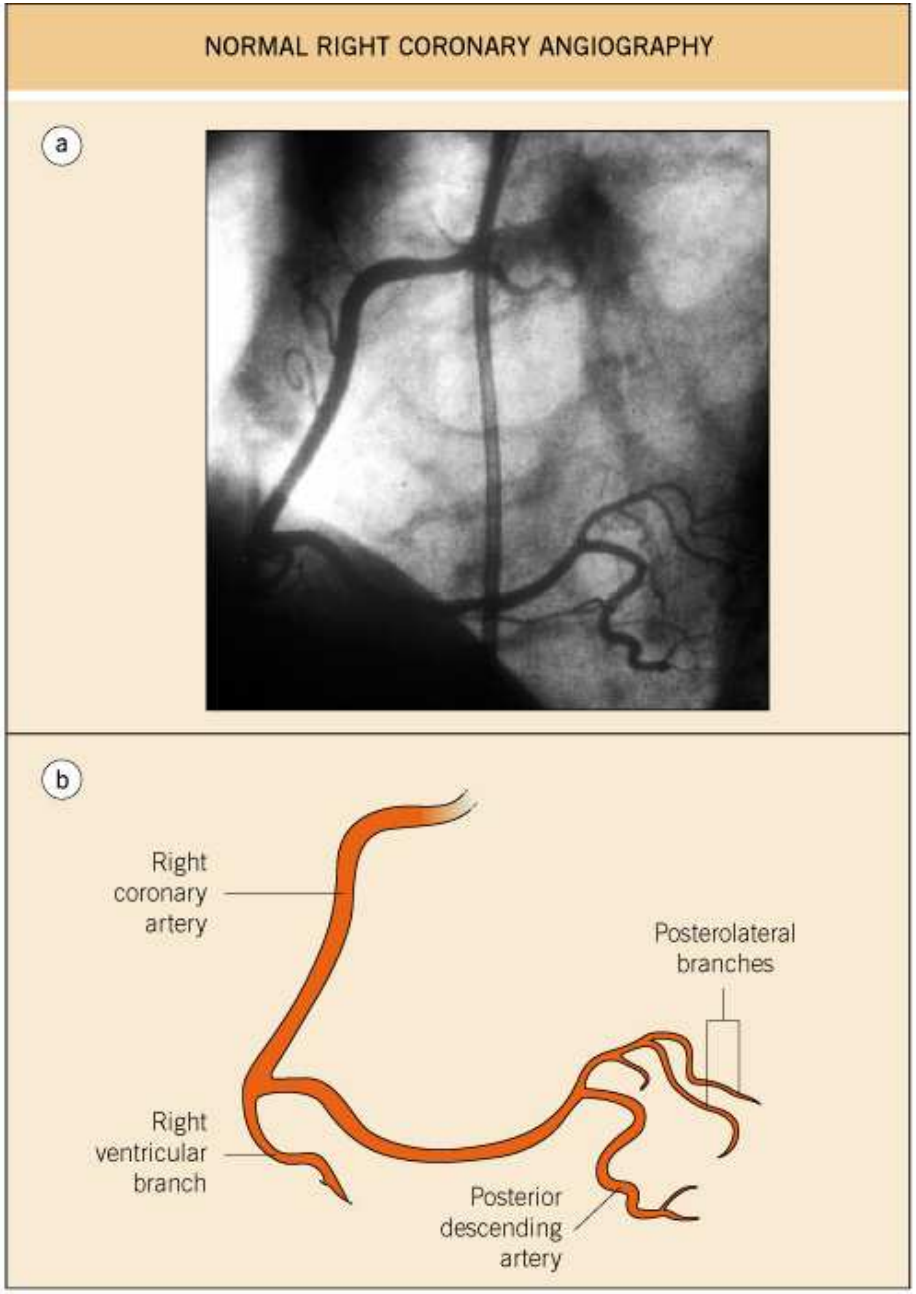
Right anterior oblique view

Left Coronary Artery

Arteriographic View 1

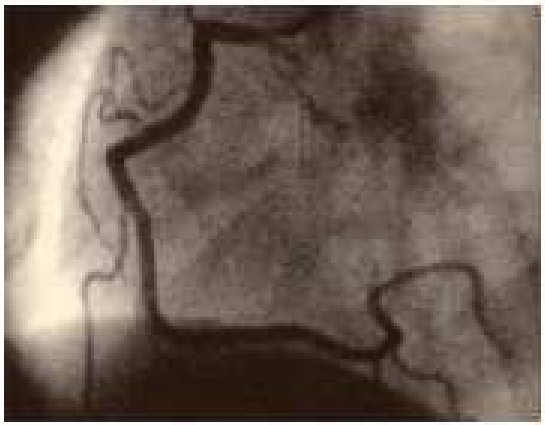


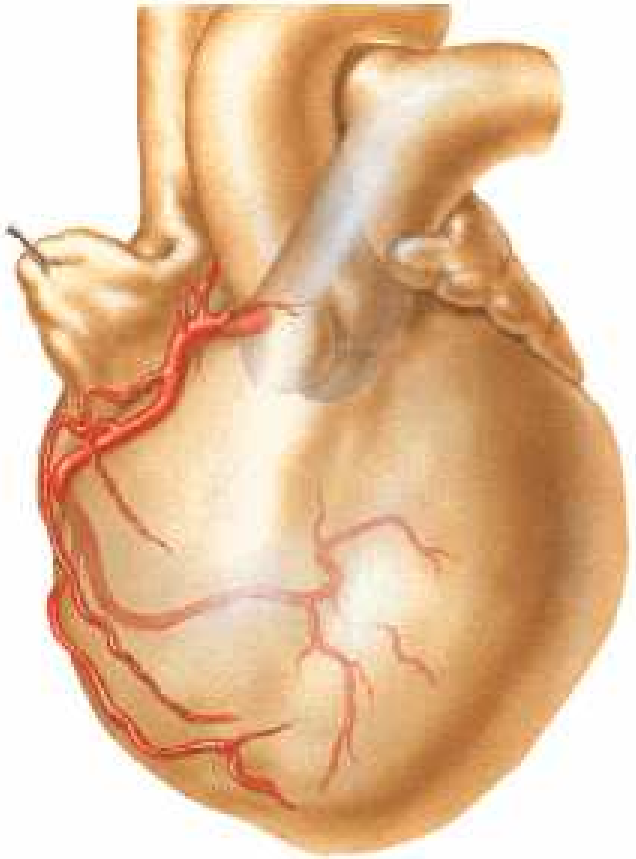
Left anterior oblique view



Right Coronary Artery

Arteriographic View 1

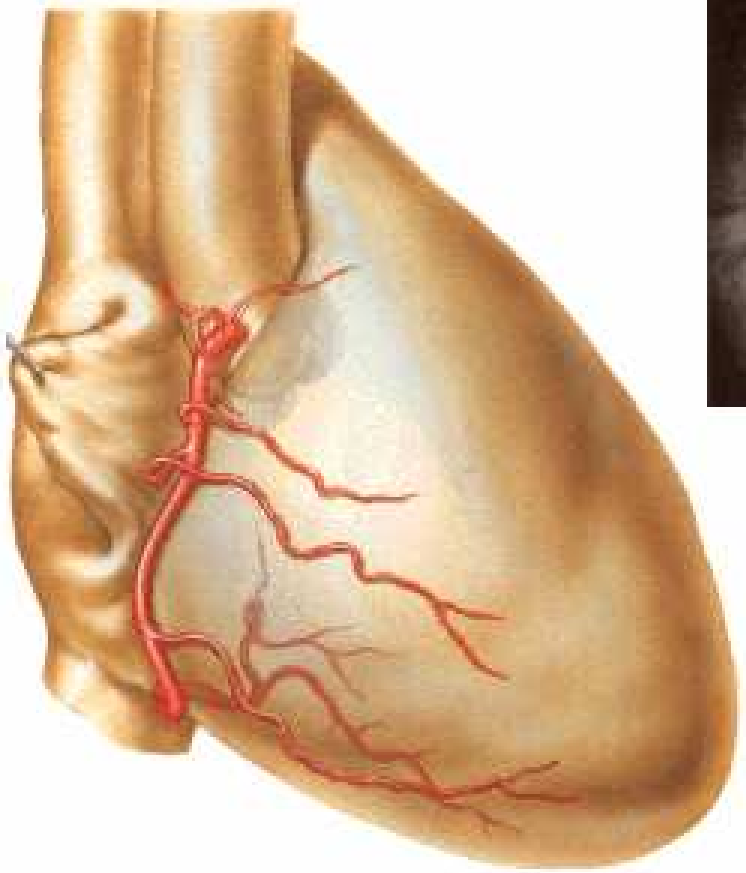


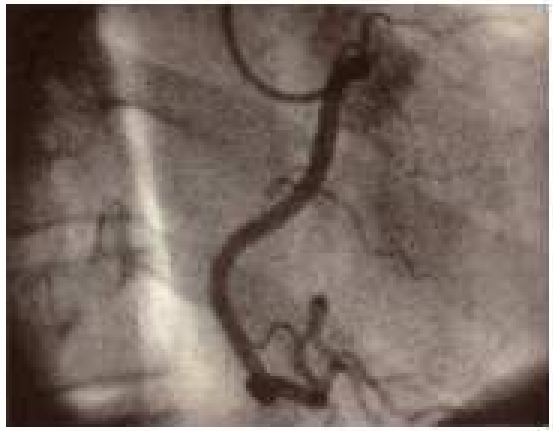


Left anterior oblique view

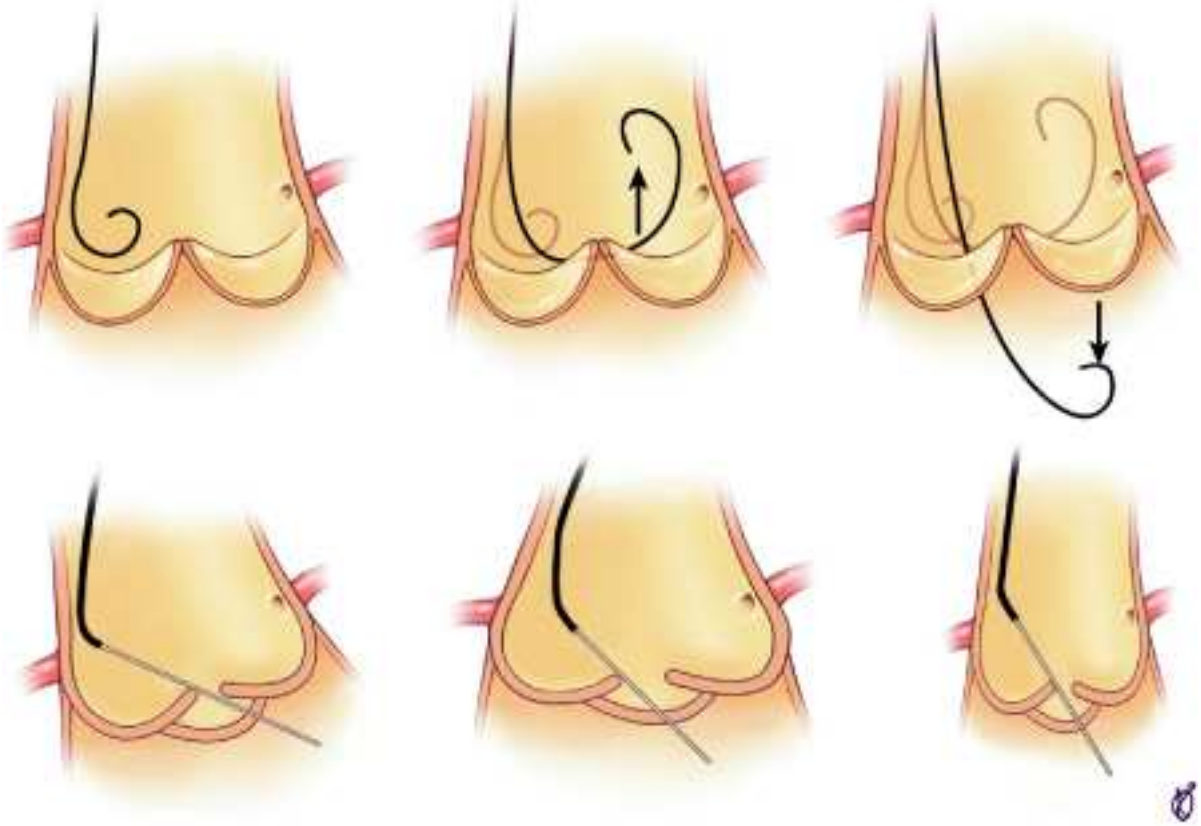
Right Coronary Artery

Arteriographic View 2





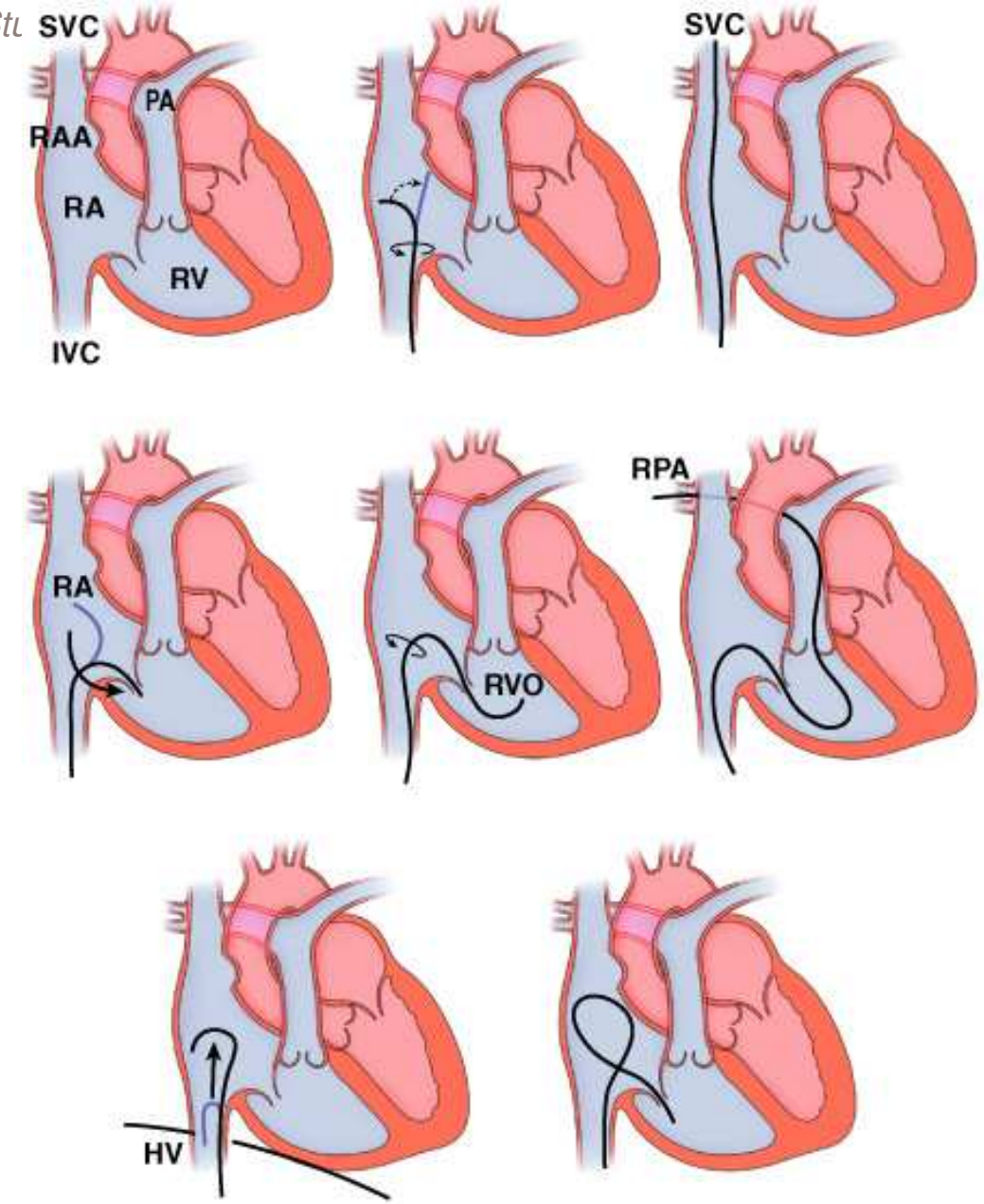
Right anterior oblique view



Hemodynamic Calculations

- Cardiac Output
- Aortic Valve Area
- Mitral Valve Area

- Cardiac shunts



Calculation of Blood Flow

- Qp = O_2 consumption /
  PV O_2 content – PA O_2 content

- Qs (Cardiac Output) = O_2 consumption /
  SA O_2 content – MV O_2 content

O_2 consumption

- Douglas bag most accurate
  - Never used
- Estimated common (10% error)
  - 125 mL/m^2 (110 mL/m^2 for elderly)
  - BSA (m^2) = Sq Root (wt in kg * height in cm/3600)
- AV difference (Fick) (5% error)
  - Photodetector technique of expired air
- Cardiac ouput = O_2 consumption/A-V O_2 oxygen content difference
    - Cardiac Output = O_2 Consumption/Hgb x 1.36 [x 10] x (Arterial O_2 – Mixed Venous O_2)

Valve Area

- $\text{AVA} = \dfrac{\text{Cardiac Output (mL/min)}}{\text{HR x SEP (s) x 44.3 x sqrt (Mean Aortic grad)}}$

Hakke equation

AVA = Cardiac Output (L/min) / sqrt (Mean or peak-peak aortic gradient)

- $\text{MVA} = \dfrac{\text{Cardiac Output (mL/min)}}{\text{HR x DFP (s) x 38.5 x sqrt (Mean Mitral grad)}}$