Cardiac Cath Lab Anatomy & Hemodynamics

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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
NORMAL RIGHT CORONARY ANGIOGRAPHY

(a) [Image of a coronary angiogram]

(b) [Diagram showing anatomical features]

- Right coronary artery
- Posterolateral branches
- Right ventricular branch
- Posterior descending artery

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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

• \( Q_p = \frac{O_2 \text{ consumption}}{PV O_2 \text{ content} - PA O_2 \text{ content}} \)

• \( Q_s \) (Cardiac Output) = \( \frac{O_2 \text{ consumption}}{SA O_2 \text{ content} - MV O_2 \text{ content}} \)
O₂ consumption

• Douglas bag most accurate
  – Never used
• Estimated common (10% error)
  – 125 mL/m² (110 mL/m² for elderly)
  – BSA (m²) = Sq Root (wt in kg * height in cm/3600)
• AV difference (Fick) (5% error)
  – Photodetector technique of expired air
• Cardiac output = O₂ consumption/A-V O₂ oxygen content difference
  • Cardiac Output = O₂ Consumption/Hgb x 1.36 [x 10] x (Arterial O₂ – Mixed Venous O₂)
Valve Area

• AVA = \( \frac{\text{Cardiac Output (mL/min)}}{\text{HR} \times \text{SEP (s)} \times 44.3 \times \sqrt{\text{Mean Aortic grad}}} \)

Hakke equation
AVA = \( \frac{\text{Cardiac Output (L/min)}}{\sqrt{\text{Mean or peak-peak aortic gradient}}} \)

• MVA = \( \frac{\text{Cardiac Output (mL/min)}}{\text{HR} \times \text{DFP (s)} \times 38.5 \times \sqrt{\text{Mean Mitral grad}}} \)