Cardiac and Coronary Anatomy

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Disclosure

Speaking honorarium - GE Healthcare

Objectives

• Review anatomy of the cardiac chambers
• Review normal coronary artery anatomy
• Review cardiac vein anatomy

Cardiac Chambers
Coronary Arteries

• Right Coronary Artery (RCA)
• Left Main Coronary Artery (LM)
• Left Anterior Descending Artery (LAD)
• Left Circumflex Artery (LCX)

Right Coronary Artery

• Arises from the right sinus of Valsalva
• Origin is below that of the LM
• Runs rightward and anteriorly and inferiorly in the right AV groove towards the interventricular septum
**Right Coronary Artery Branches**

- Conus Branch (1st branch in 50%)
- SA nodal branch (60%)
- Anterior branches supplying the free wall of the RV
- Acute Marginal Branches
- AV nodal branch
- PDA
- Posterolateral branch

**Coronary Artery Axial Anatomy**

**Left Coronary Artery**

- LM – could be short or long
- Divides into LAD and LCX
- Occasionally trifurcates
  - LAD, LCX & RI
- Ramus intermedius supplies the anterior wall of the LV similar to the 1st diagonal
- Left coronary is dominant in 8-10% of cases

**LCA - Branches**

- LAD runs anterior and inferiorly in the anterior inter-ventricular groove to the apex of the heart
  - Septal perforators
  - Diagonal branches
- LCX runs posteriorly into the posterior inter-ventricular groove
  - Obtuse marginal branches
  - PDA and PLB (Left dominant)

**RCA, LAD, Ramus I & Cx**
Left Ventricular Segmental Anatomy for LV Functional Analysis

Standard Cardiac Viewing Planes
Coronary Artery Territories
Short axis views

- Base
- Mid body
- Apex

Coronary Artery Territories
Long Axis Views

- Horizontal long axis
- Vertical long axis

Wall Motion
Short Axis

- Basal
- Mid-Cavity
- Apex

Wall Motion
Long Axis – 4 chamber

Aortic Valve

- Located between the left ventricle and the aorta
- Three leaflets
- Valve leaflets open during systole
**Aortic Valve**

- One way valve between the left atrium and left ventricle
- Opens during ventricular diastole
- Two leaflets – anterior and posterior
- Chordae tendinae attach the ventricular surface of the MV leaflets to the papillary muscles

**Mitral Valve**

- One way valve between the left atrium and left ventricle
- Opens during ventricular diastole
- Two leaflets – anterior and posterior
- Chordae tendinae attach the ventricular surface of the MV leaflets to the papillary muscles

**Mitral Valve**

**Cardiac Veins**

- Coronary sinus and its tributaries
  - Return blood from almost the entire heart
- Anterior cardiac veins
  - Drain anterior regions of the RC and right cardiac border
- Thebesian veins
  - Open directly into any of the four chambers

**Cardiac Veins**

**Left Cardiac Veins**

- Great cardiac vein
- Middle cardiac vein
- Small cardiac vein
- Left obtuse marginal vein
- Left posterior ventricular vein
- Coronary Sinus
Cardiac Veins

Coronary Sinus
Posterior left ventricular vein

Cardiac Veins

Great cardiac vein

Cardiac Veins

Anterior interventricular vein
Middle cardiac vein

Cardiac Veins

Great Cardiac Vein
Coronary Sinus
Middle Cardiac Vein
Posterior LV Cardiac Vein

References

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Thank you!