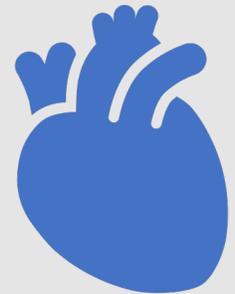


# Anatomy of the Right Heart



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Bart's Heart Centre

Fellows Club

28<sup>th</sup> January 2021

# Introduction



Coronary Blood  
Supply



Right Atrium



Tricuspid Valve



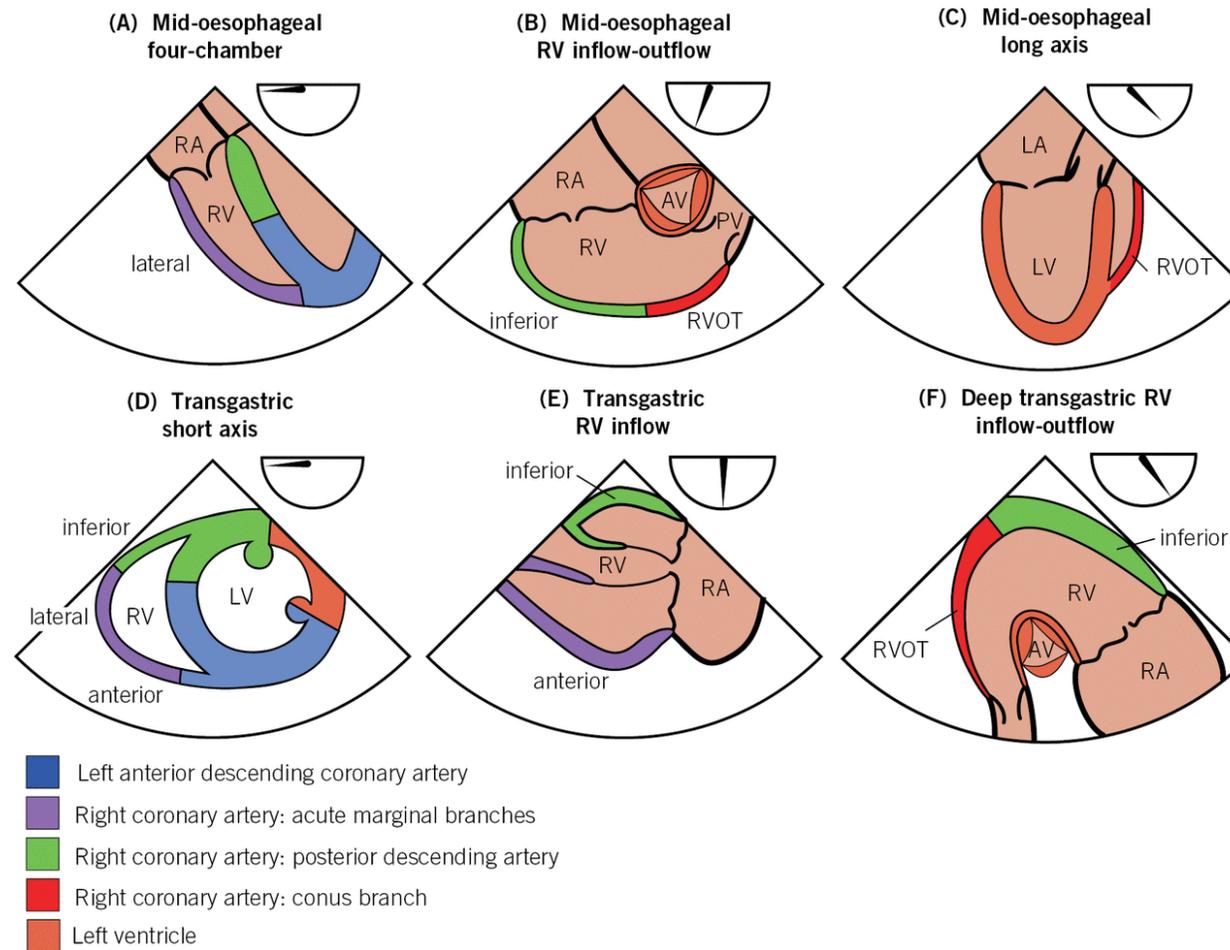
Right Ventricle



Pulmonary Valve

# Coronary Blood Supply to the Right Heart

**Figure 14.2** Standard TOE views for assessing the RV. The segmental anatomy of the RV and the associated blood supply are indicated. See also Online appendix Appendix 1.7: Right heart views1.7 .



**Chapter:** The right ventricle **From:** Practical Perioperative Transoesophageal Echocardiography **Editor(s):** David Sidebotham, Alan Merry, Malcolm Legget and Gavin Wright

## Right Atrium

Receives blood from

- SVC (Crista Terminalis)
- IVC (Eustachian Valve)
- Coronary sinus (Thebesian Valve)

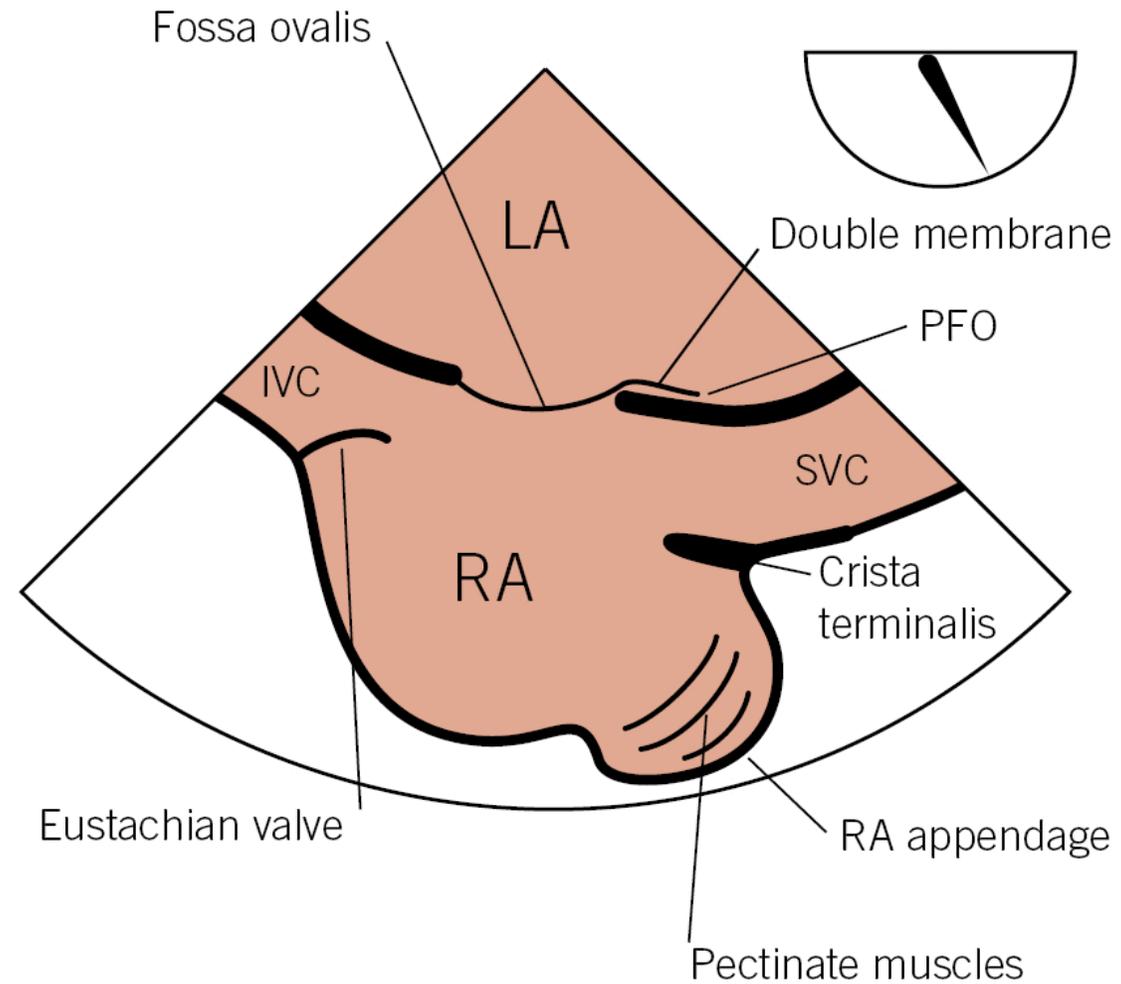
Cross-sectional area of 15cm Female / 16cm Male

Surface posterior to CT originates from sinus venosus – smooth, anterior to CT forms from primitive atrium and is trabeculated by bands of pectinate muscle

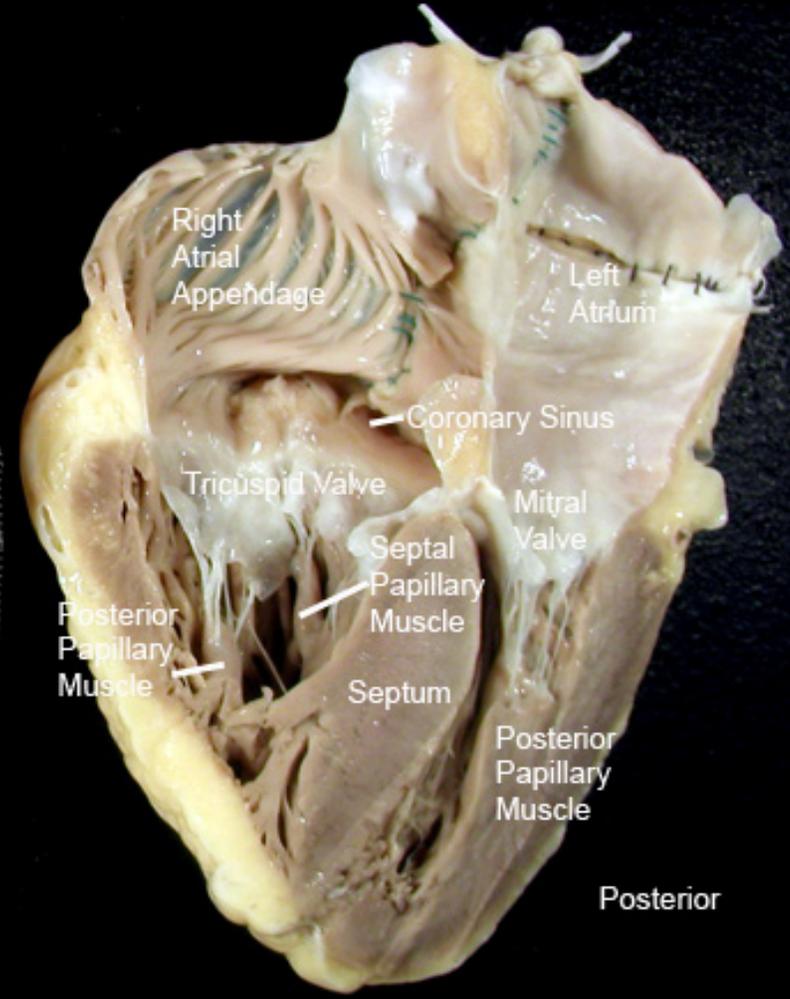
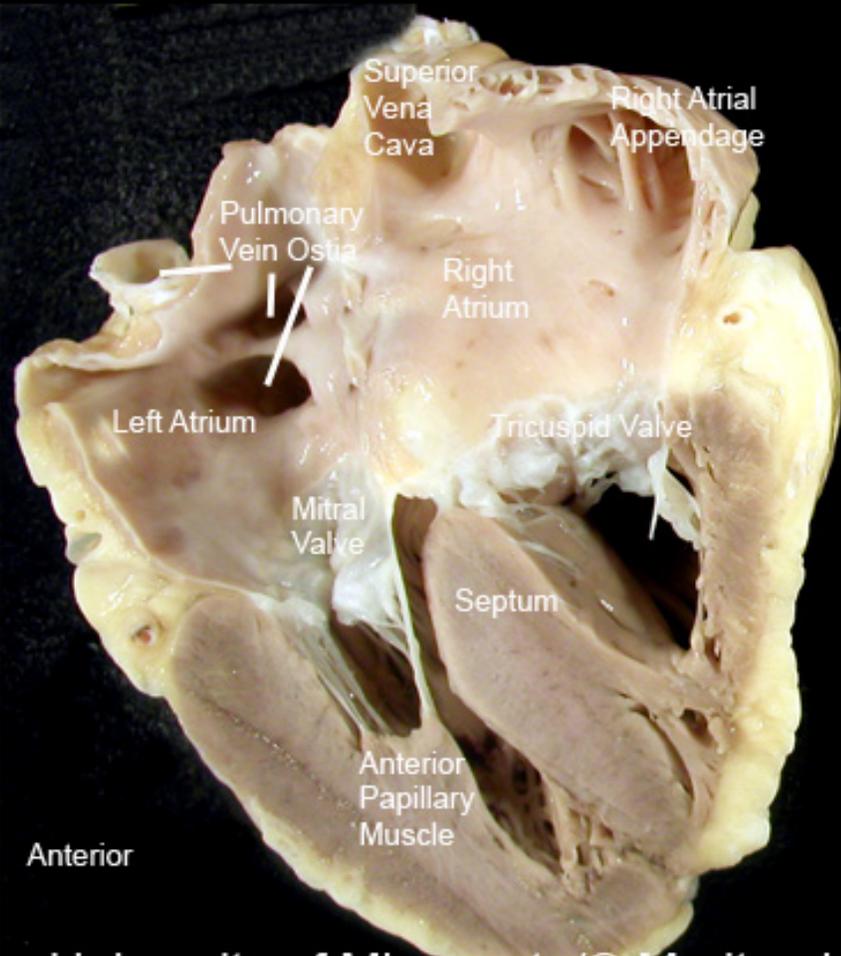
Triangle of Koch (helpful for identifying the AV node)

- ostium of the coronary sinus
- anterior-septal leaflet commissure
- tendon of Todaro

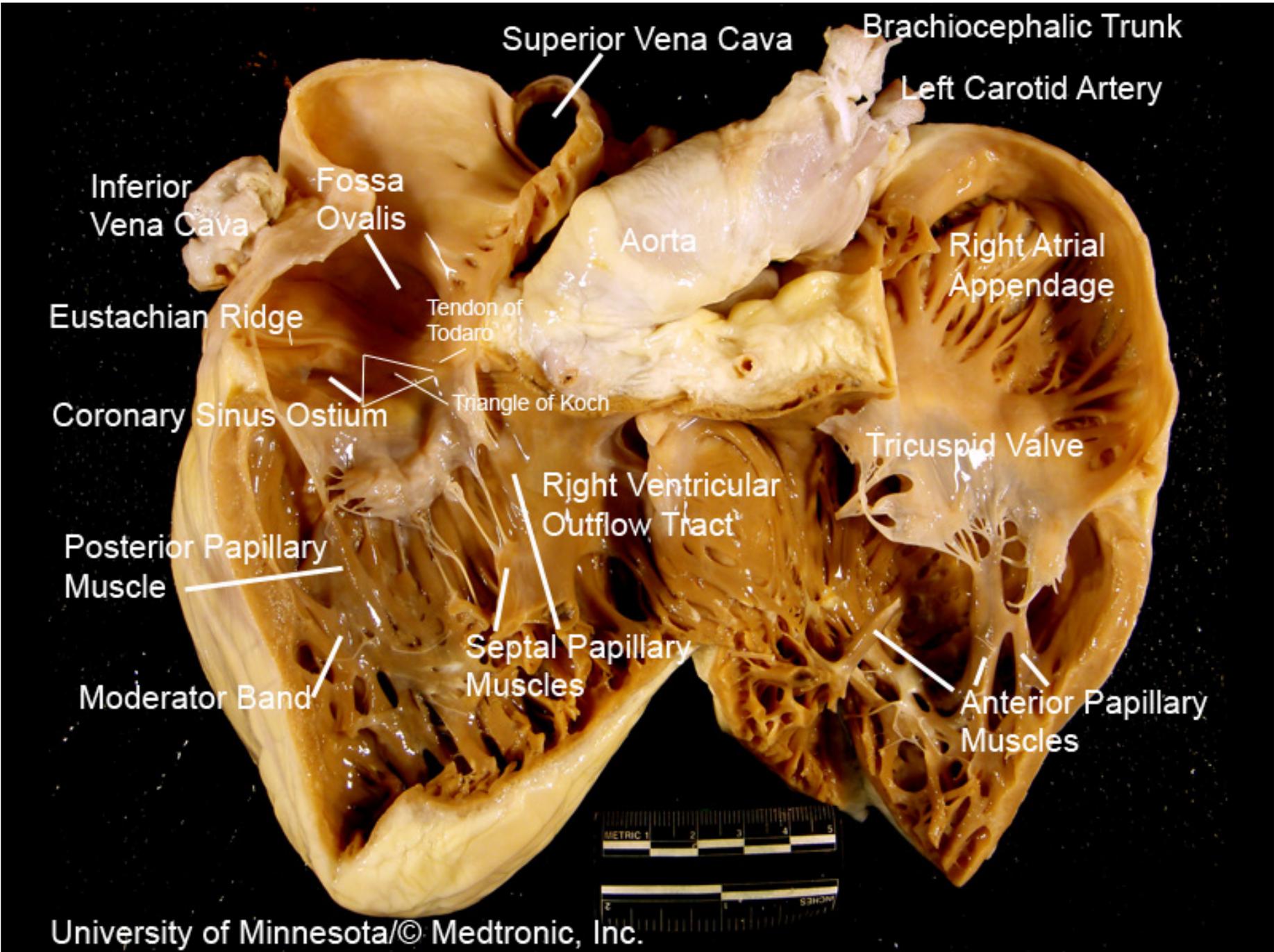
**Figure 5.1** Schematic representation of normal structures within the RA, as seen in the mid-oesophageal bicaval view. PFO, patent foramen ovale. See text for details.



**Chapter:** Anatomical variants and cardiac masses **From:** Practical Perioperative Transoesophageal Echocardiography **Editor(s):** David Sidebotham, Alan Merry, Malcolm Legget and Gavin Wright



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Superior Vena Cava

Brachiocephalic Trunk

Left Carotid Artery

Inferior Vena Cava

Fossa Ovalis

Aorta

Right Atrial Appendage

Eustachian Ridge

Tendon of Todaro

Triangle of Koch

Coronary Sinus Ostium

Tricuspid Valve

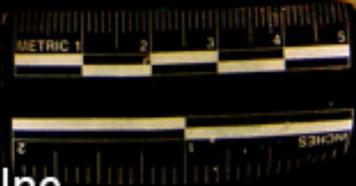
Right Ventricular Outflow Tract

Posterior Papillary Muscle

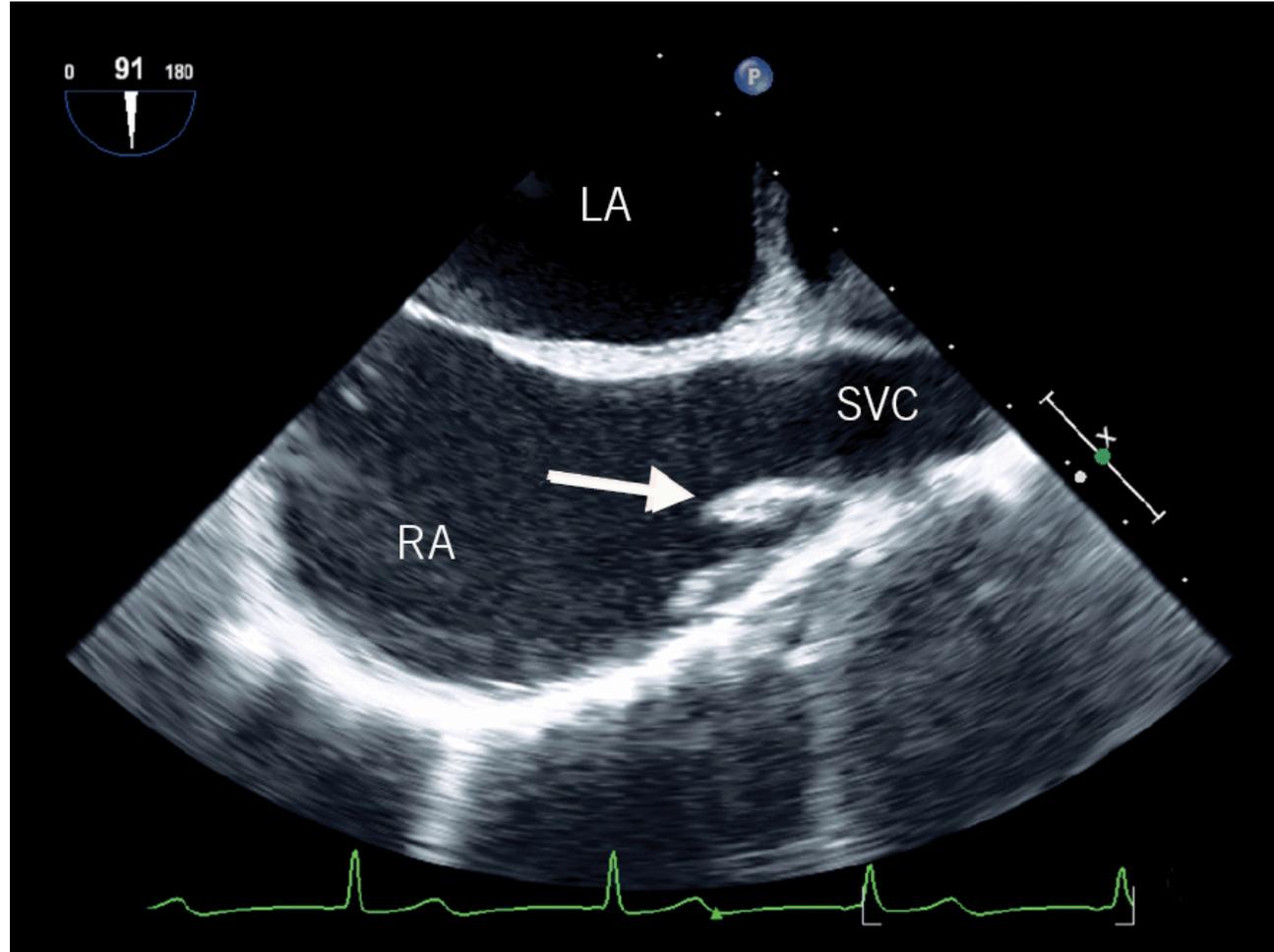
Septal Papillary Muscles

Anterior Papillary Muscles

Moderator Band

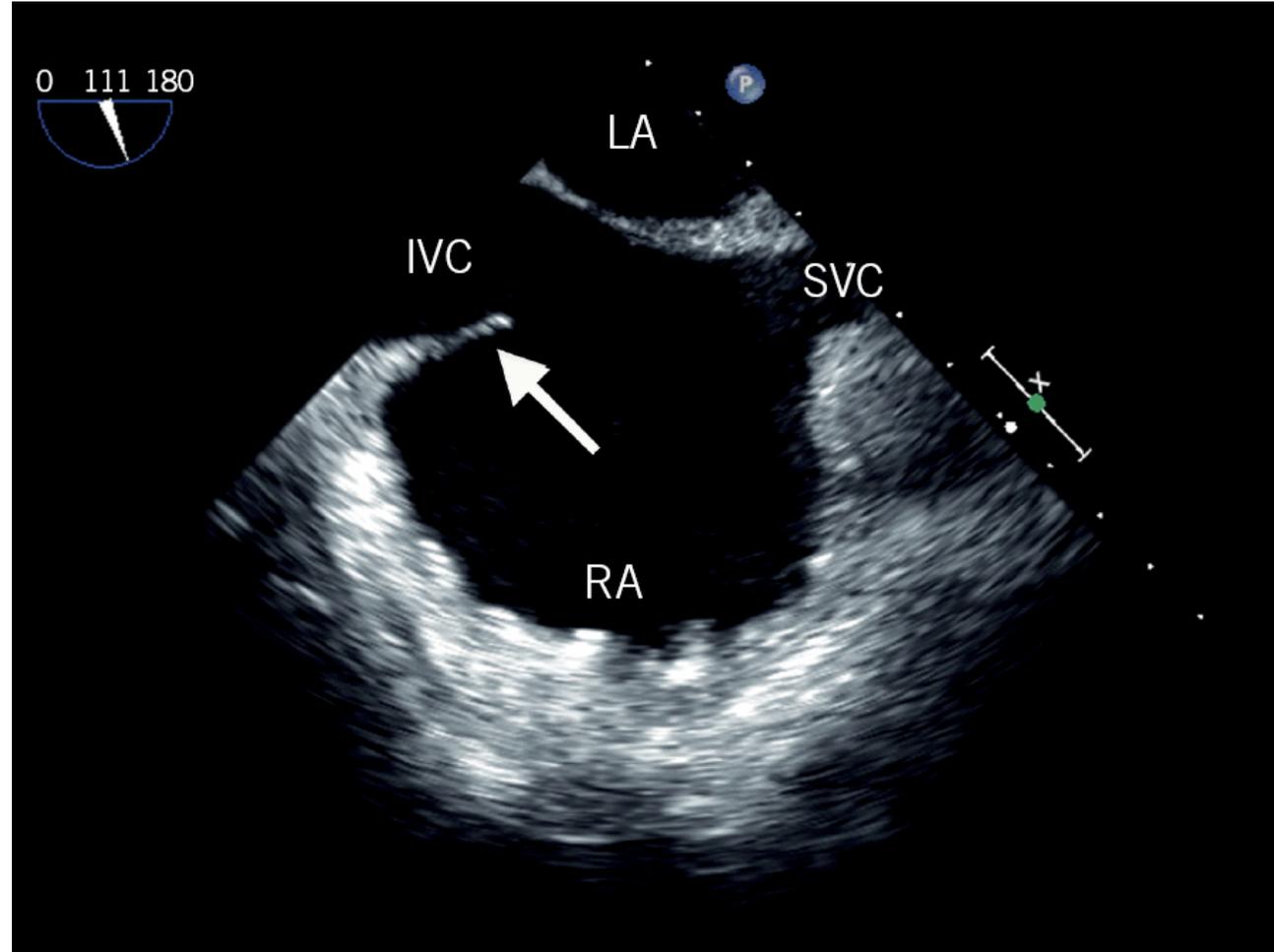


**Figure 5.2** Crista terminalis. In this mid-oesophageal bicaval view, the crista terminalis (arrow) is seen as a prominent ridge at the junction of the RA and SVC. This figure also appears as Online appendix 2.2b .



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**Figure 5.3** Eustachian valve. In this mid-oesophageal bicaval view, the Eustachian valve (arrow) can be seen as a flap of tissue at the junction of the RA and IVC. This figure also appears as Online appendix 2.2a .



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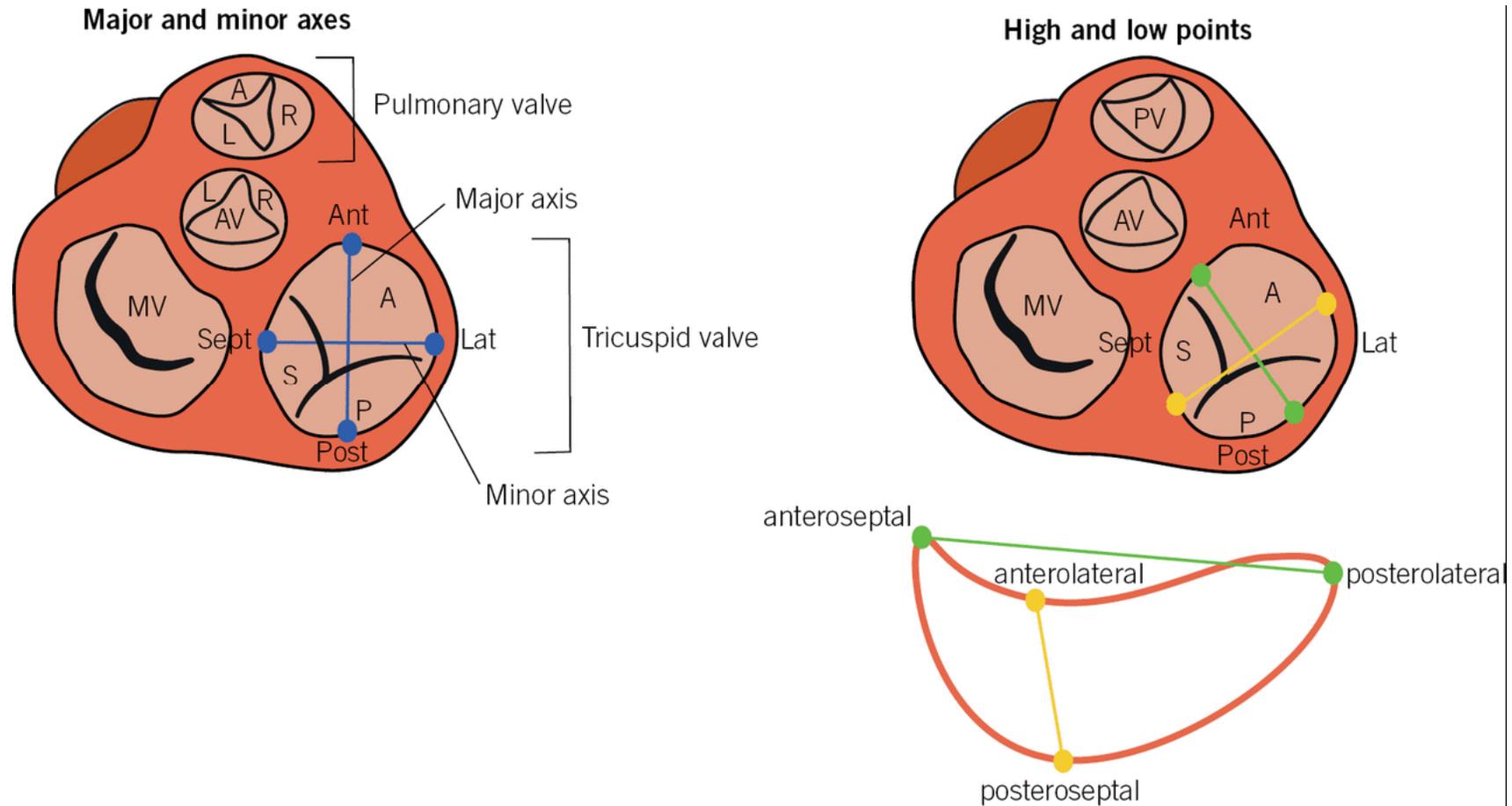
# Tricuspid Valve

- Separates the right atrium and ventricle
- Largest and most apical of the four valves
- Three cusps attached the fibrous A-V ring by their bases
  - Septal (smallest)
  - Anterior (largest)
  - Posterior (multiple small scallops)

# Tricuspid Valve

- Complex 3D structure
- Major (AP) and minor axes (SL)
- High and low points (atrial and ventricular respectively)
- Semi-saddle shaped
- During systole the annulus descends towards RV apex reducing TV annulus size by ~30%

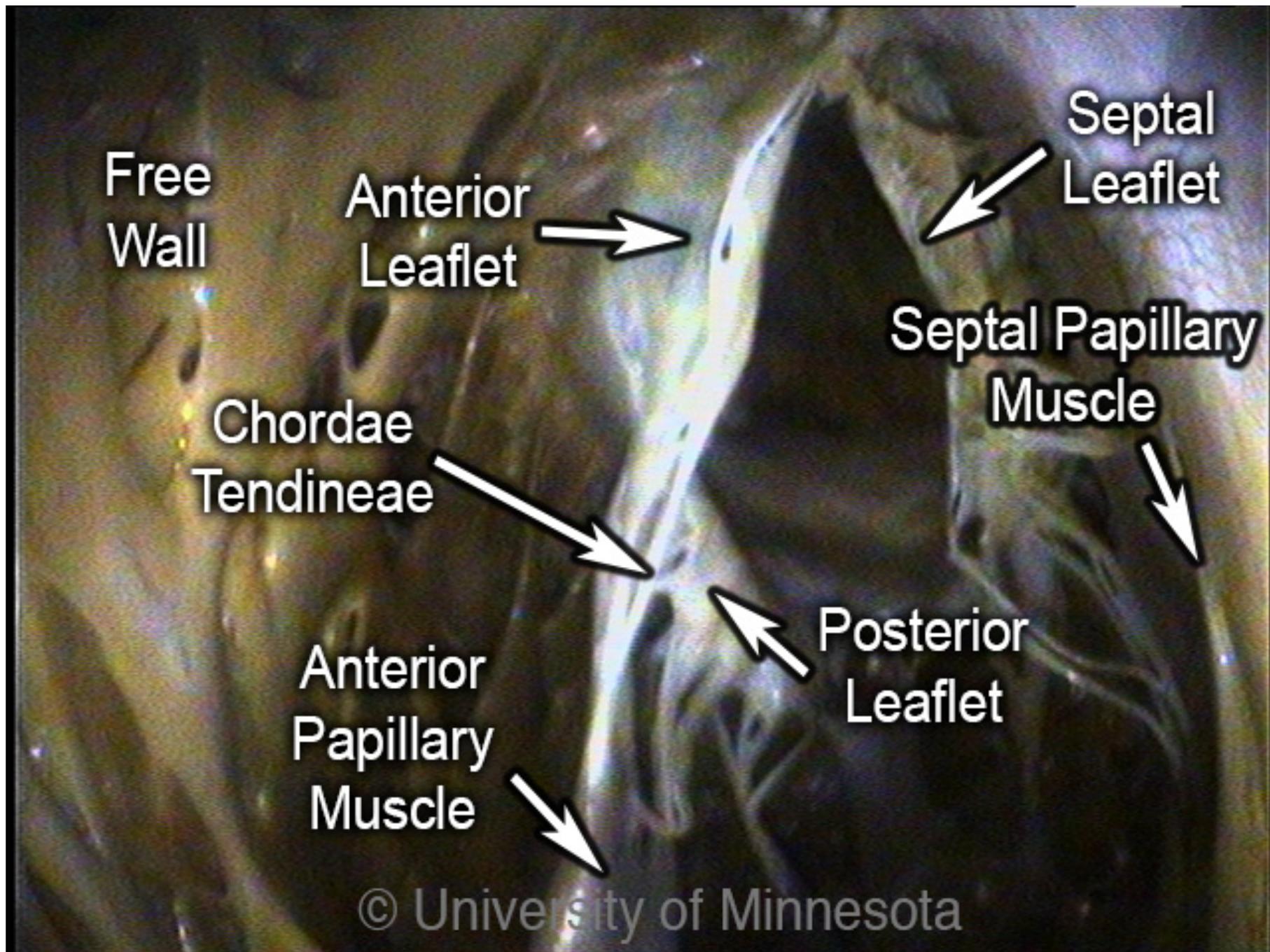
**Figure 15.1** The tricuspid valve annulus and leaflets. The tricuspid annulus has a complex 3D shape, with major and minor axes and high and low points. The major axis lies in an anterior–posterior orientation, and the minor axis lies in a septal–lateral orientation. The high points (i.e. towards the RA) are in the anteroseptal and posterolateral positions, and the low points (i.e. towards the RV) are in the anterolateral and posteroseptal positions.



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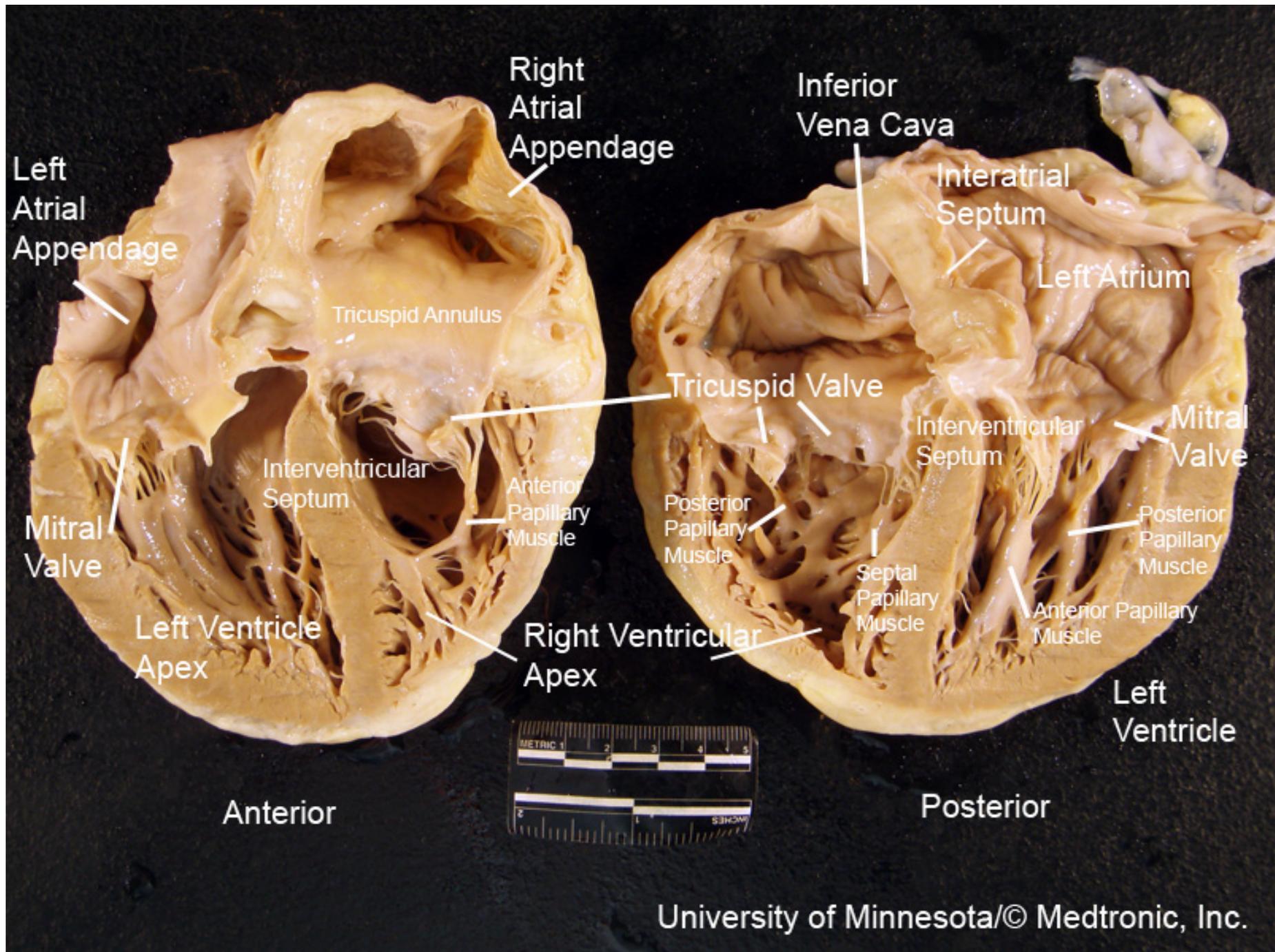
# Tricuspid Valve

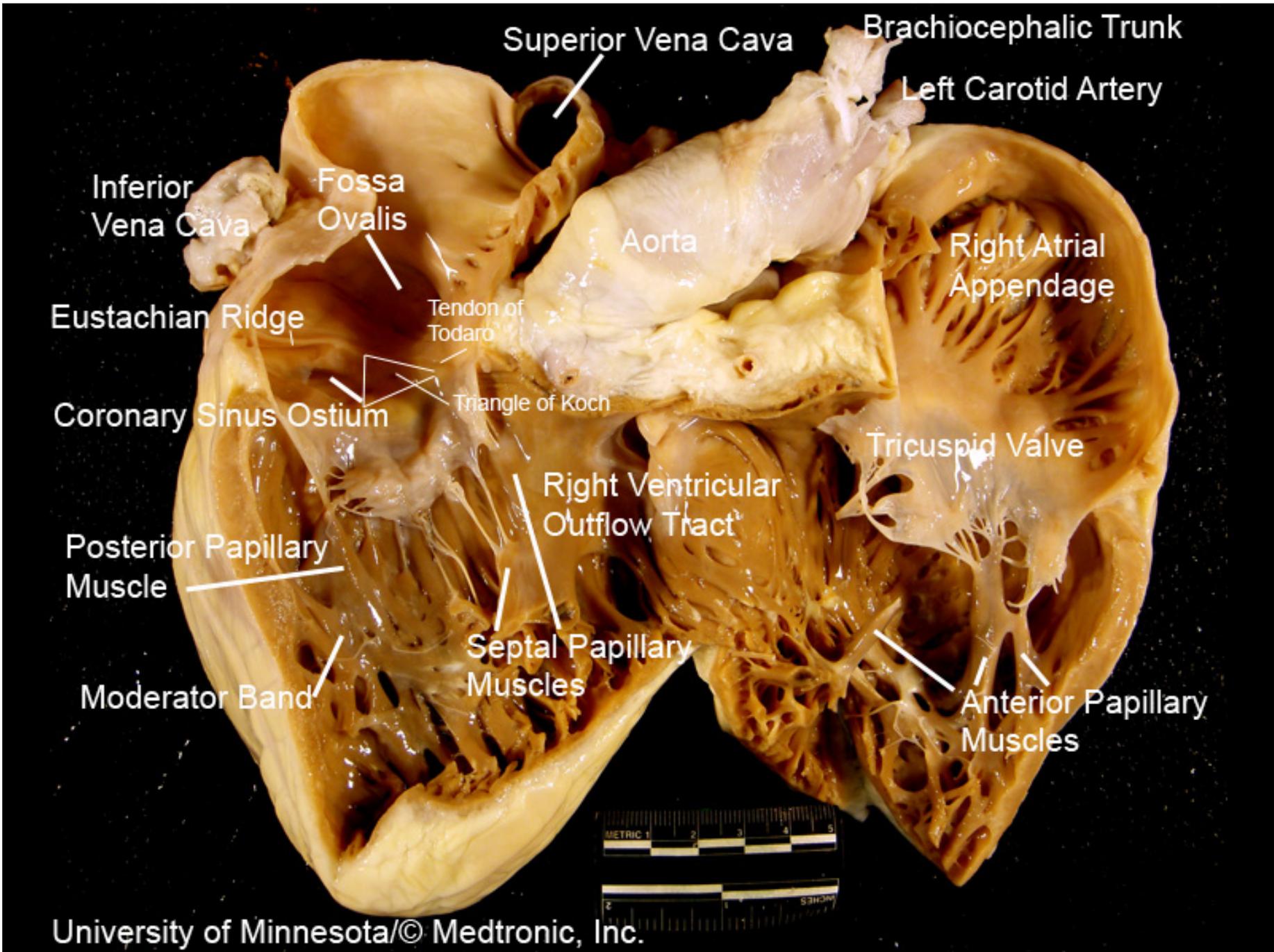
- Usually 2 papillary muscles
  - Anterior – chordae to A & P leaflets
  - Posterior – chordae to P & S leaflets
- Ventricular septum - chordae directly to A & S leaflets



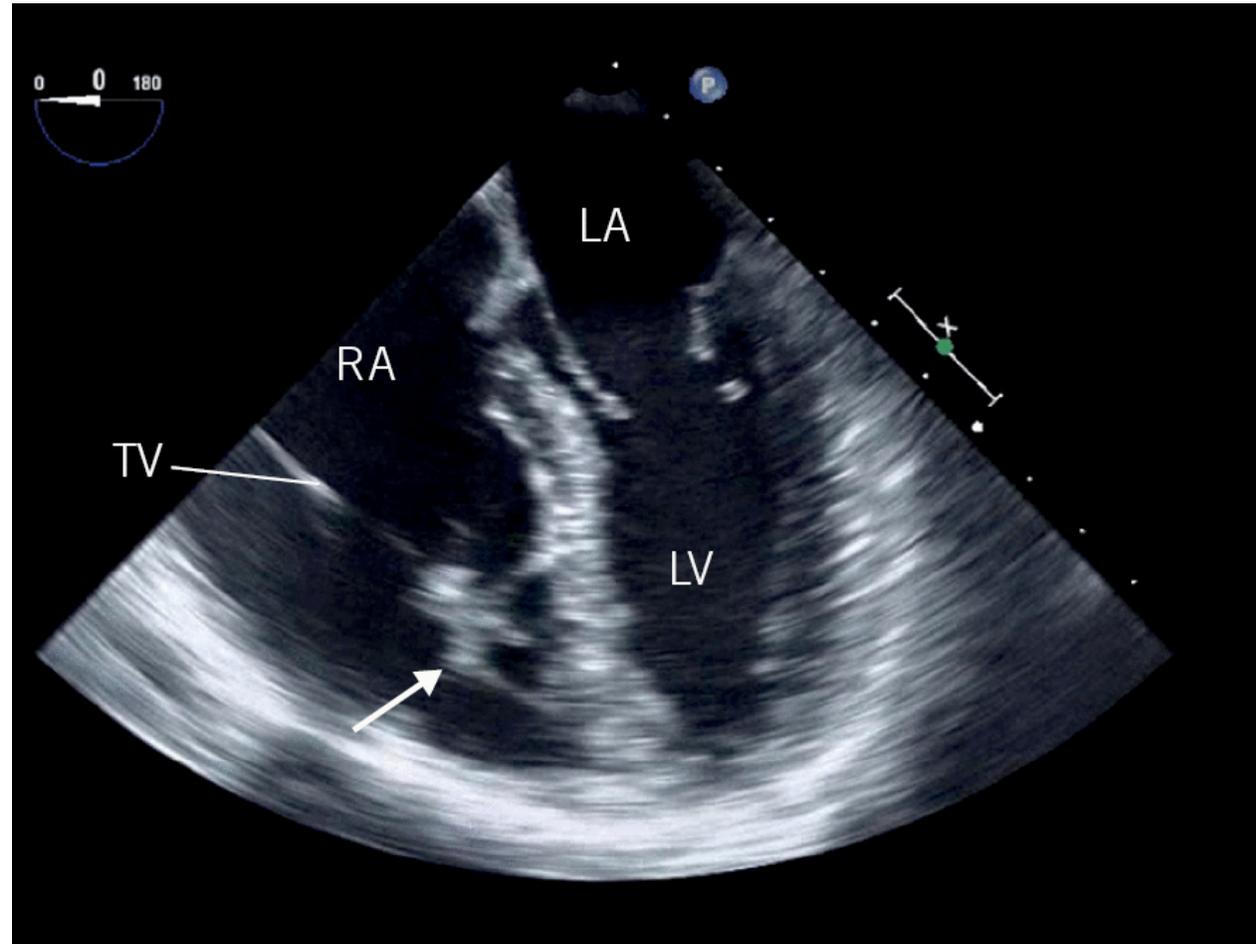
# Right Ventricle

- Complex 3D structure "tea kettle" or "flask" or "V" shaped
- Inflow and outflow regions, free wall and septum
- Trabeculae carnae
  - rounded irregular muscle columns
  - Free wall and muscular septum
  - More prominent than in LV
  - Moderator band (more prominent, extends from septum to base of APM of TV on lat free wall)





**Figure 5.10** Moderator band. In this mid-oesophageal four-chamber view, a prominent moderator band (arrow) can be seen in the apical third of the RV. The anterior leaflet of the TV can also be seen. The clip related to this image appears in Online appendix 2.11: Moderator band2.11 .

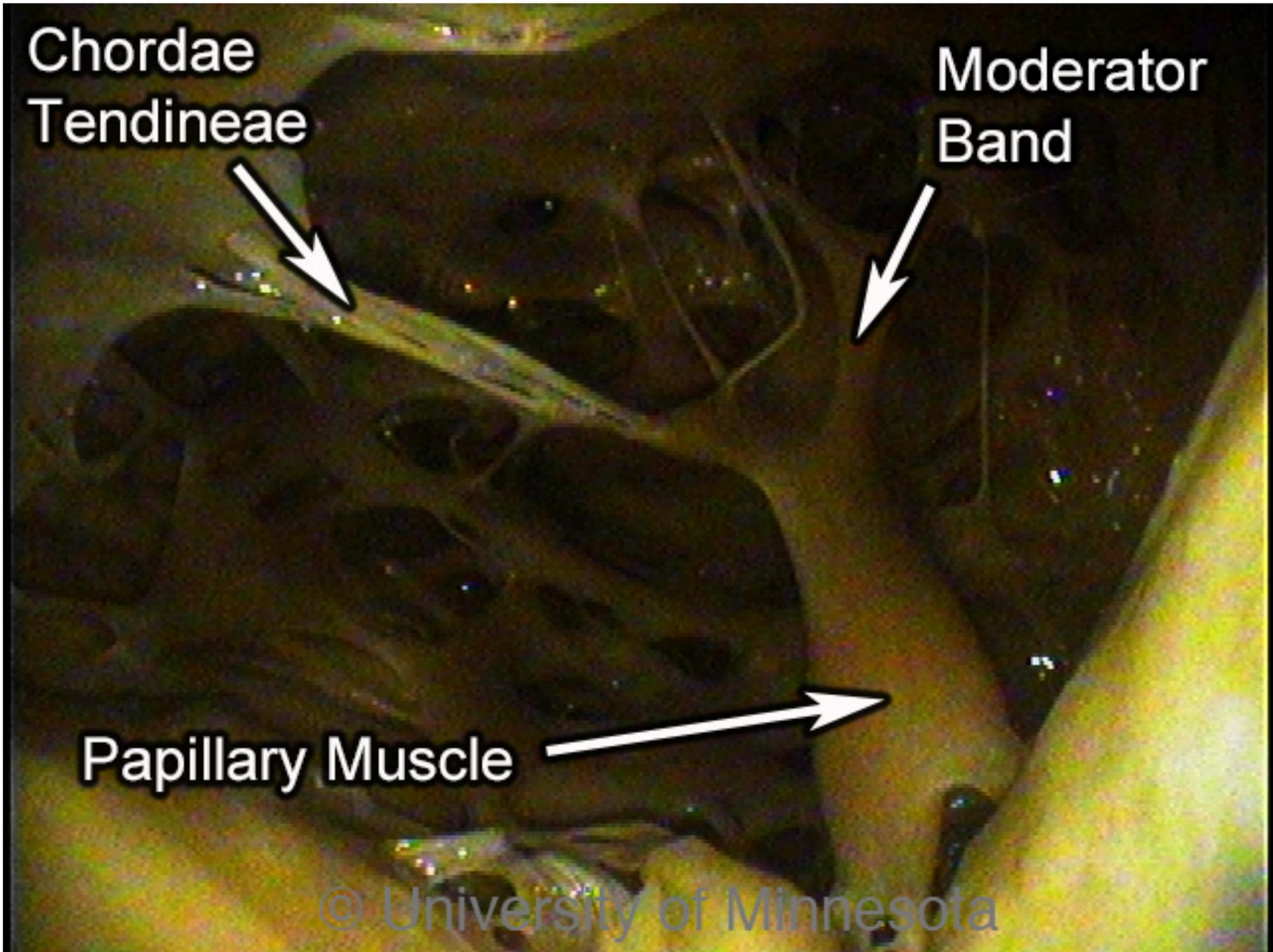


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Chordae  
Tendineae

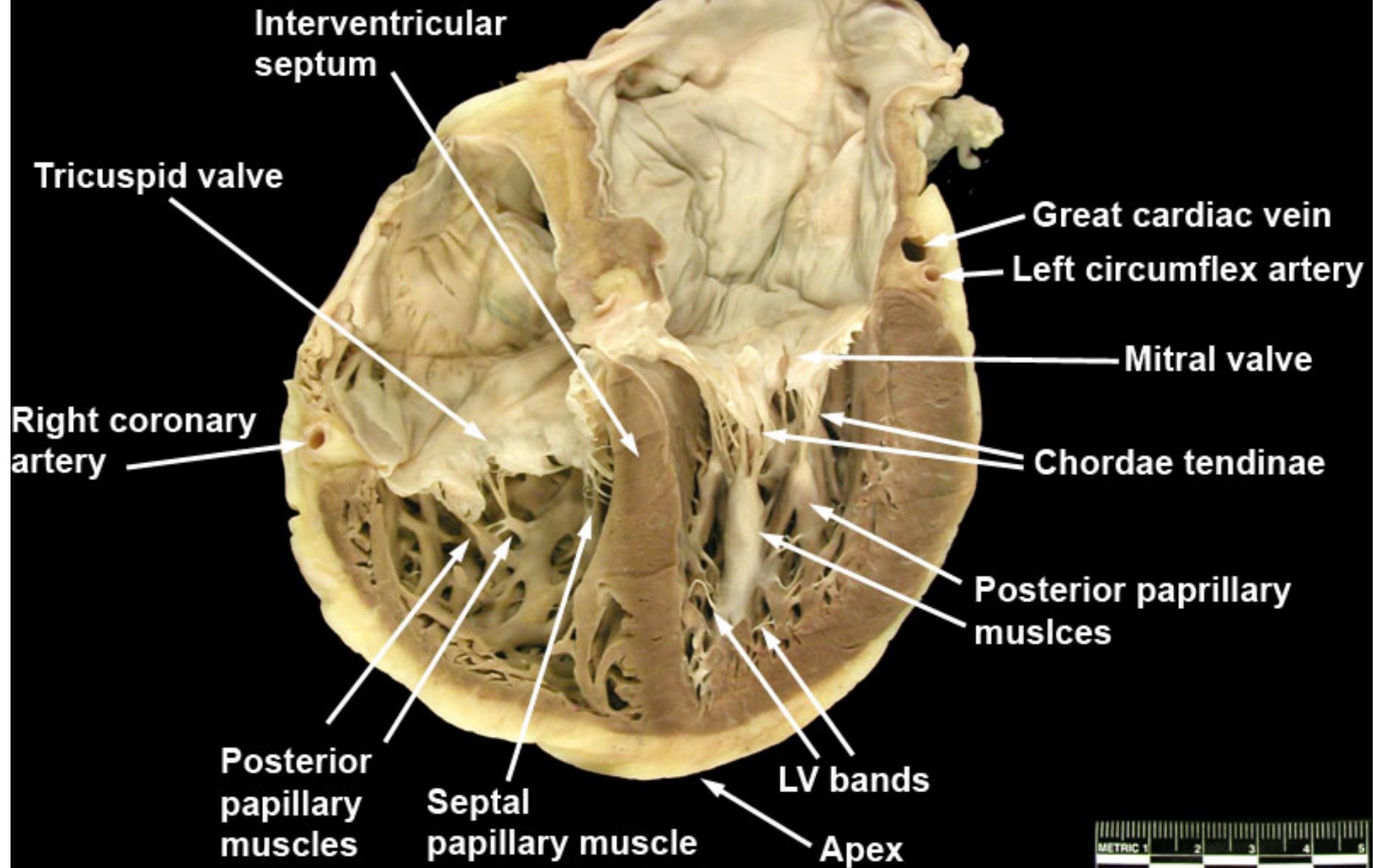
Moderator  
Band

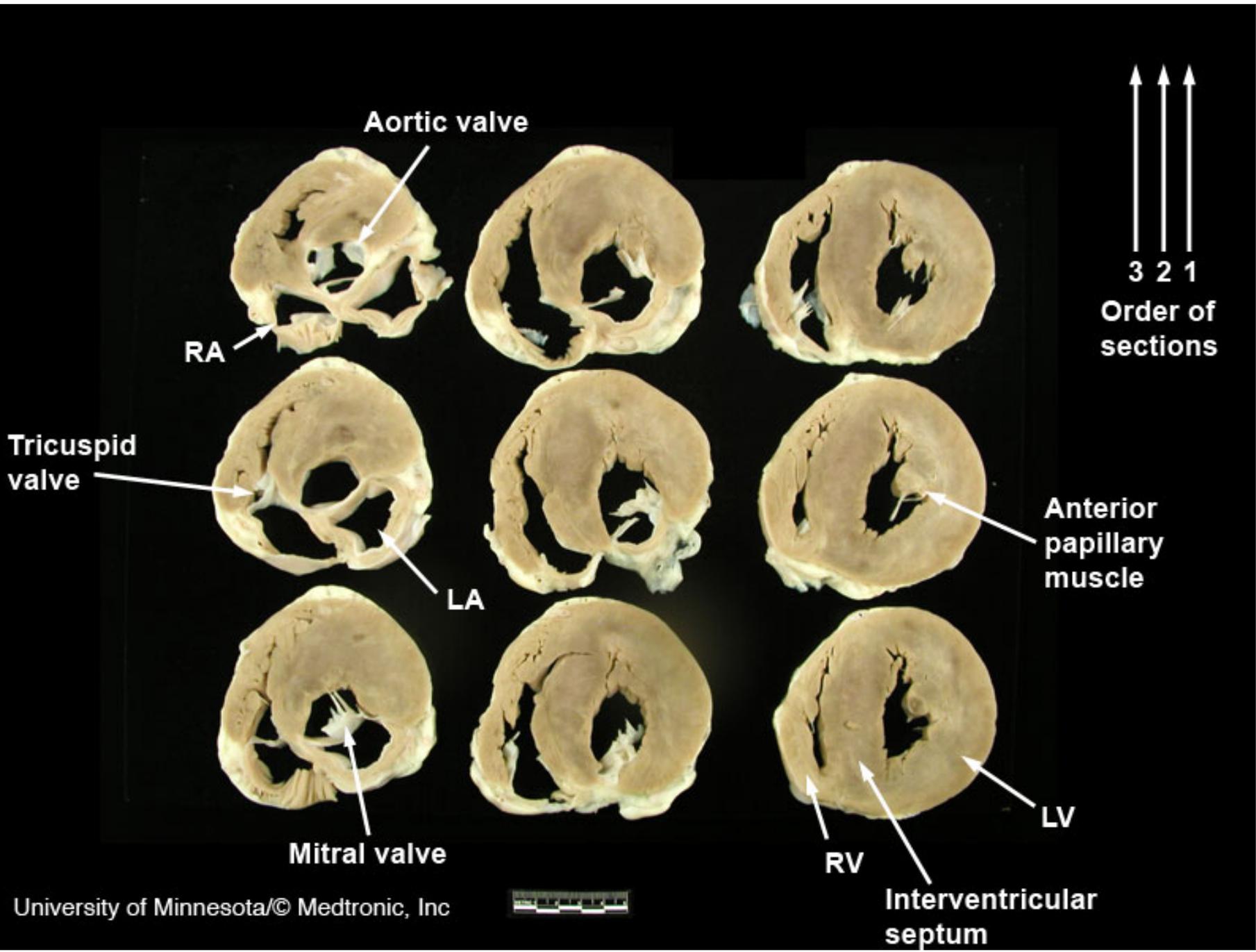
Papillary Muscle



# Right Ventricle

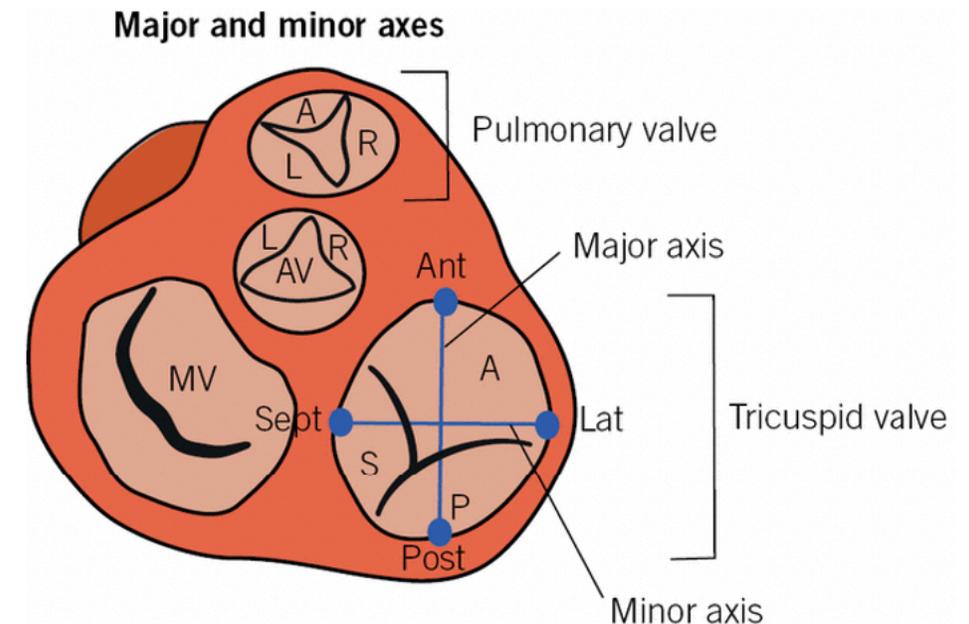
- IV septum is functionally part of the LV
  - Septum bulges into the RV giving it a crescent shape
- RV free wall is major contributor to RV ejection
  - Majority of RV muscle fibres are longitudinal
  - RV wall thickness around  $\frac{1}{2}$  that of LV

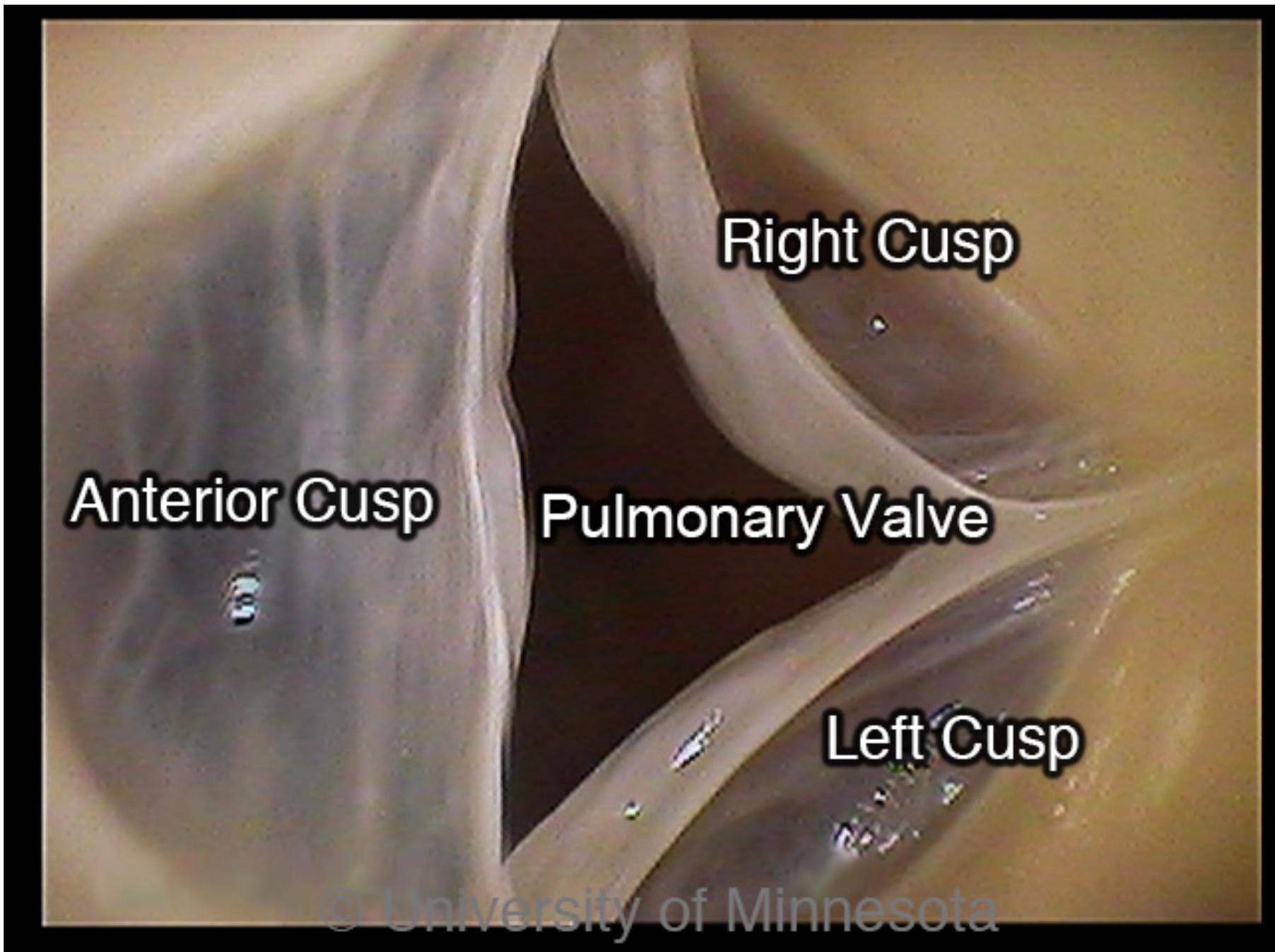




# Pulmonary Valve

- Trileaflet with oval annulus
  - Anterior – furthest from AV
  - Left } Directly opposite to respective coronary cusps of AV
  - Right }
- Similar in shape to AV but
  - Slightly larger
  - Thinner leaflets
  - No fibrous connection to the TV





# To finish

- Right atrium features Triangle of Koch
  - ostium of the coronary sinus
  - anterior-septal leaflet commissure
  - tendon of Todaro
- Tricuspid valve has a small septal, large anterior and scalloped posterior leaflets
- Right ventricle has prominent trabeculae carnae and moderator band
- Pulmonary valve has anterior, left and right leaflets

# Image Credits

- Figures

- Practical Perioperative Transoesophageal Echocardiography 3rd Edition

**Editor(s):** David Sidebotham, Alan Merry, Malcolm Legget and Gavin Wright

- Anatomical Plates and Perfused Specimens

- University of Minnesota Visible Heart Lab, Atlas of Human Cardiac Anatomy

<http://www.vhlab.umn.edu/atlas/index.shtml>

Thank you

