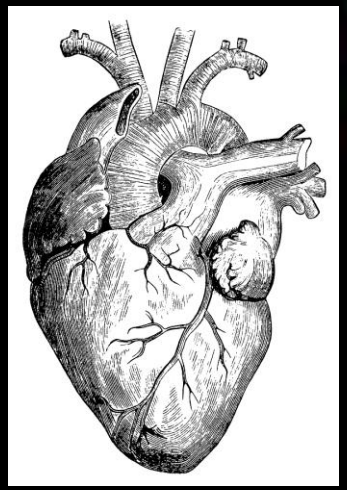
THE HEART



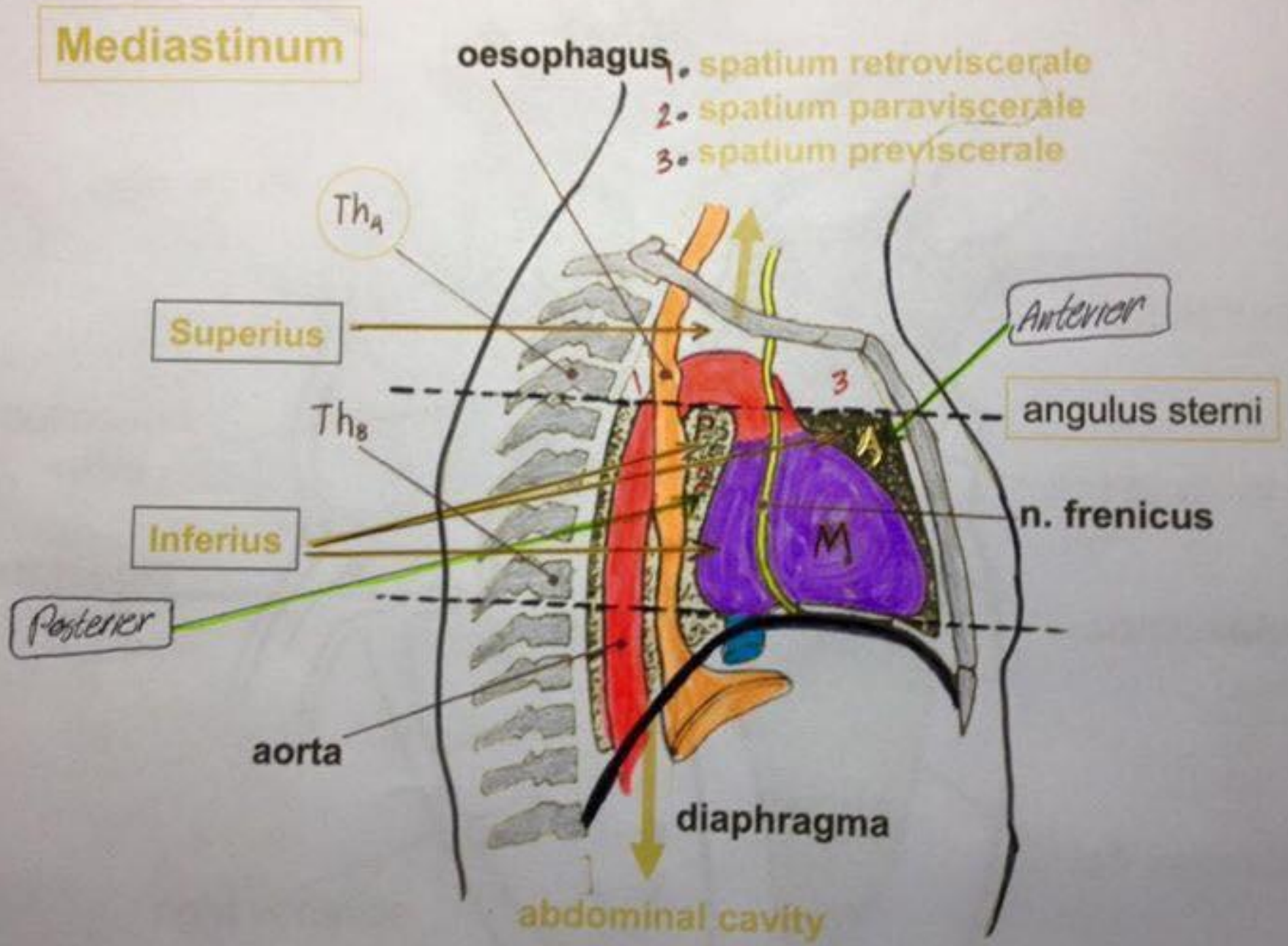
MUDr. Azzat Al-Redouan

Mar.2018

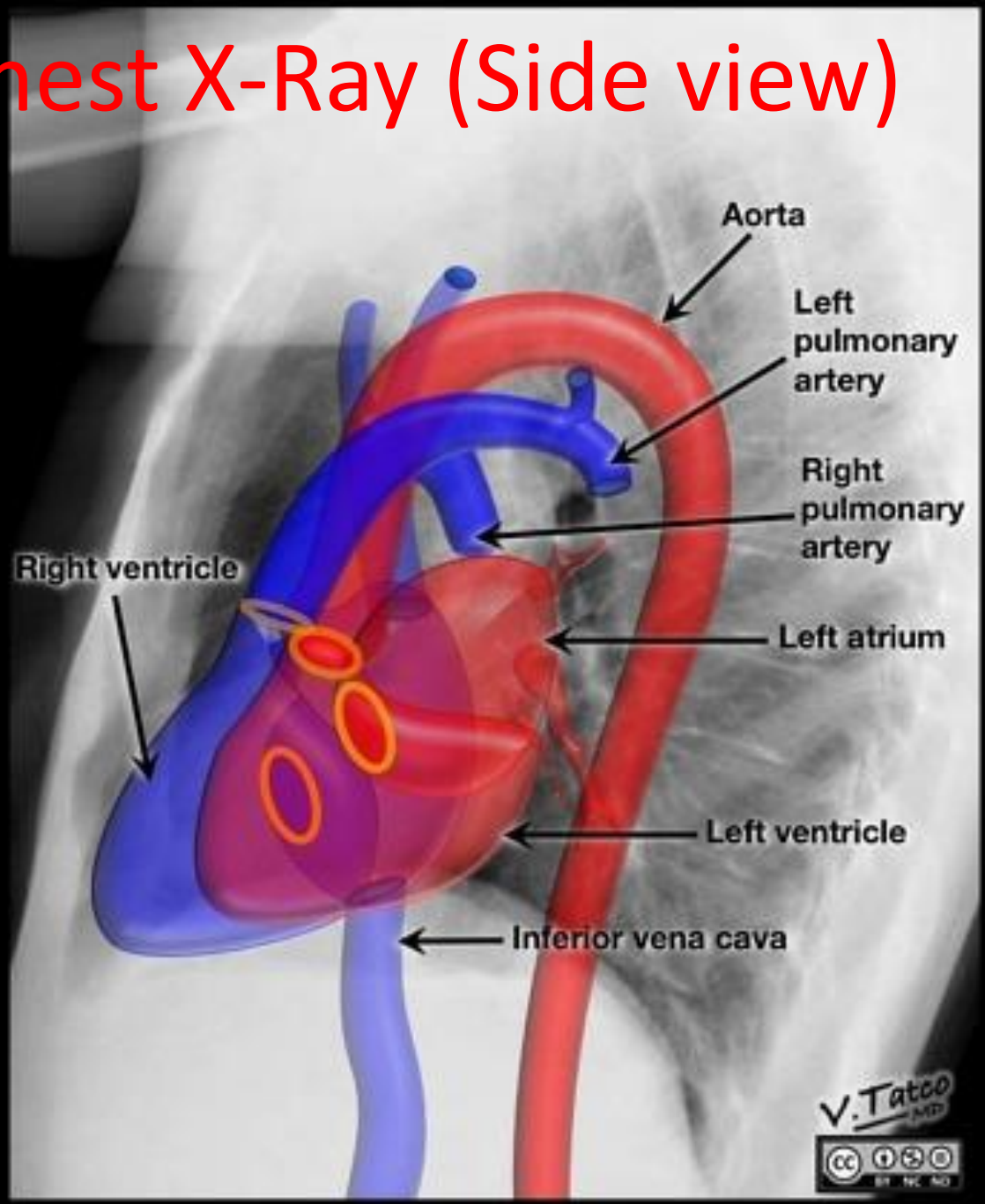
How does my anatomy knowledge of the heart apply in basic medicine ?!!

A) Structural anomalies ↑↓ B) Functional anomalies → **Mechanical Disturbances**

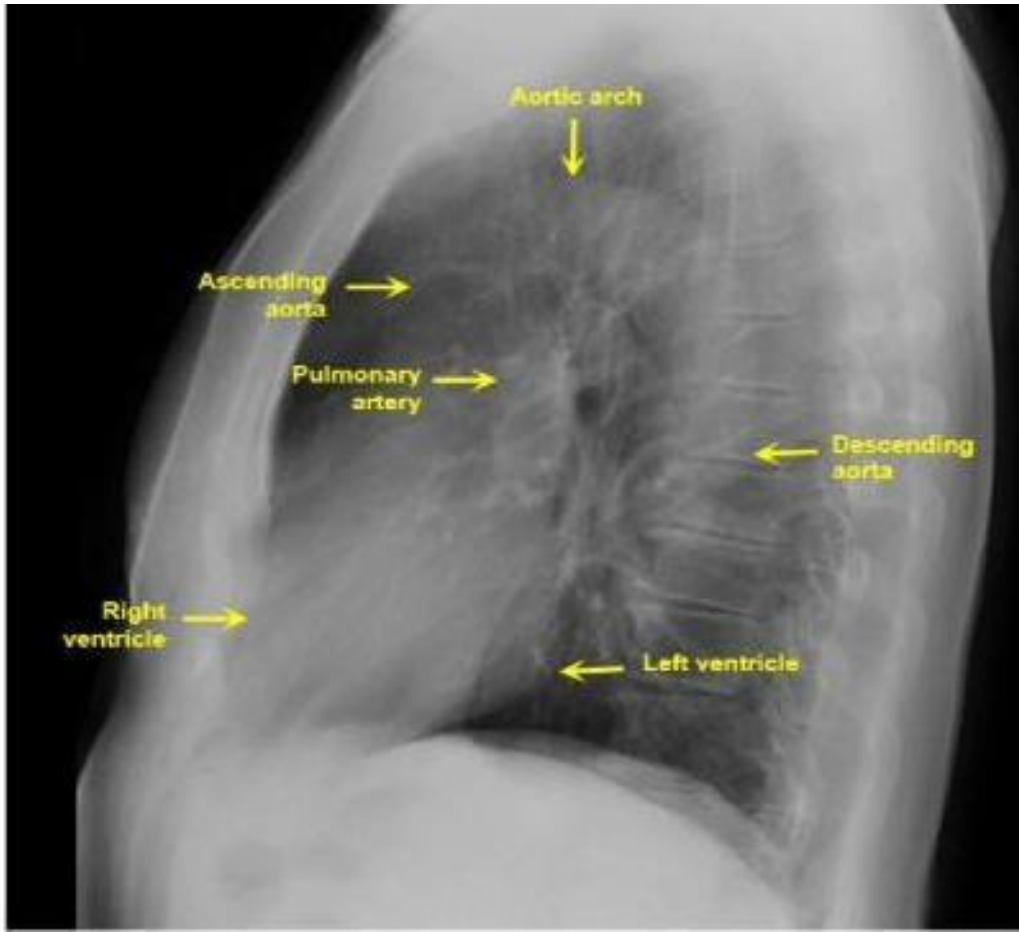
1) **Arrest** → Cease of contraction
2) **Failure** → Insufficient pump (blood stasis) a) Right b) Left
3) **Arrhythmia** → Irregular conduction
4) **Rate** → Shift in ANS control a) ↑ Tachycardia b) ↓ Bradycardia
5) **Infarction** → Defect in coronary arteries
6) **Valvular** → a) Def-Closure → **Regurgitation** b) Def-Opening → **Stenosis**
7) **Congenital Malformation** → Abnormal structures and function
8) **Wall** → *Septal-Nonseptal *Endocardium, Myocardium, Pericardium
9) **Trauma** → Damage to structures
10) **Mediastinum** → Defect within anatomical topography


Mediastinum
oesophagus
1. spatium retroviscerale
2. spatium paraviscerale
3. spatium previscerale
Th4
Superius
Anterior
angulus sterni
Th8
Inferius
n. frenicus
Posterior
aorta
diaphragma
abdominal cavity

Chest X-Ray (Side view)



Chest Side X-Ray (Side view)

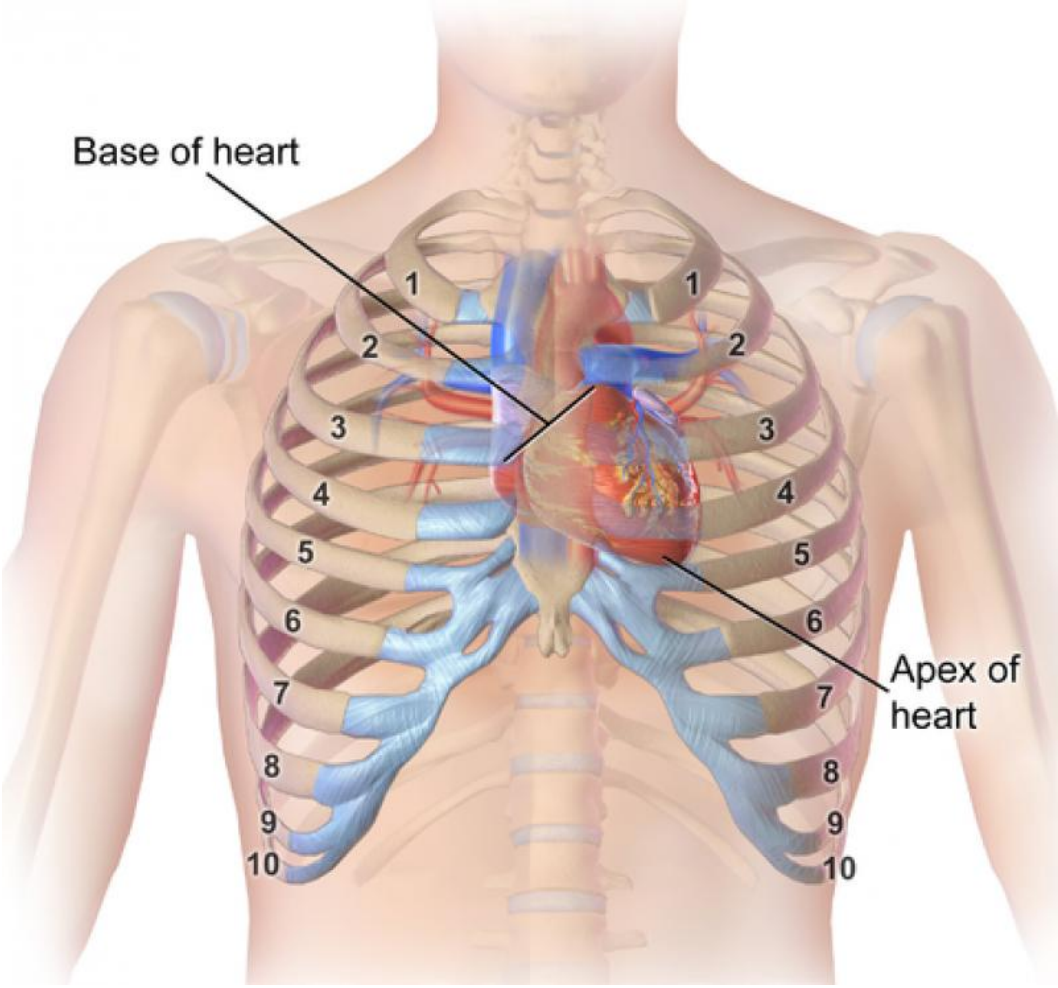


What is the best way to man's heart?

***It's NOT a joke !

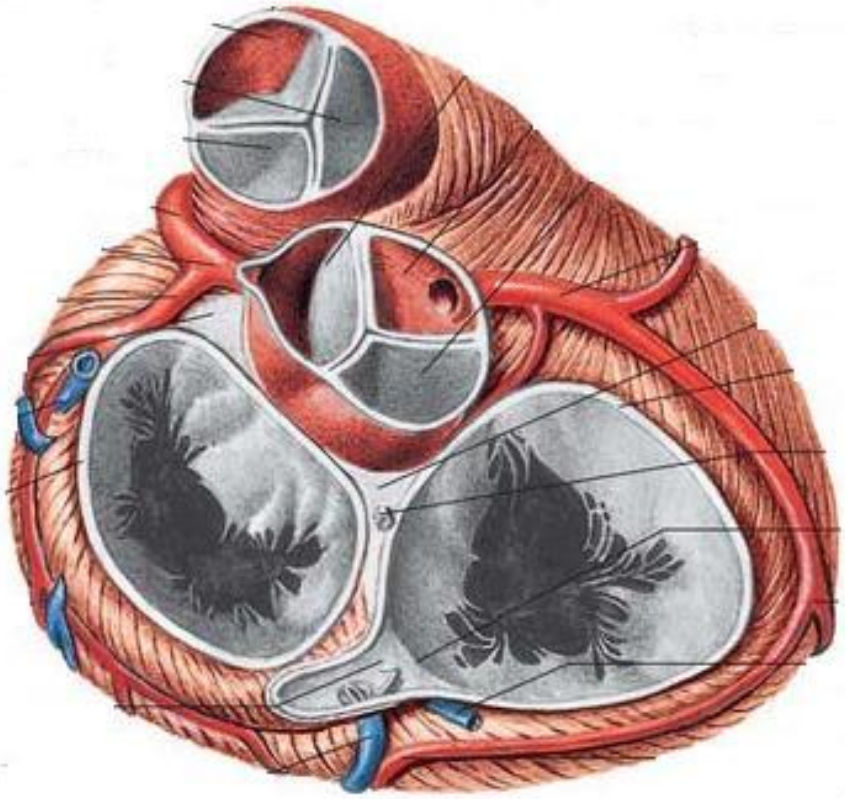
Answer next slide

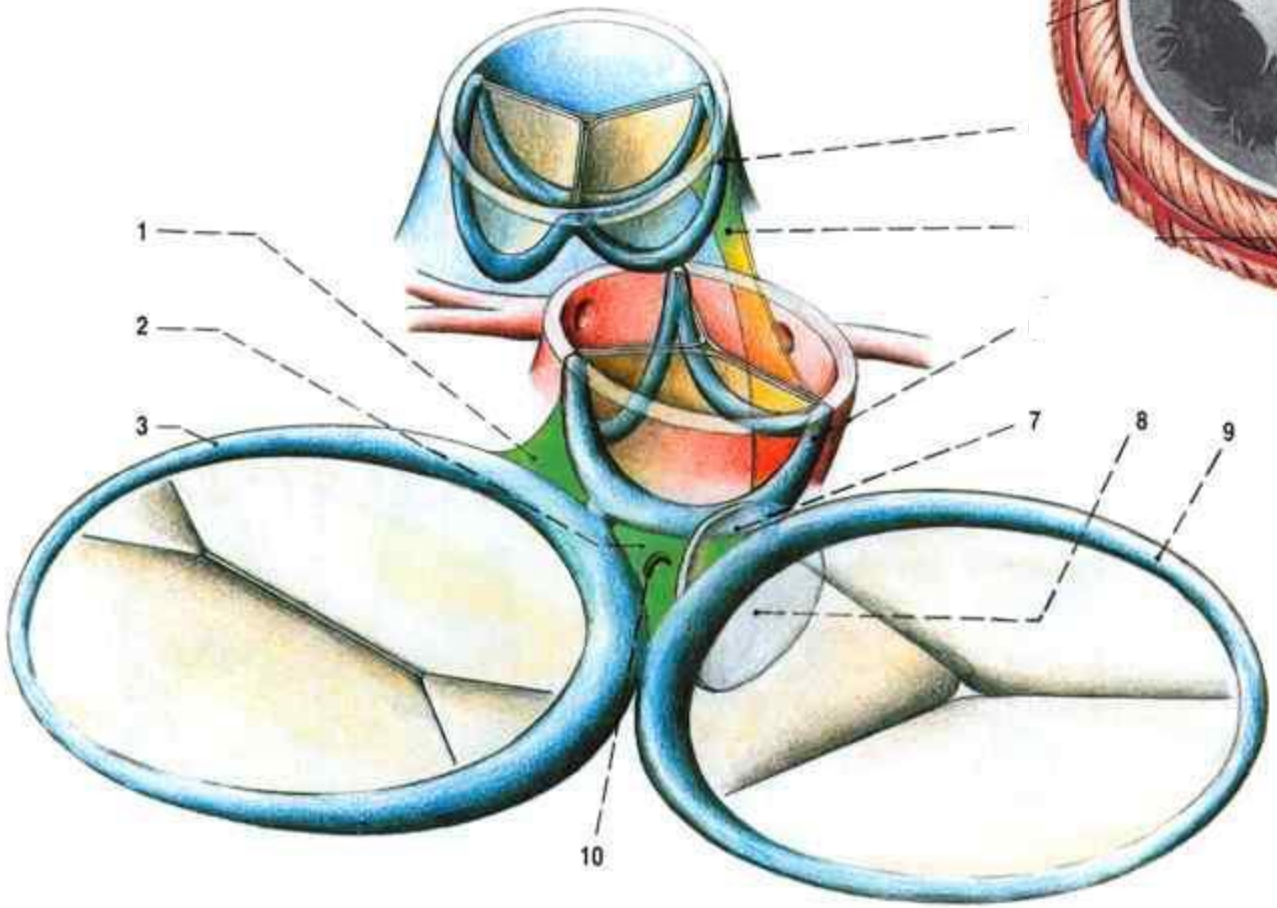
5th left intercostal space at miclavicular line

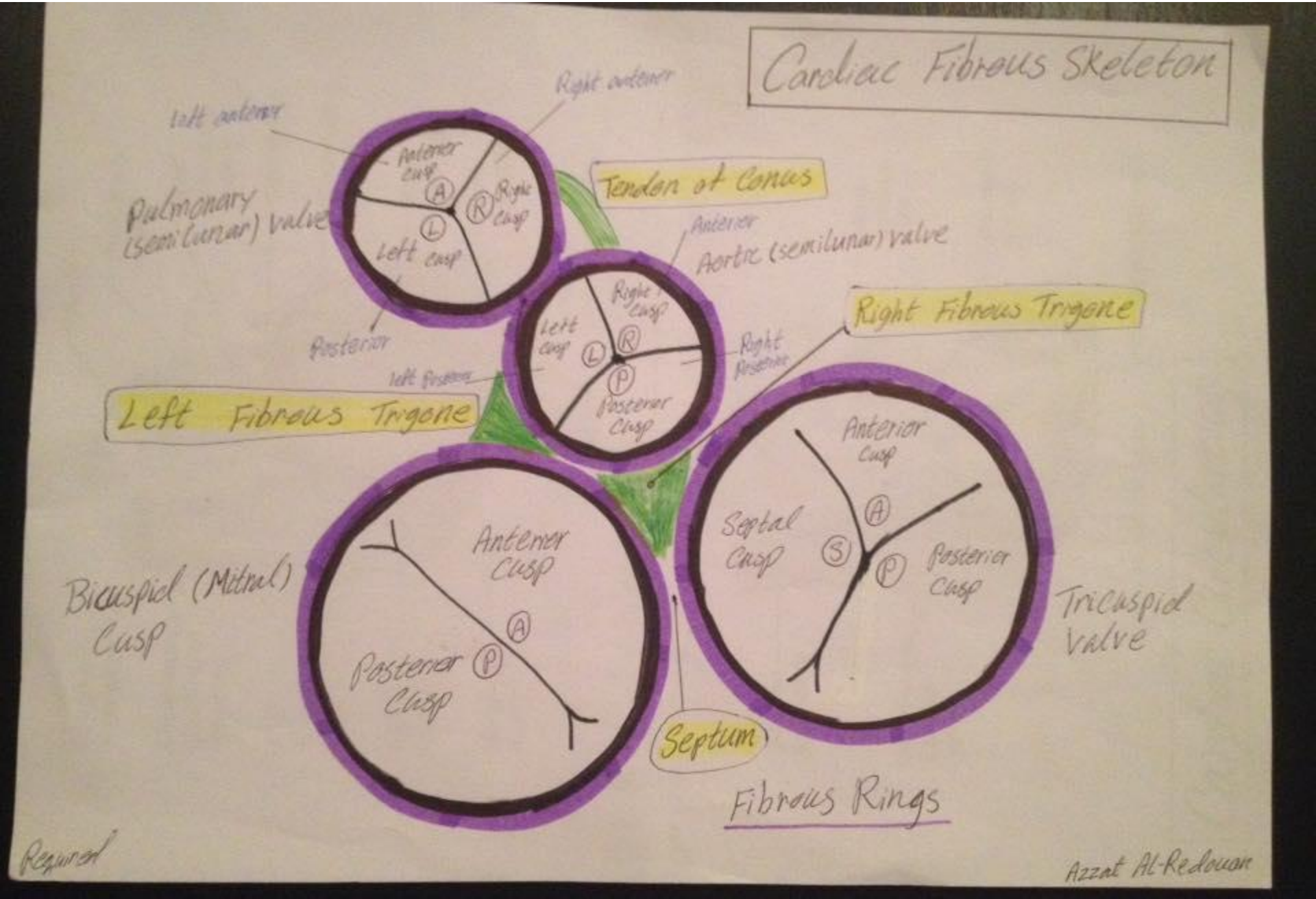


- It’s where you can palpate the apex of the heart. *[clinical physical examination]
- Stab by a sharp object will penetrate the heart!!! *[traumatology]

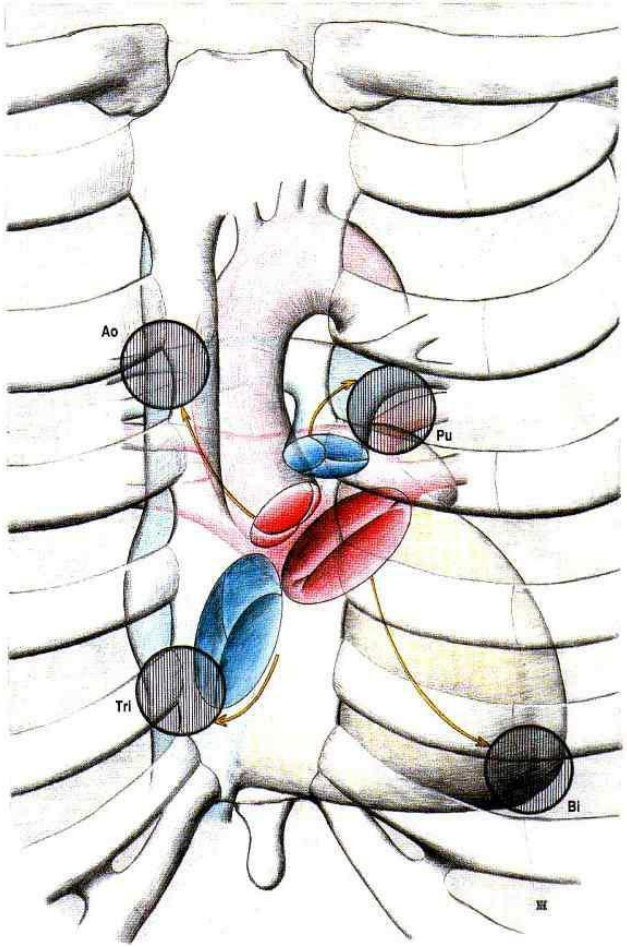
Cardiac skeleton and valves






Cardiac Fibrous Skeleton
Left anterior
Right anterior
Anterior Cusp
A
Right Cusp
R
Left Cusp
L
Pulmonary (semilunar) valve
Tendon of Conus
Anterior
Aortic (semilunar) valve
Right Cusp
Left Cusp
L
R
Right Posterior
P
Posterior Cusp
Posterior
Left Posterior
Left Fibrous Trigone
Right Fibrous Trigone
Anterior Cusp
Septal Cusp
S
A
P
Posterior Cusp
Tricuspid valve
Anterior Cusp
A
Posterior Cusp
P
Bicuspid (Mitral) Cusp
Septum
Fibrous Rings
Required
Azzat Al-Rebouni

“Auscultation points”



Sites of auscultation of valves

AORTIC
PULMONIC
TRICUSPID
MITRAL

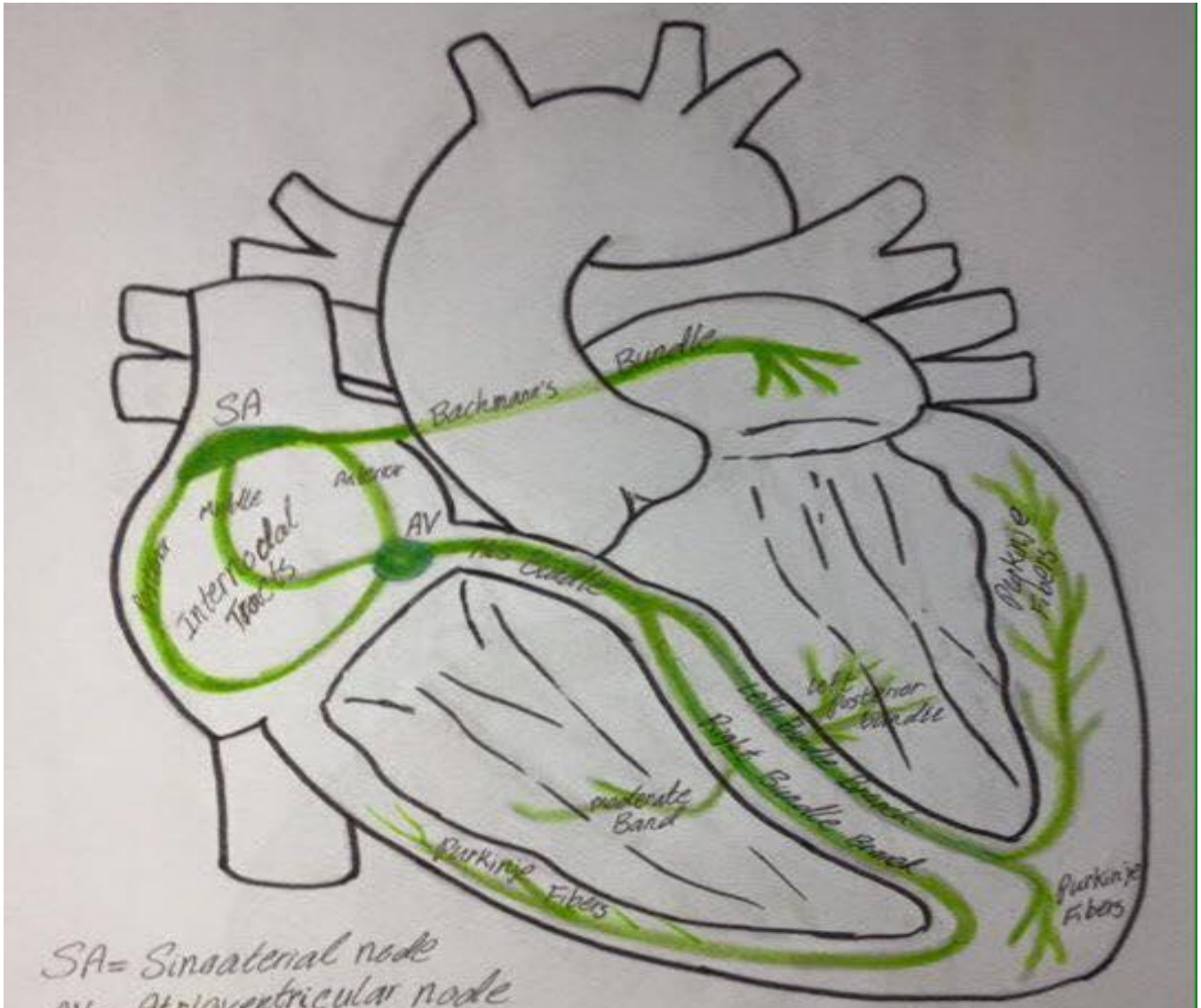
1 1
2 2
3 3
4 4
5 5
6 6
7 7

Location of valves

PULMONIC
AORTIC
TRICUSPID
MITRAL

“Auscultation points”

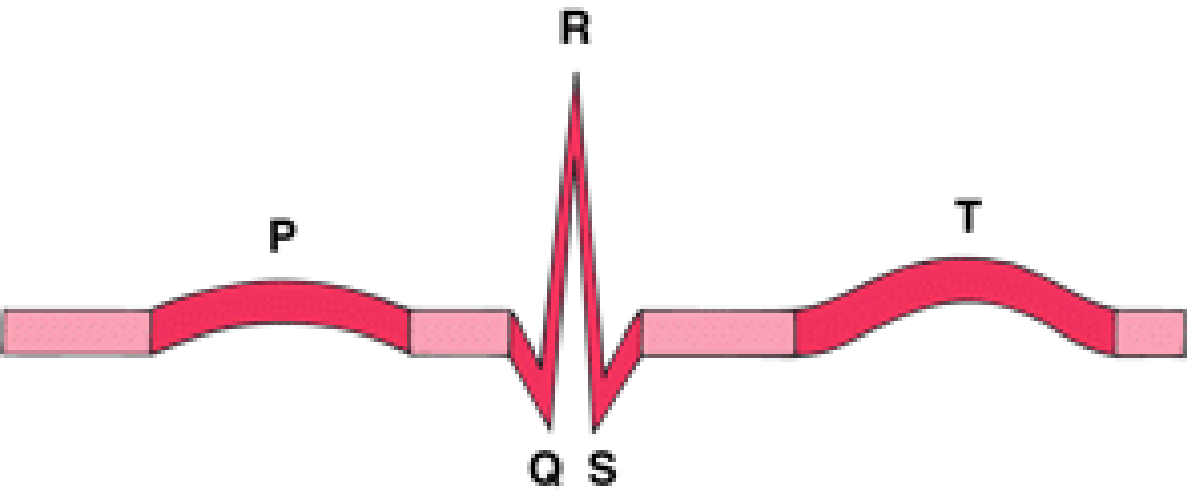
- Anatomic location
- Corresponding functional structures
- ***Practice it to master it’s locations!***

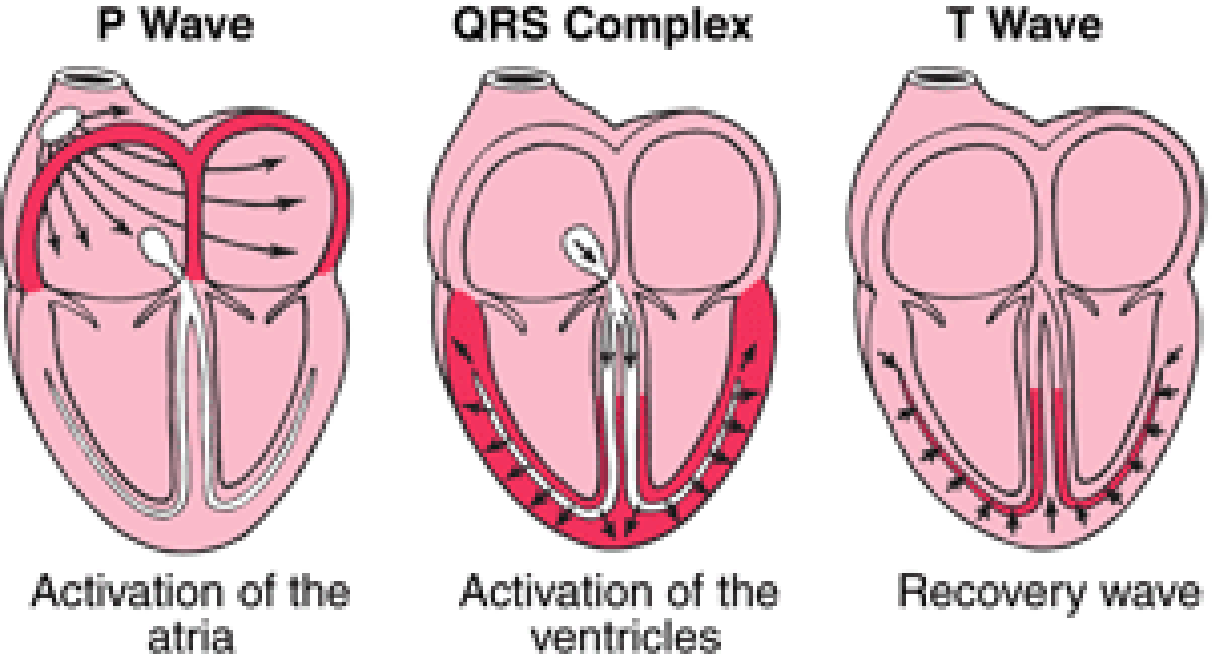


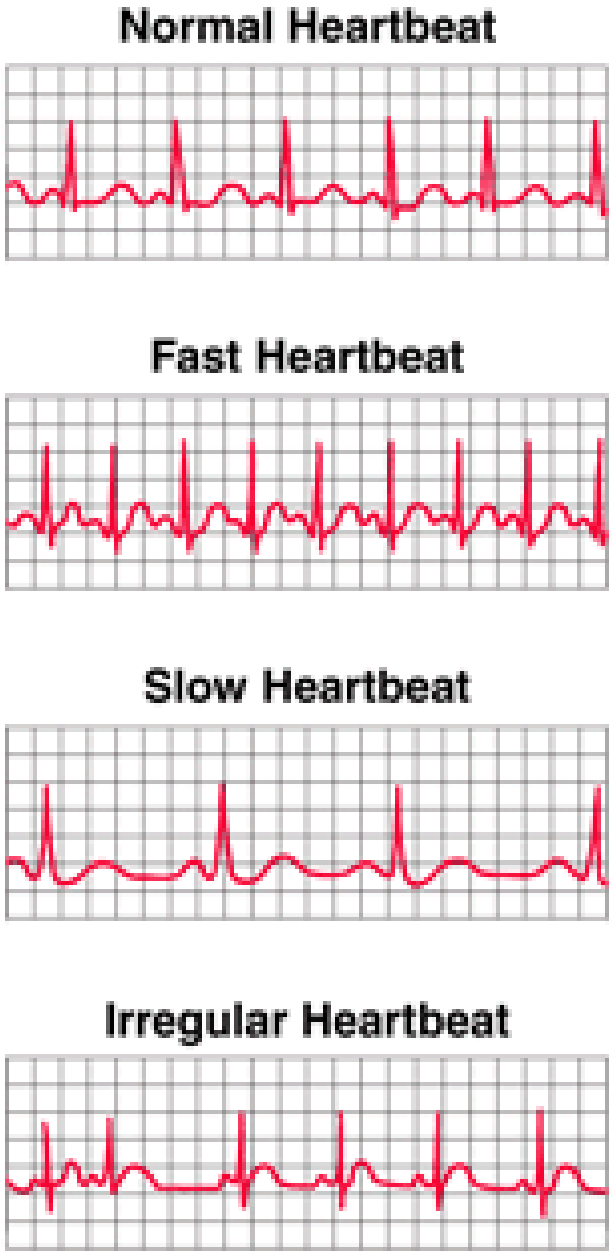
SA= Sinoatrial node
AV= Atrioventricular node

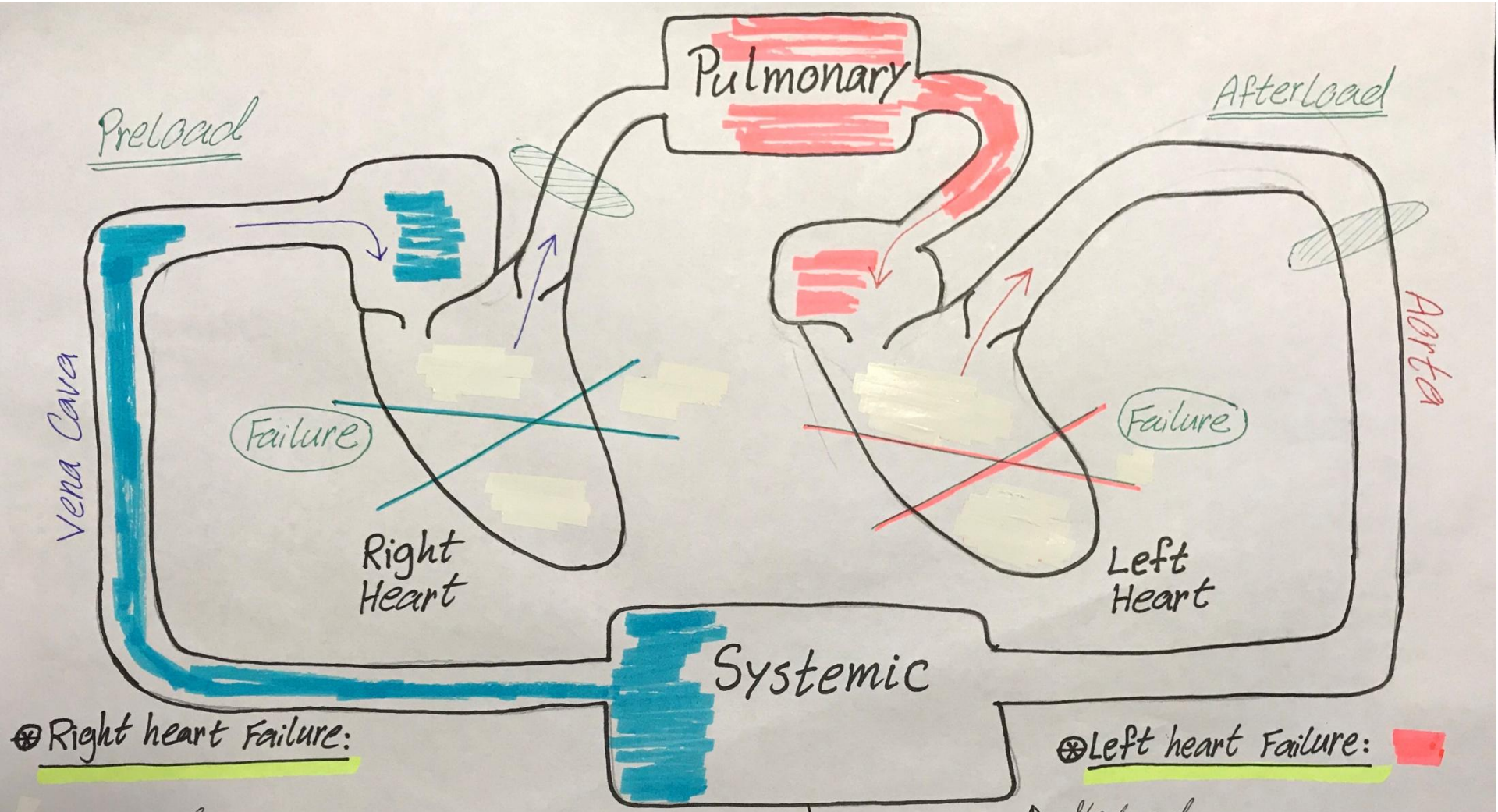
Cardiac Conductive System

EKG/ECG in relation to heart anatomy









⊛Right heart Failure:

- ↑ Preload
- Blood accumulation in Systemic Circulation
- Decressed blood Flow to lungs
- Edema in legs

⇒ Less O_2 delivery [cynosis]

Heart Failure

Azzat Al-Redouan

⊛Left heart Failure:

- ↑ afterload
- Decreassed Blood flow to Syste
- Blood accumulation in Lungs
- Pulmonary hypertension

⇒ Coughing

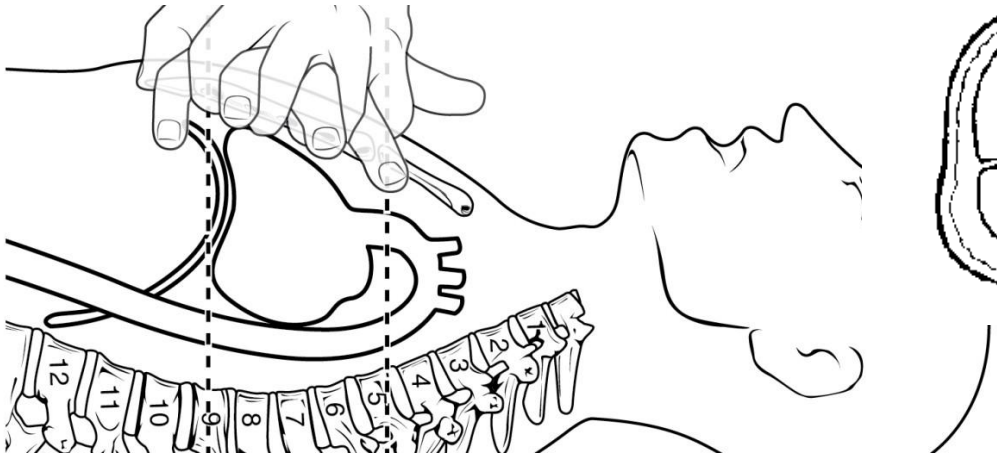
What is the concept of CPR (Cardiopulmonary resuscitation) ?

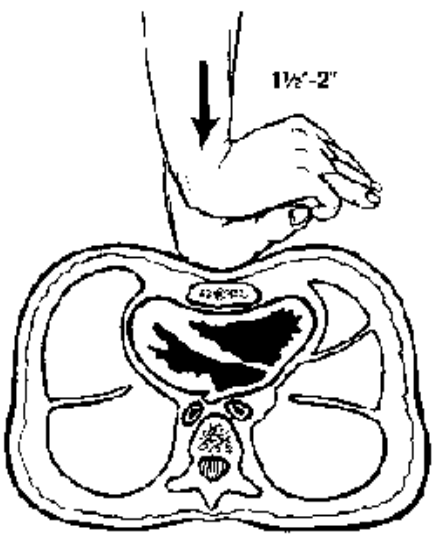
Compress → Squeezing heart between sternum and vertebrae → **Blood eject**

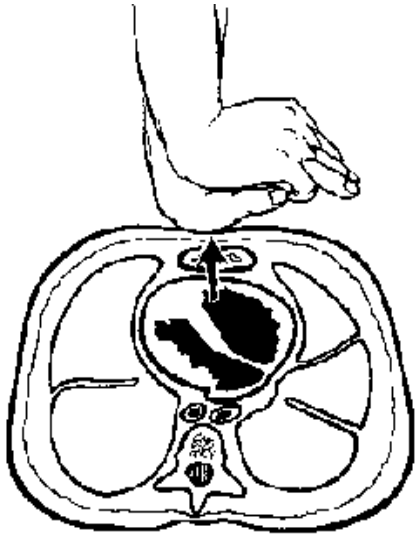
Decompress → heart chambers expand back → **Blood fill**

Cycles of compression → mechanical pump of blood

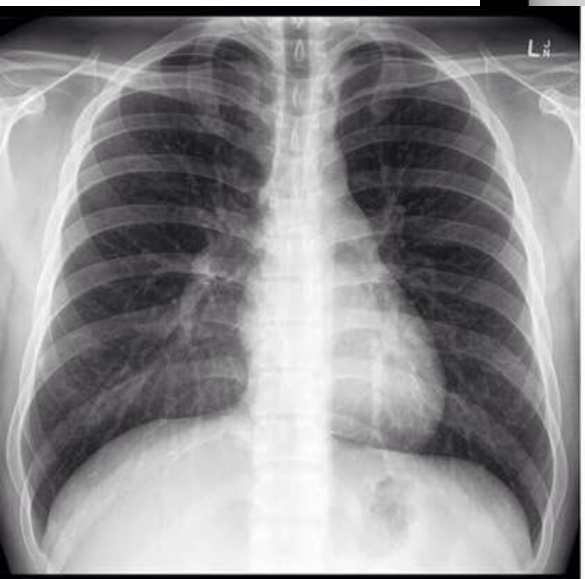
ENSURE CONTINOUS BLOOD SUPPLY TO THE ***BRAIN***

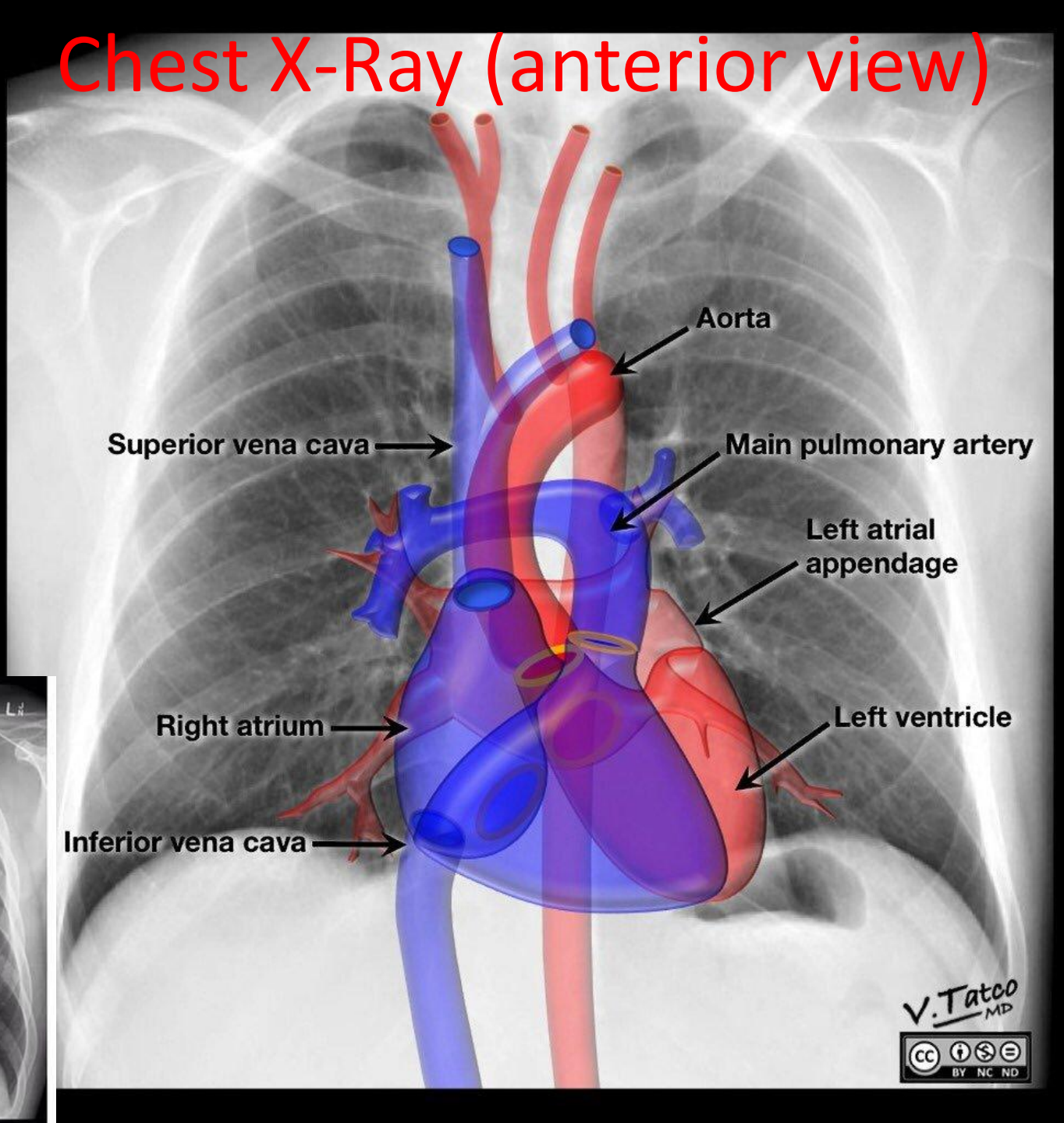


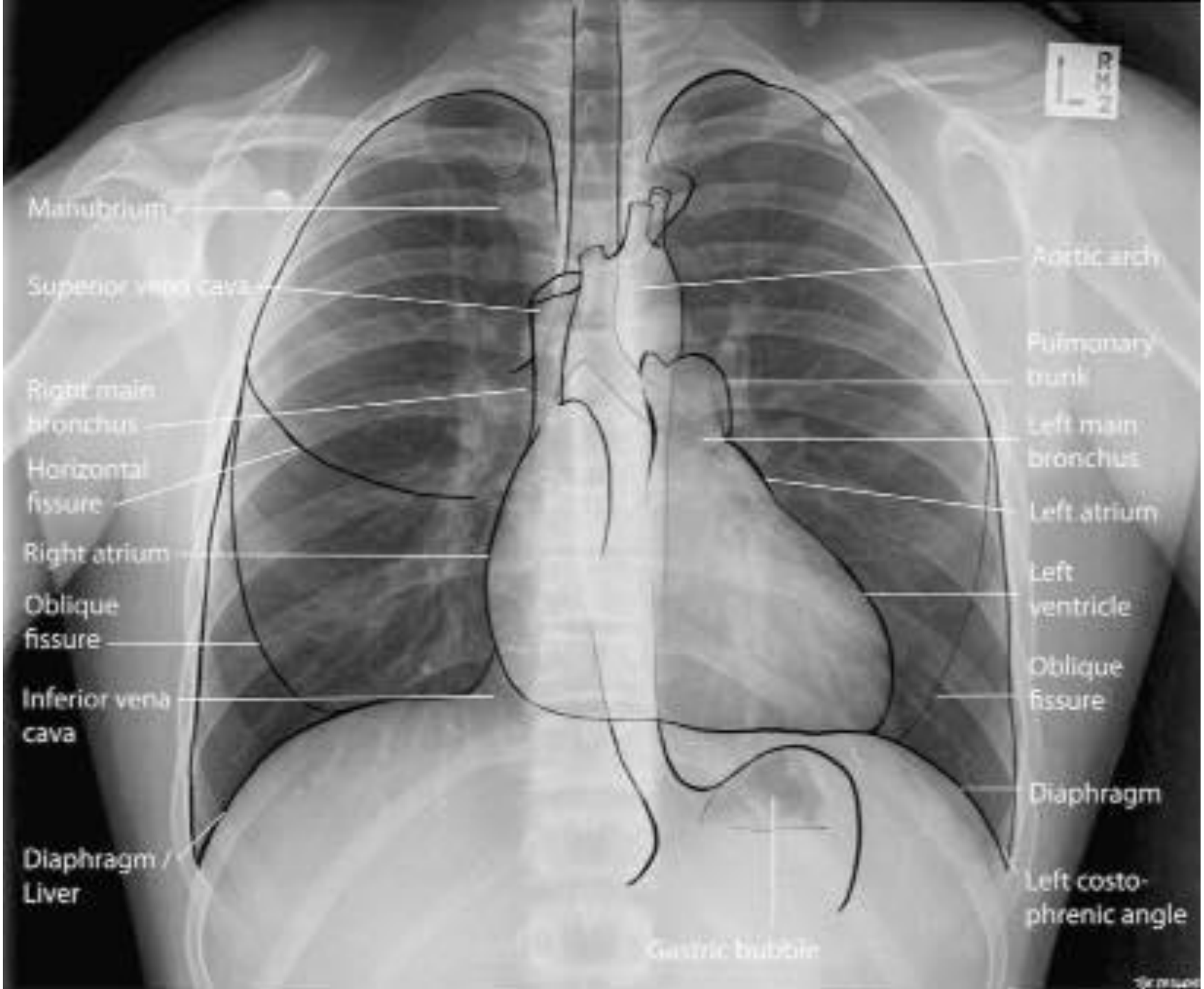




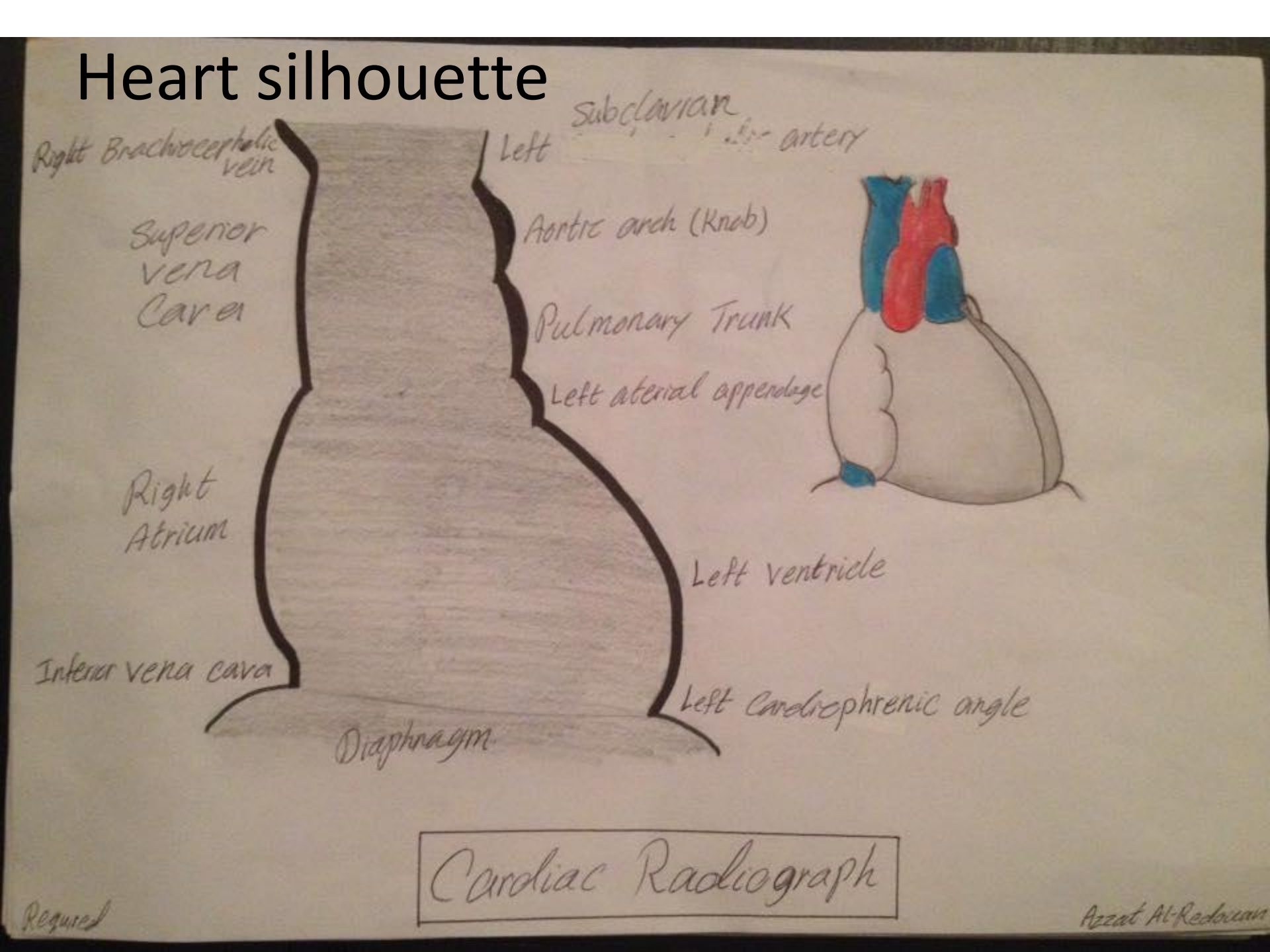
Chest X-Ray (anterior view)



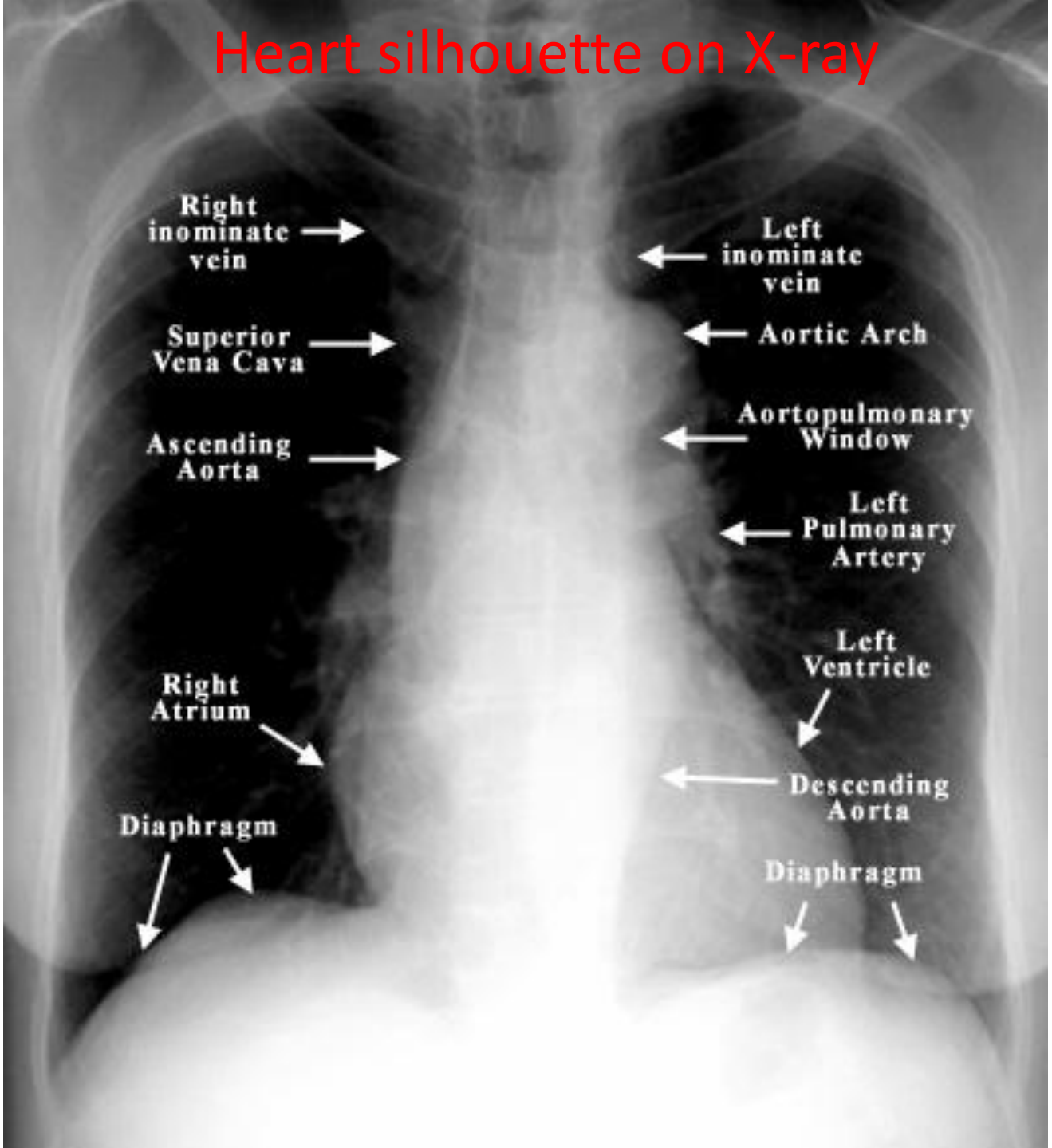



Manubrium
Superior vena cava
Right main bronchus
Horizontal fissure
Right atrium
Oblique fissure
Inferior vena cava
Diaphragm / Liver
Aortic arch
Pulmonary trunk
Left main bronchus
Left atrium
Left ventricle
Oblique fissure
Diaphragm
Left costo-phrenic angle
Gastric bubble

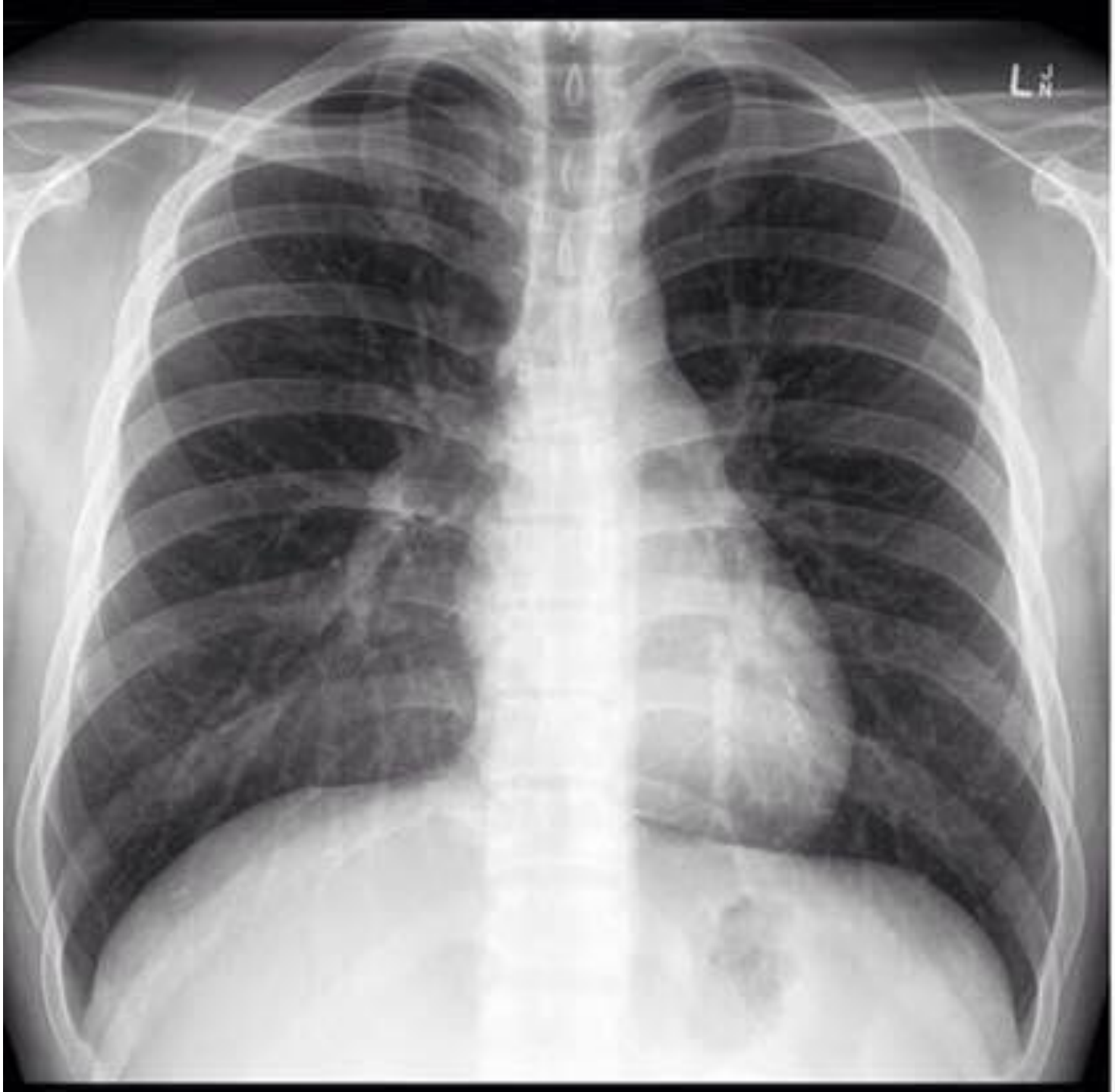
Heart silhouette



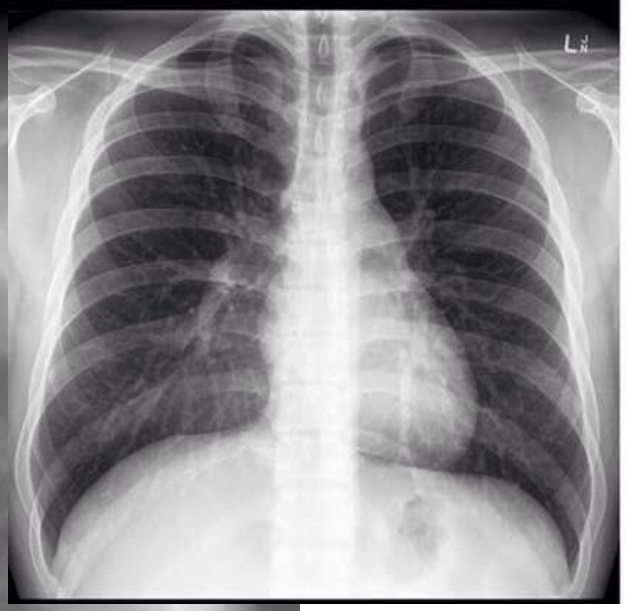
Heart silhouette on X-ray



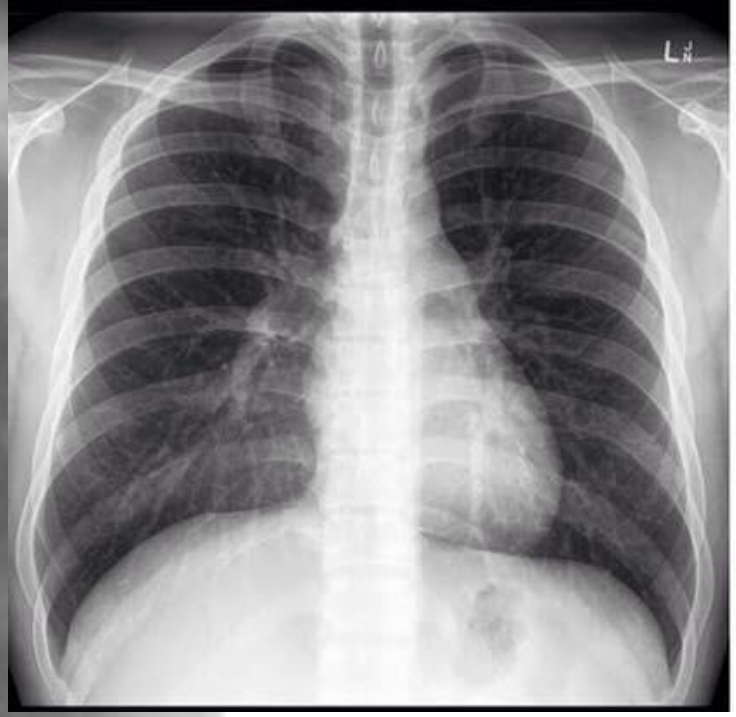
Normal
Chest X-ray

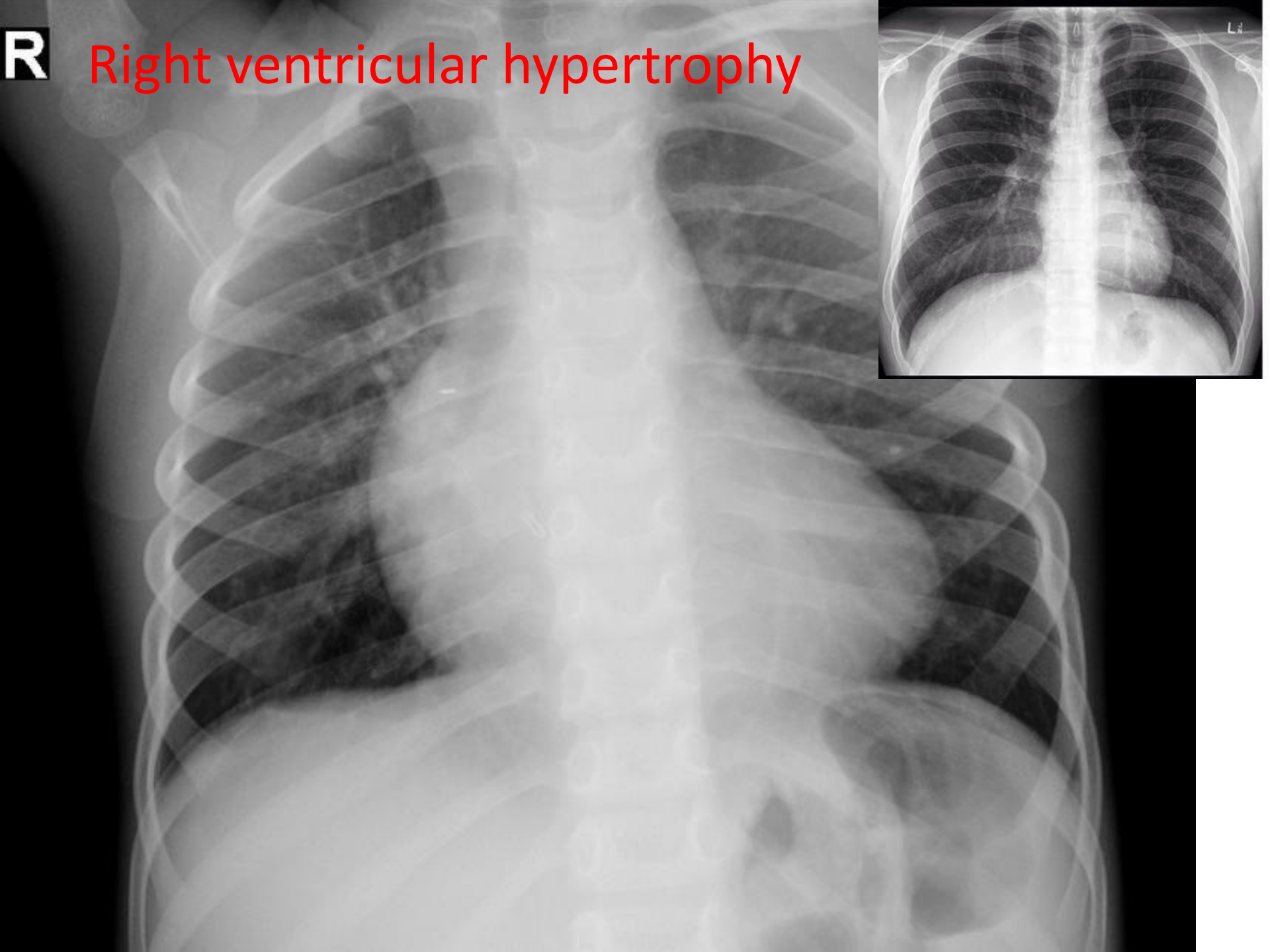


Cardiomegaly

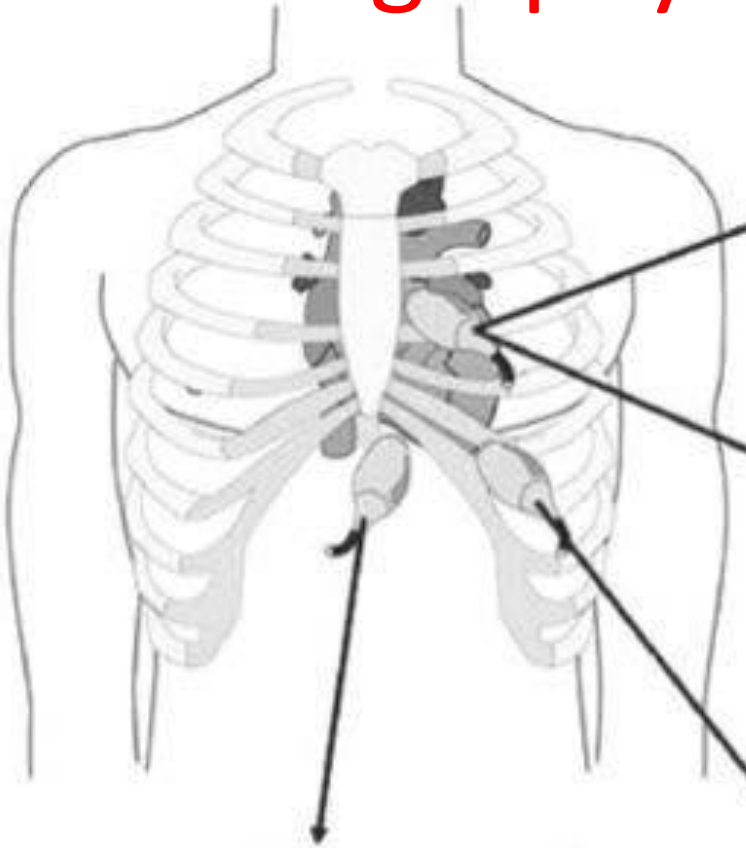


Left ventricular hypertrophy

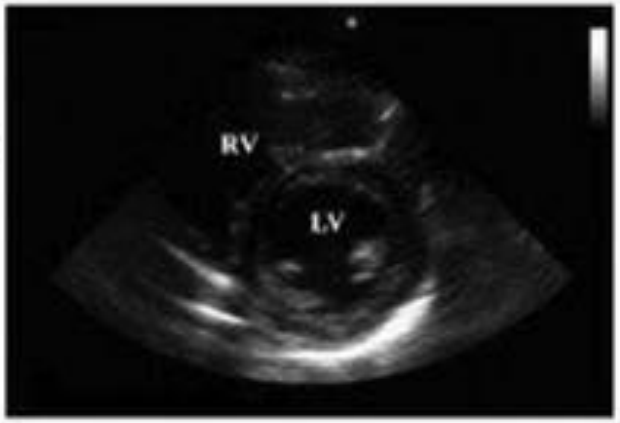



R
Right ventricular hypertrophy

Ecocardiography



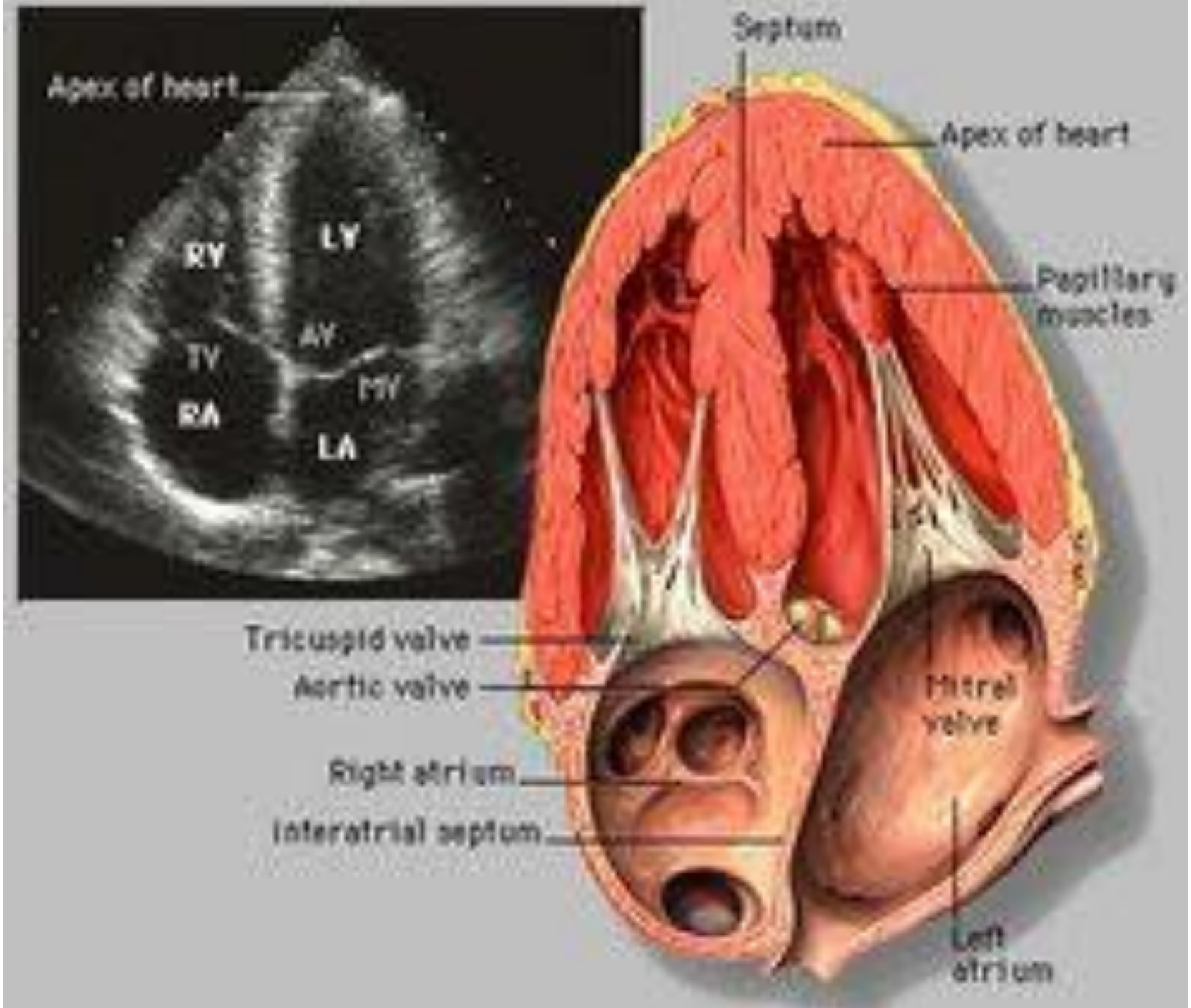
A



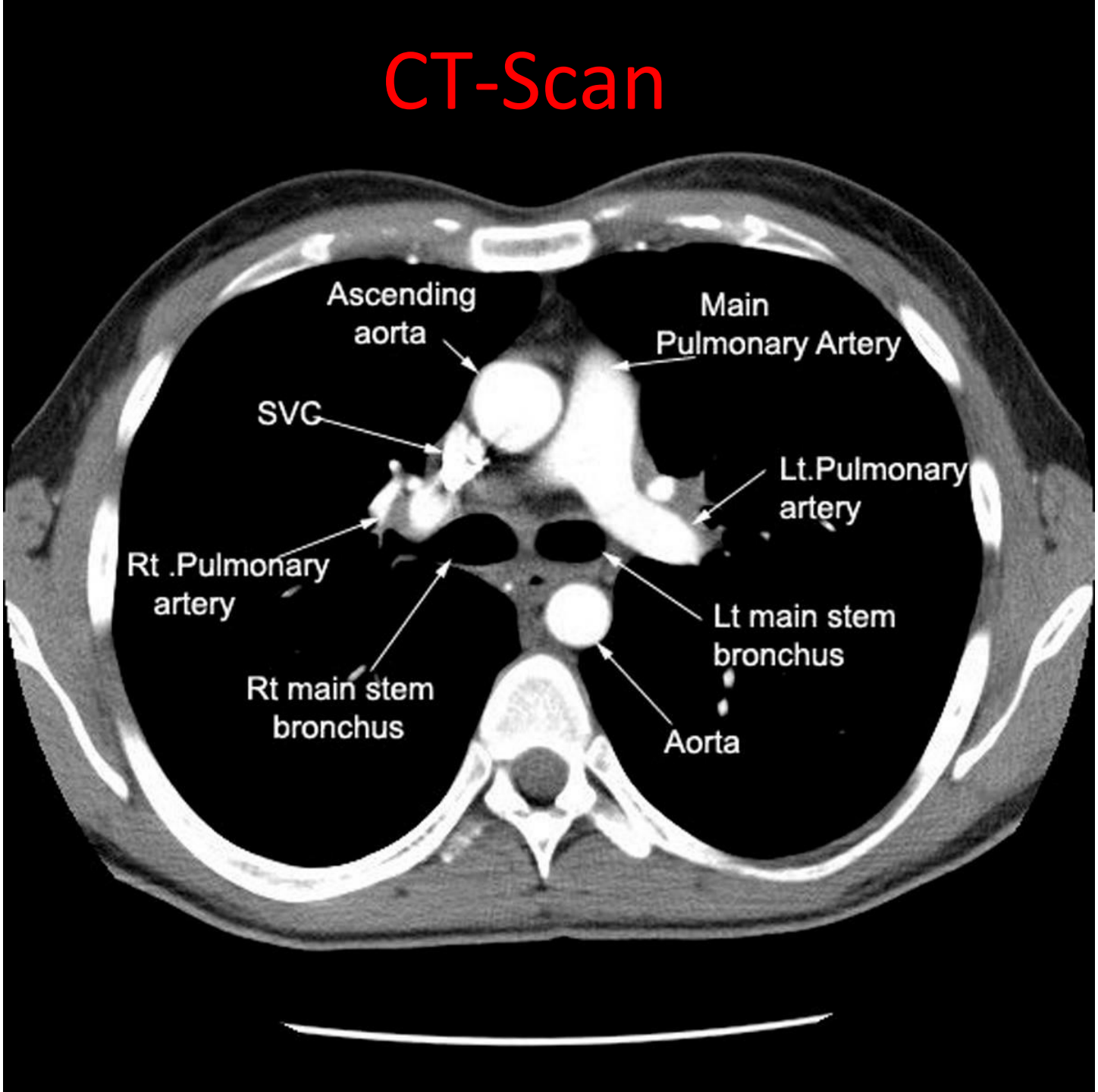
B

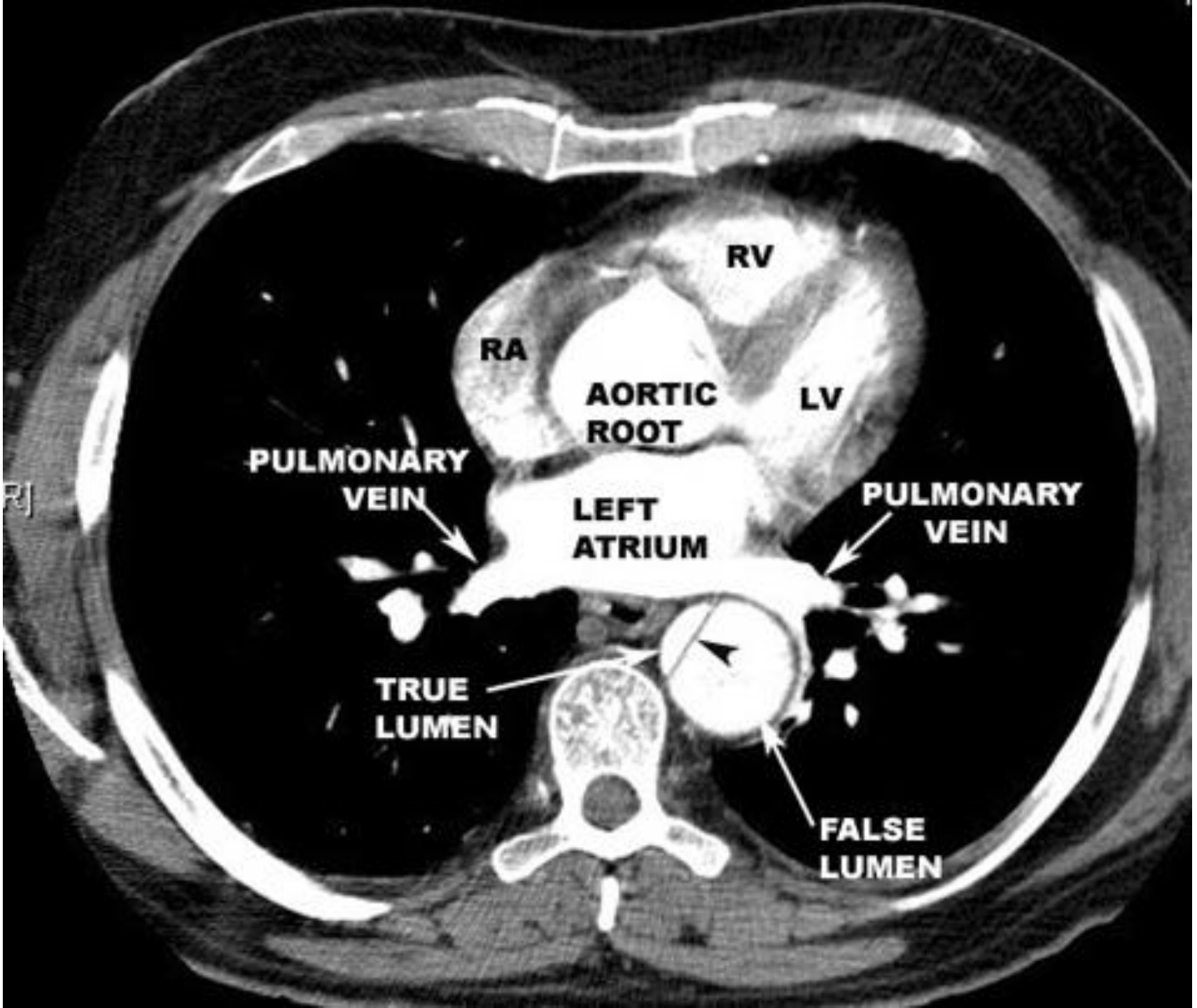
D

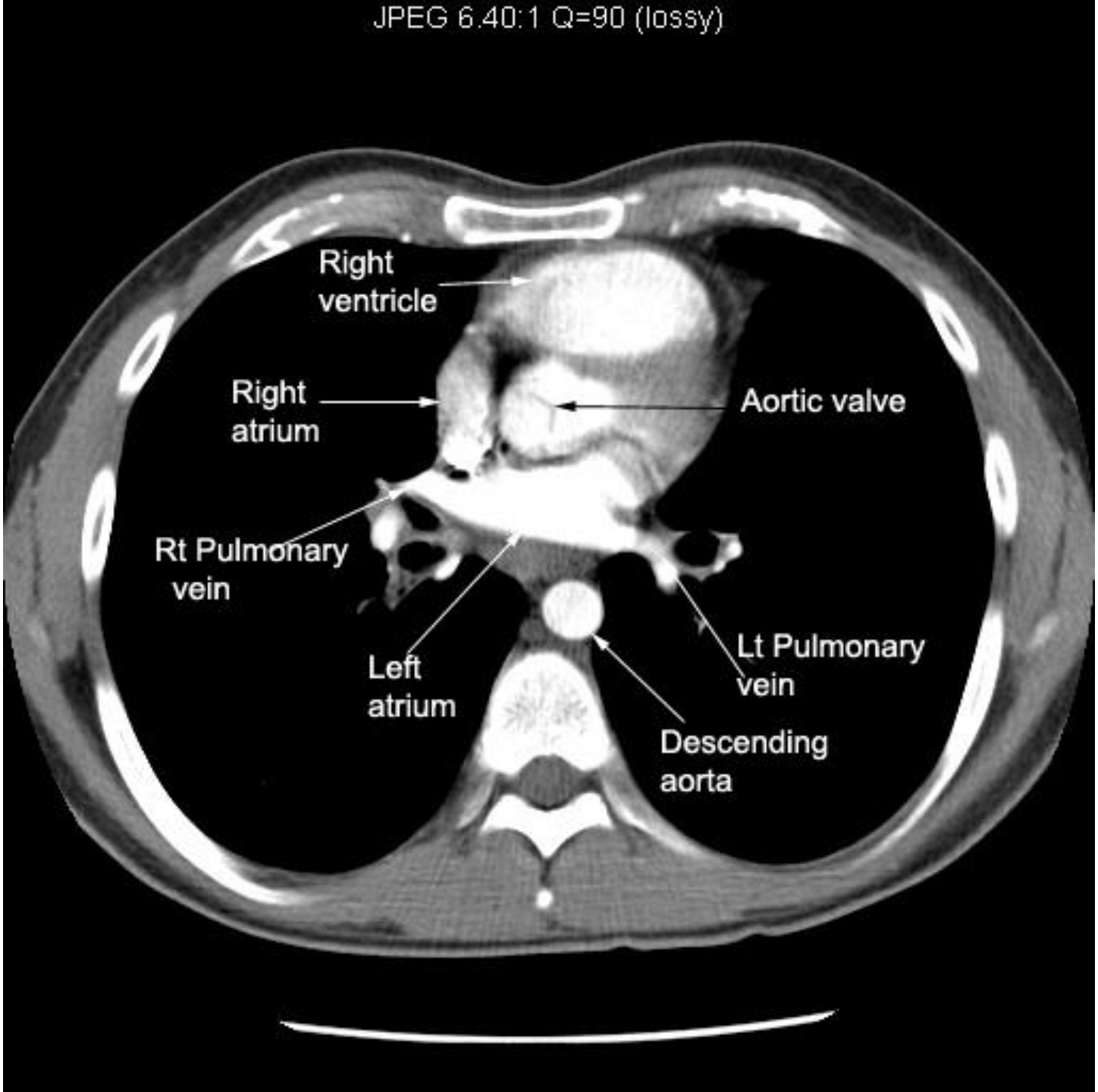
C

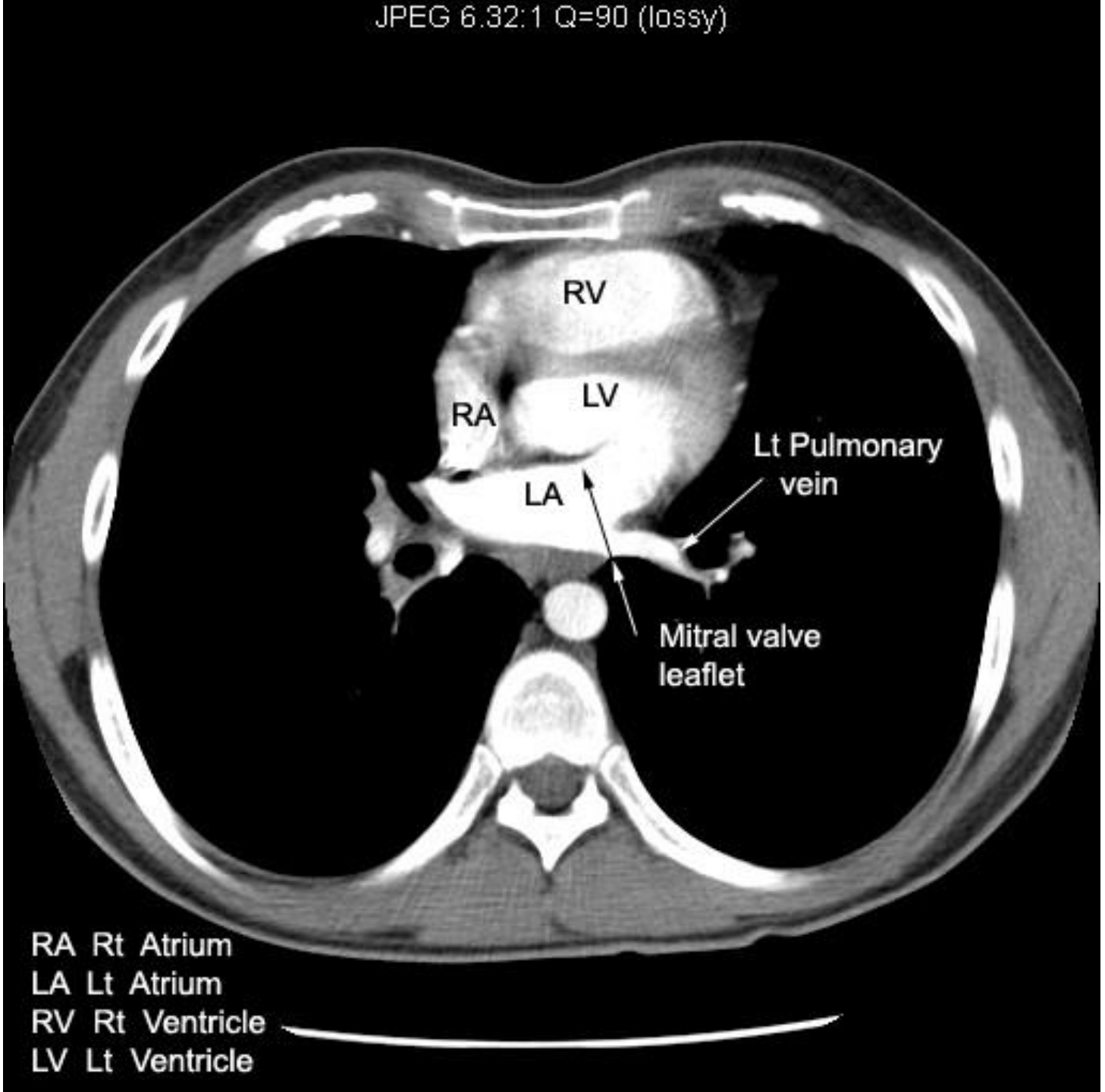

Apex of heart
RV
LV
AV
TV
PV
RA
LA
Septum
Apex of heart
Papillary muscles
Tricuspid valve
Aortic valve
Mitral valve
Right atrium
Interatrial septum
Left atrium

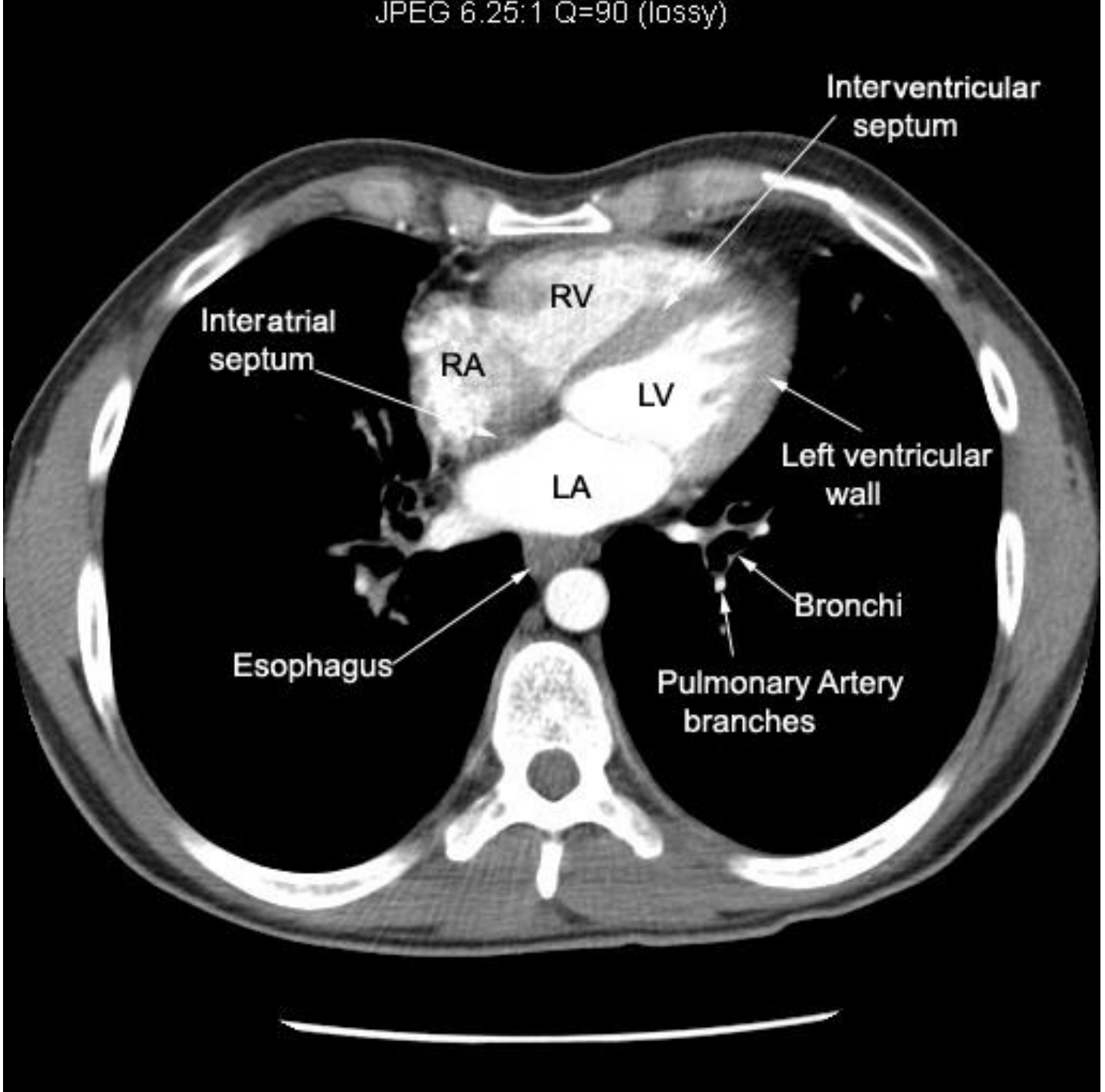
CT-Scan

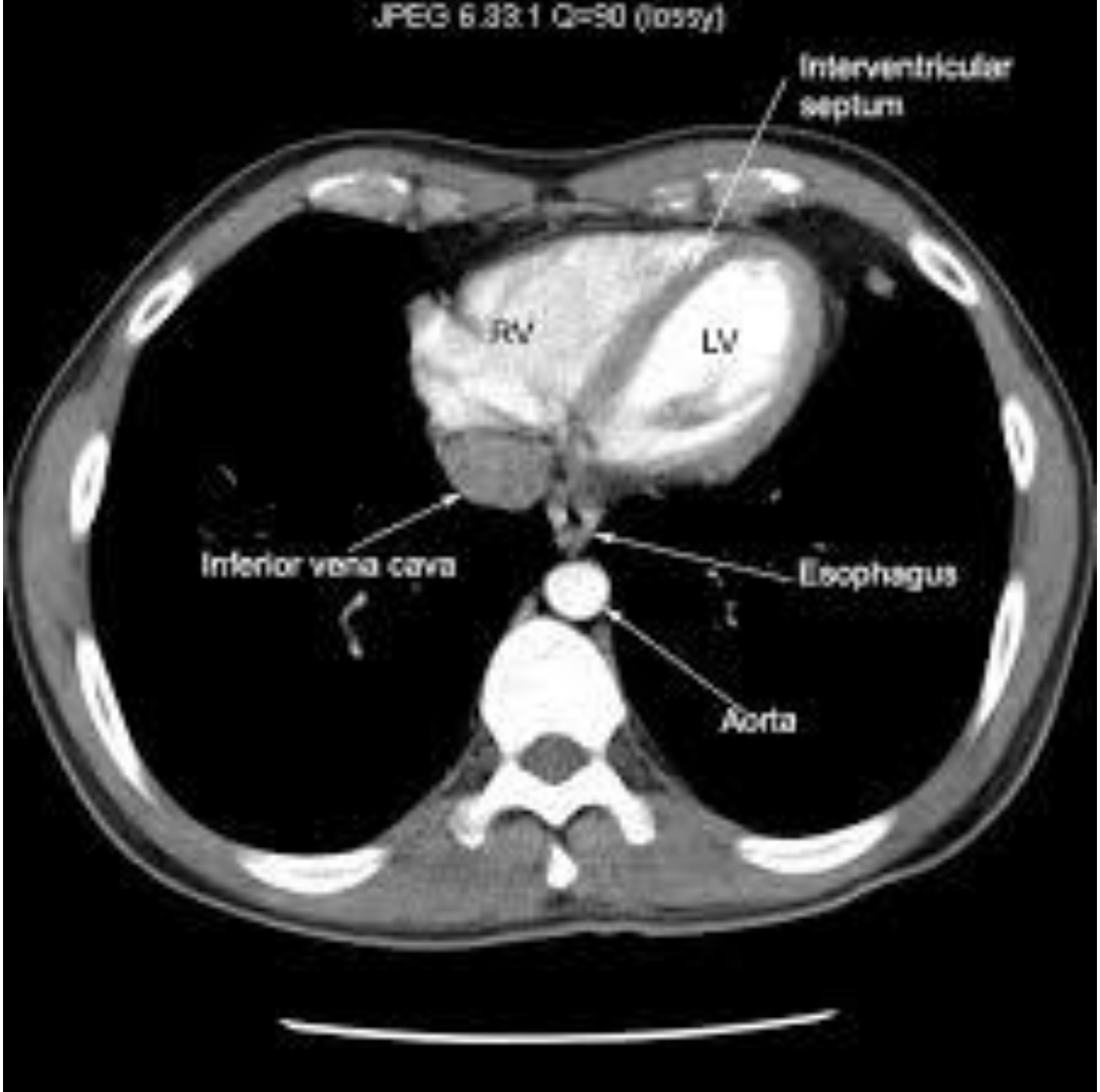

Ascending aorta
Main Pulmonary Artery
SVC
Lt.Pulmonary artery
Rt .Pulmonary artery
Lt main stem bronchus
Rt main stem bronchus
Aorta

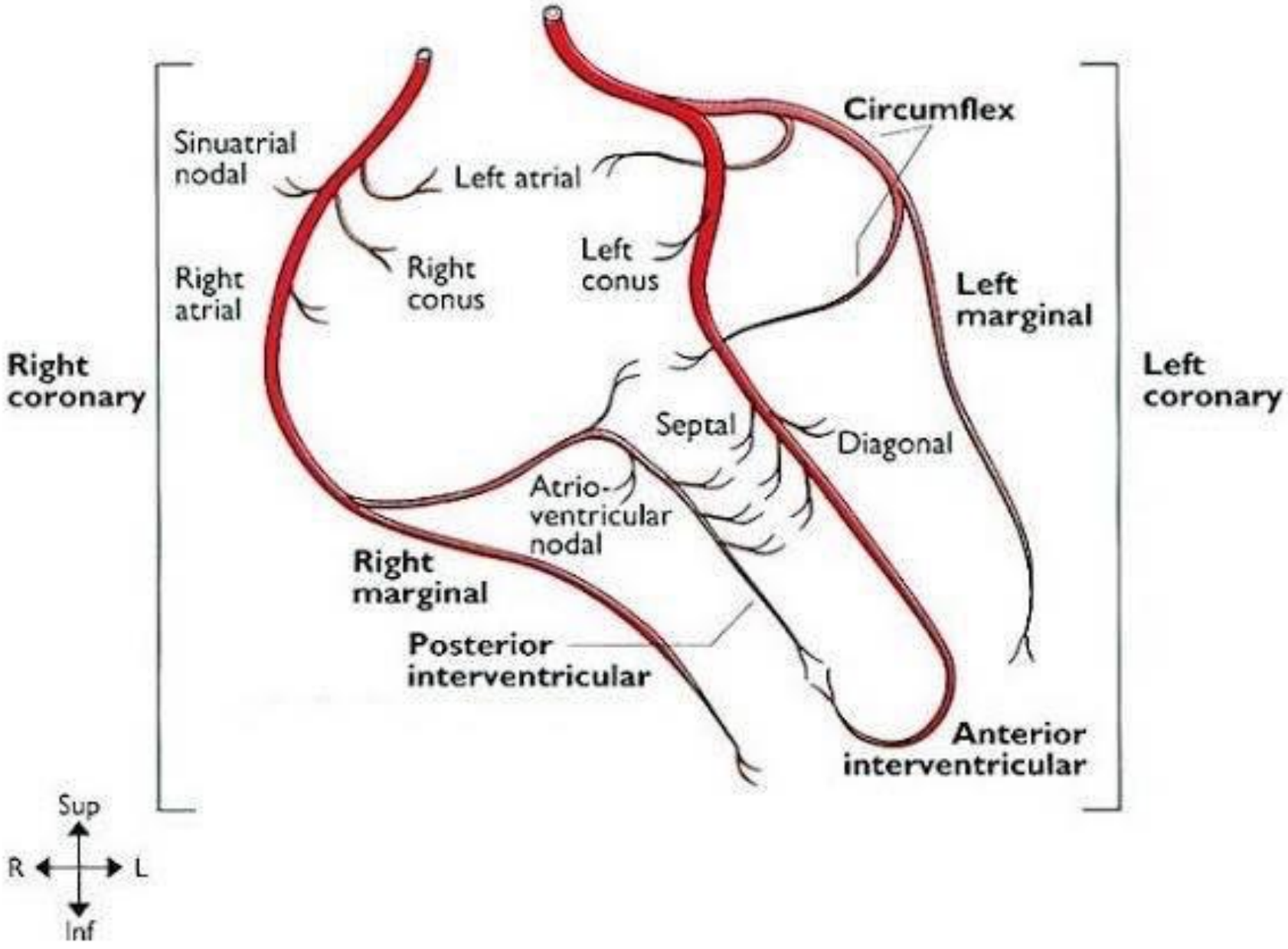

RV
RA
AORTIC ROOT
LV
PULMONARY VEIN
LEFT ATRIUM
PULMONARY VEIN
TRUE LUMEN
FALSE LUMEN


JPEG 6.40:1 Q=90 (lossy)
Right ventricle
Right atrium
Aortic valve
Rt Pulmonary vein
Left atrium
Lt Pulmonary vein
Descending aorta

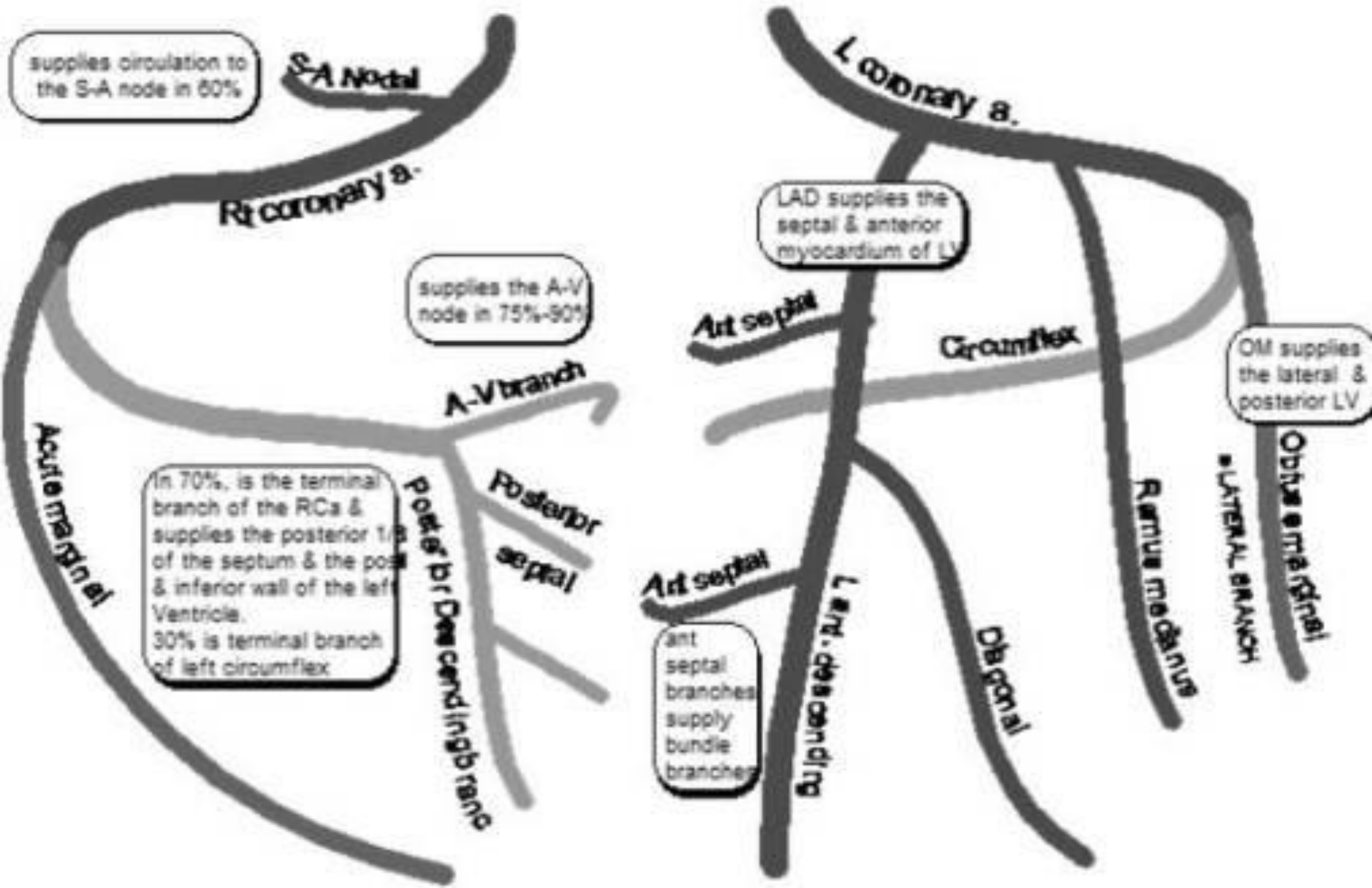

JPEG 6.32:1 Q=90 (lossy)
RV
LV
RA
LA
Lt Pulmonary vein
Mitral valve leaflet
RA Rt Atrium
LA Lt Atrium
RV Rt Ventricle
LV Lt Ventricle


JPEG 6.25:1 Q=90 (lossy)
Interventricular septum
RV
Interatrial septum
RA
LV
Left ventricular wall
LA
Bronchi
Esophagus
Pulmonary Artery branches

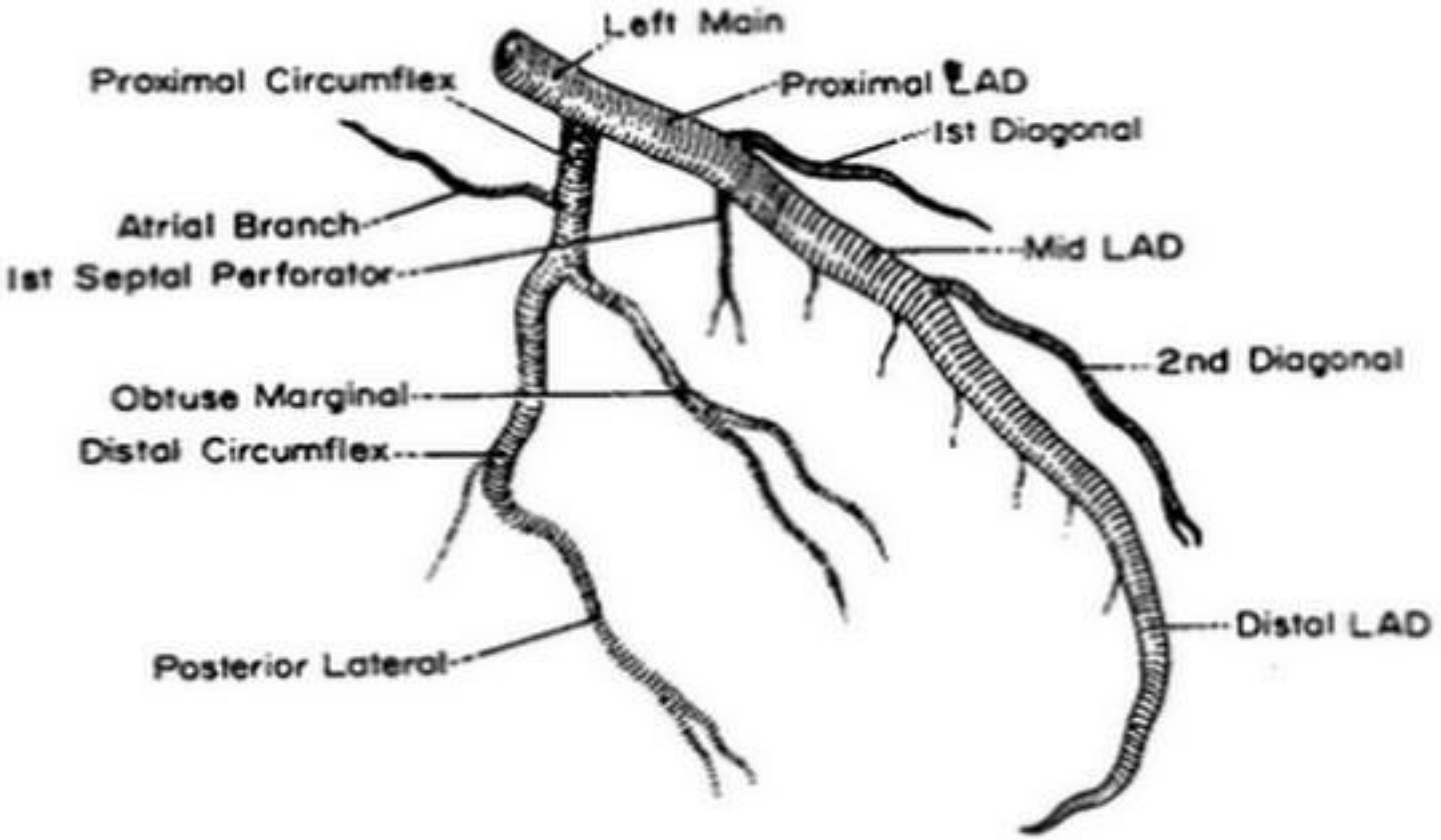

JPEG 6.33:1 Q=90 (lossy)
Interventricular septum
RV
LV
Inferior vena cava
Esophagus
Aorta



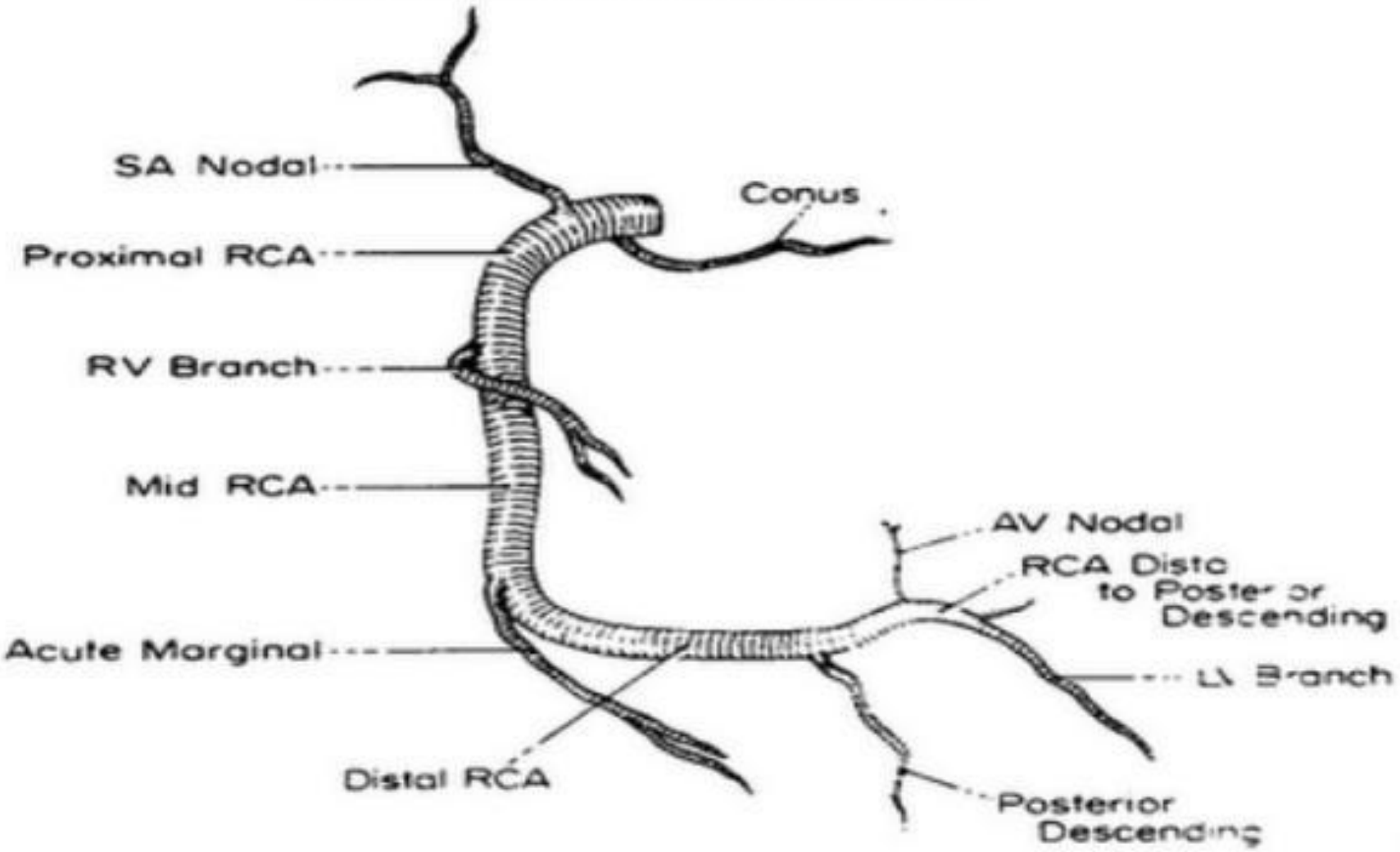
Coronary arteries

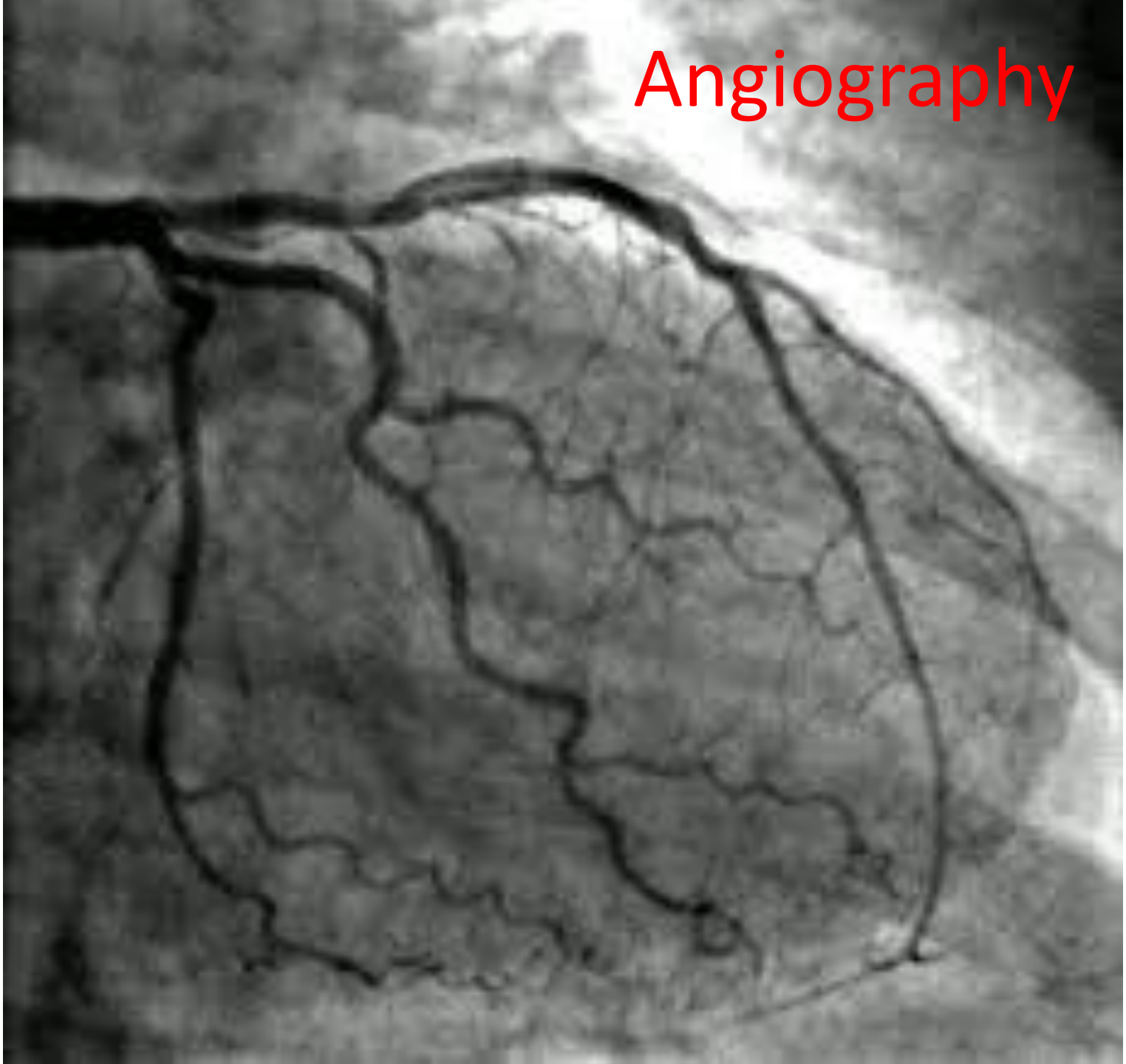

supplies circulation to the S-A node in 60%
S-A Nodal
Rt coronary a.
supplies the A-V node in 75%-90%
A-V branch
In 70%, is the terminal branch of the RCa & supplies the posterior 1/3 of the septum & the post & inferior wall of the left Ventricle.
30% is terminal branch of left circumflex
Acute marginal
Posterior septal
Posterior Descending branch
L coronary a.
LAD supplies the septal & anterior myocardium of LV
Art septal
Circumflex
OM supplies the lateral & posterior LV
Obtuse marginal
LATERAL BRANCH
Ramus medianus
Art septal
ant septal branches supply bundle branches
Lant. descending
Diagonal

LEFT CORONARY ARTERY (Right Oblique)

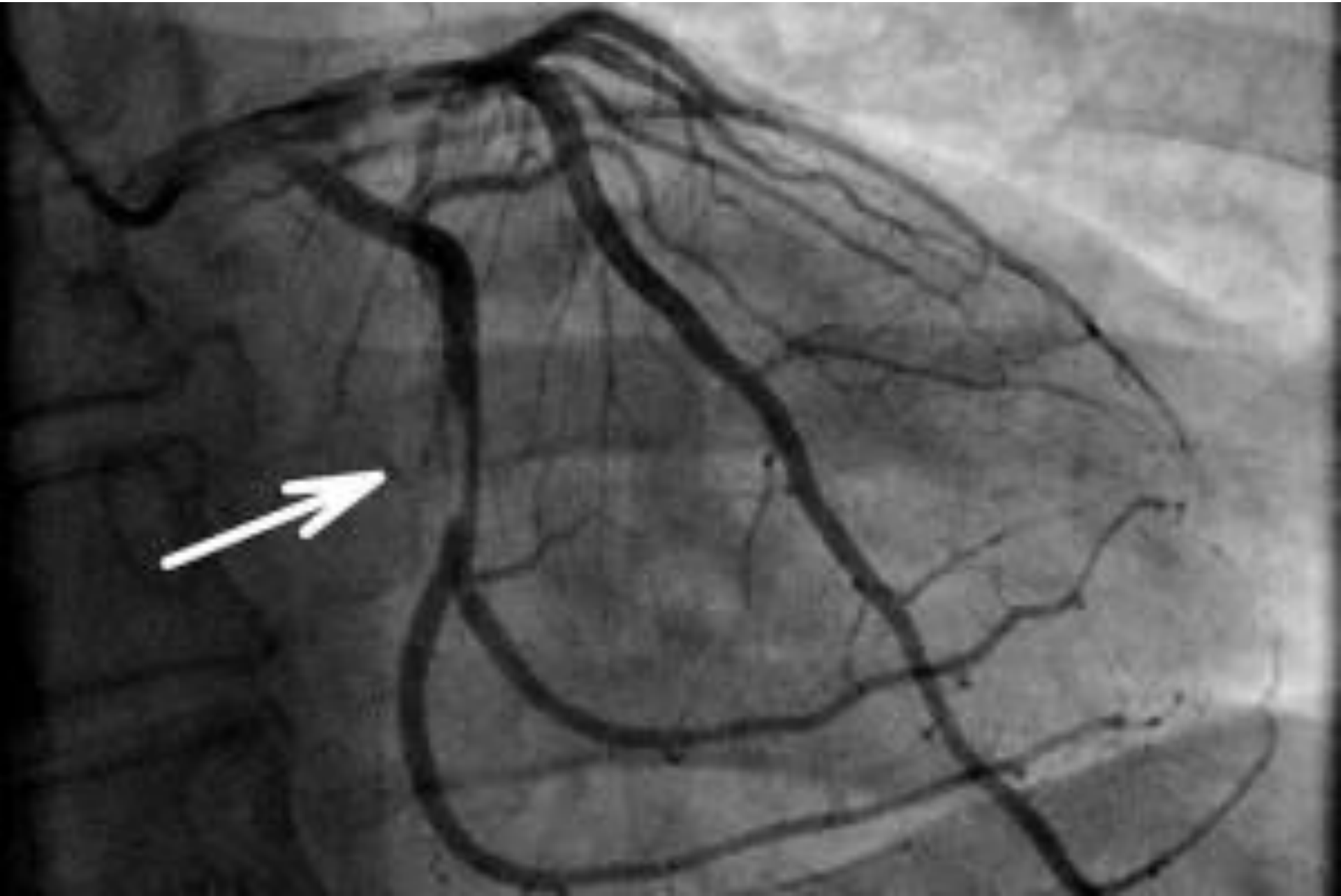


RIGHT CORONARY ARTERY




Angiography

Left coronary a. stenosis



Cardiac Bypass surgeries