256 shades of gray: Exploring your body with medical imaging

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MD Anderson Cancer Center

Learning objectives

1. Review radiologic imaging planes and projections.
2. Identify major structures in medical images of the human body.
3. Examine how disease processes affect normal anatomy and their impact on medical images.

ANATOMIC PLANES AND PROJECTIONS

Anatomic planes

Axial

Coronal

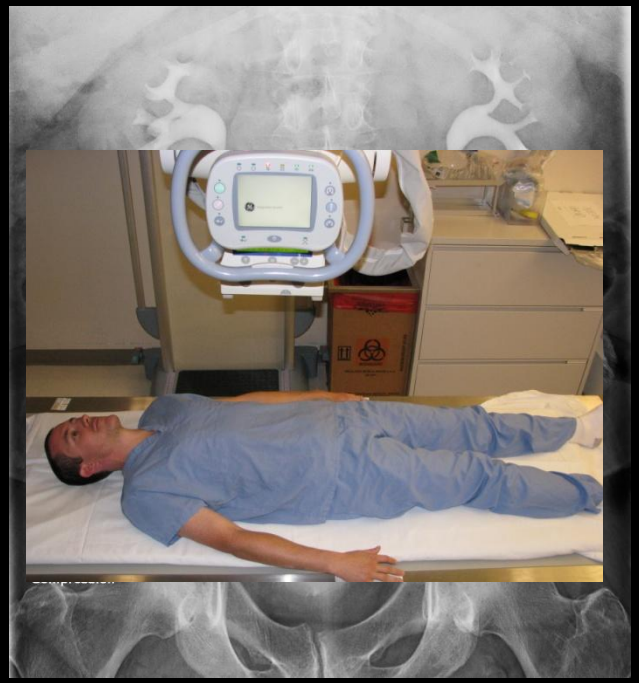
Sagittal

Radiographic projections

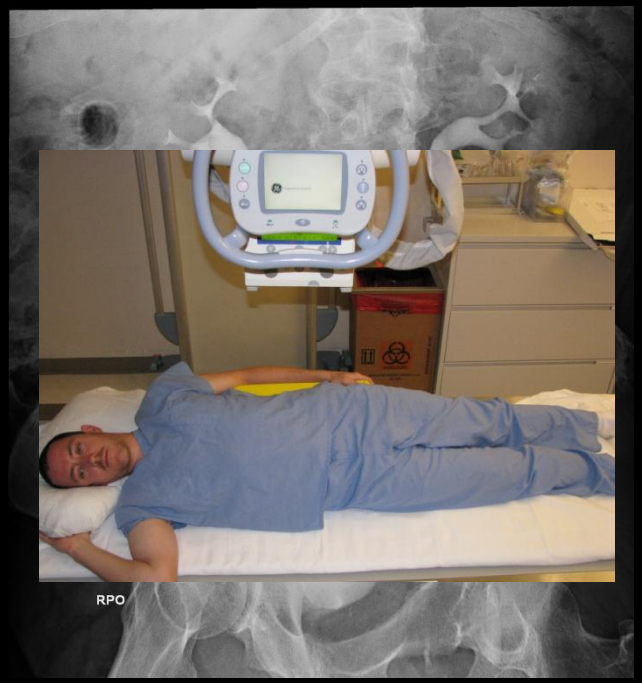
Posteroanterior (PA)

Left lateral (LL)

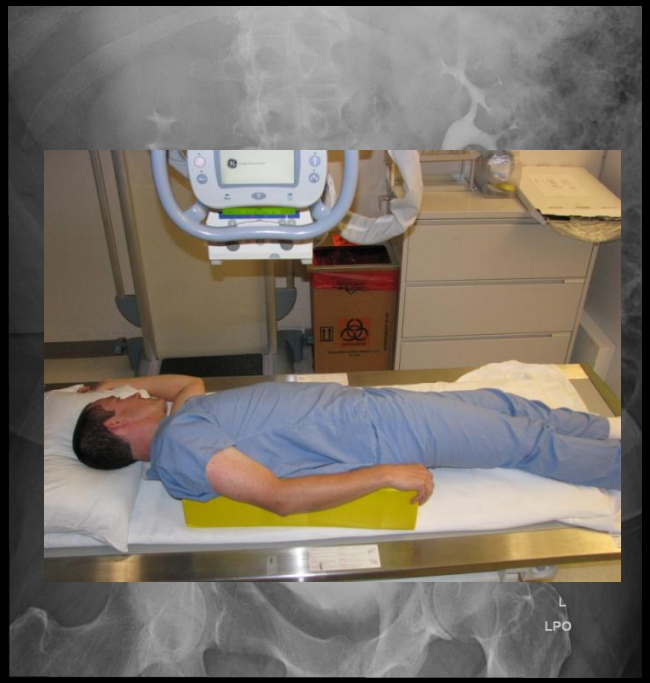
Radiographic projections



Anteroposterior (AP)

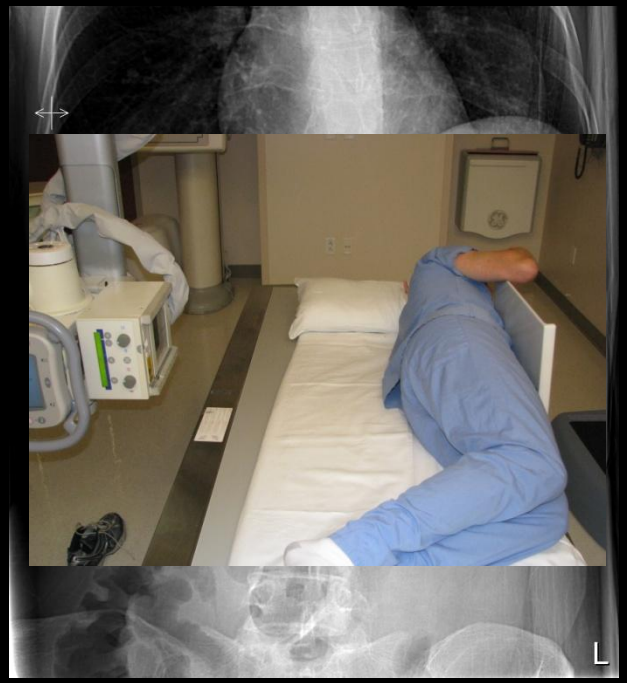


Right posterior oblique (RPO)

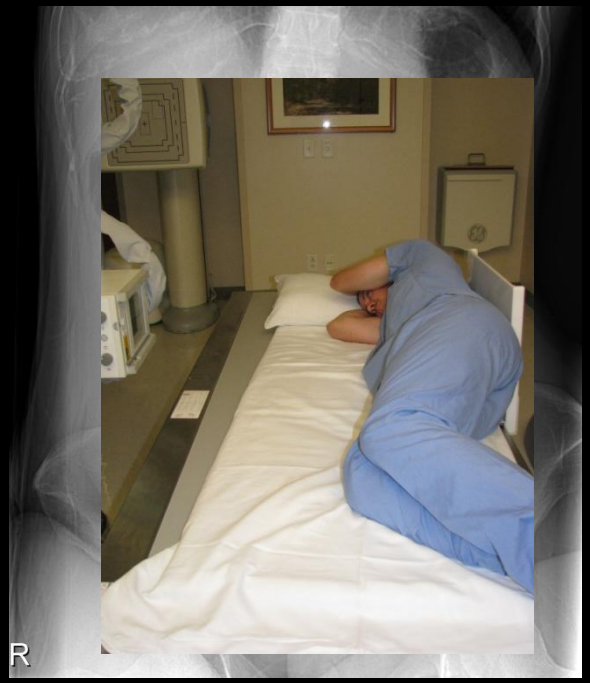


Left posterior oblique (LPO)

Radiographic projections



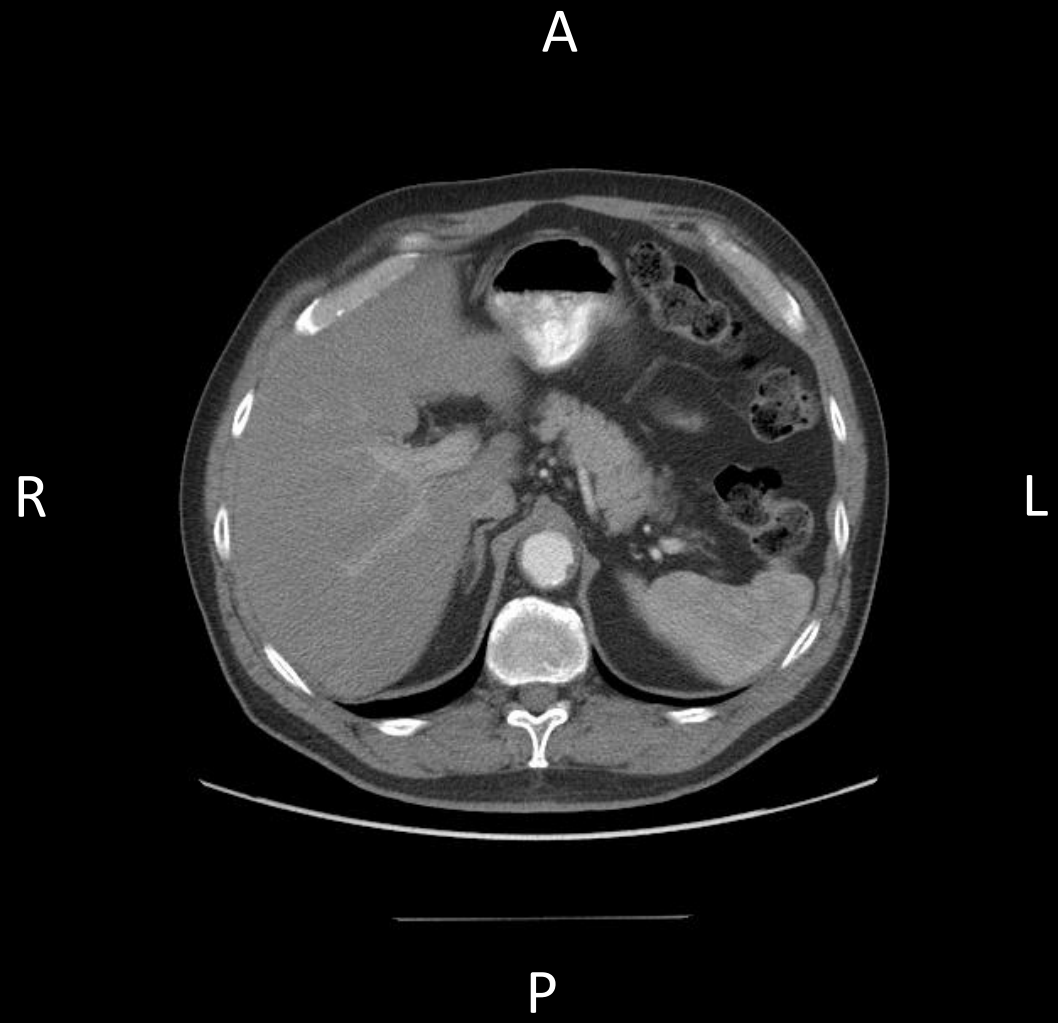
Left decubitus

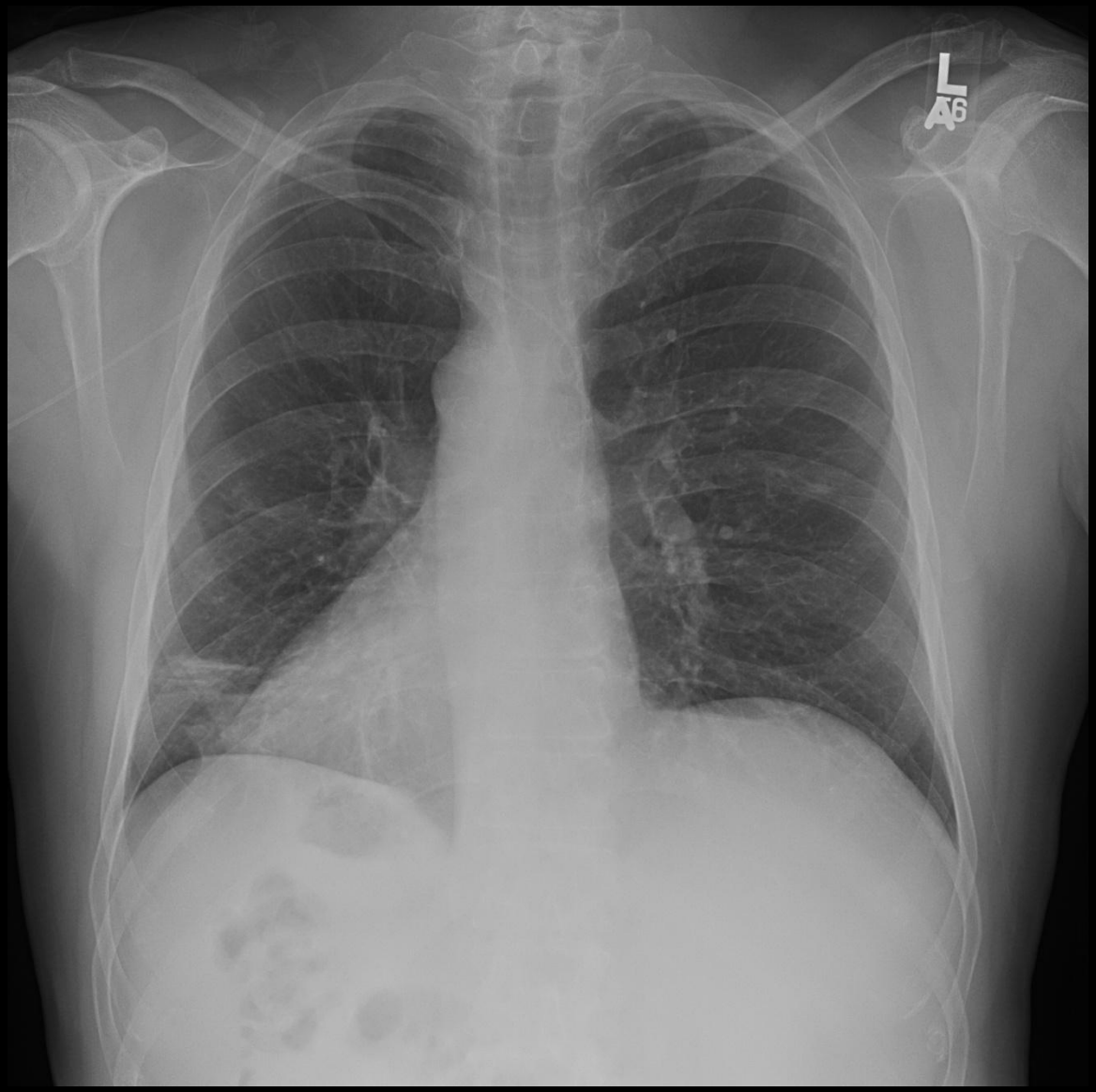


Right decubitus

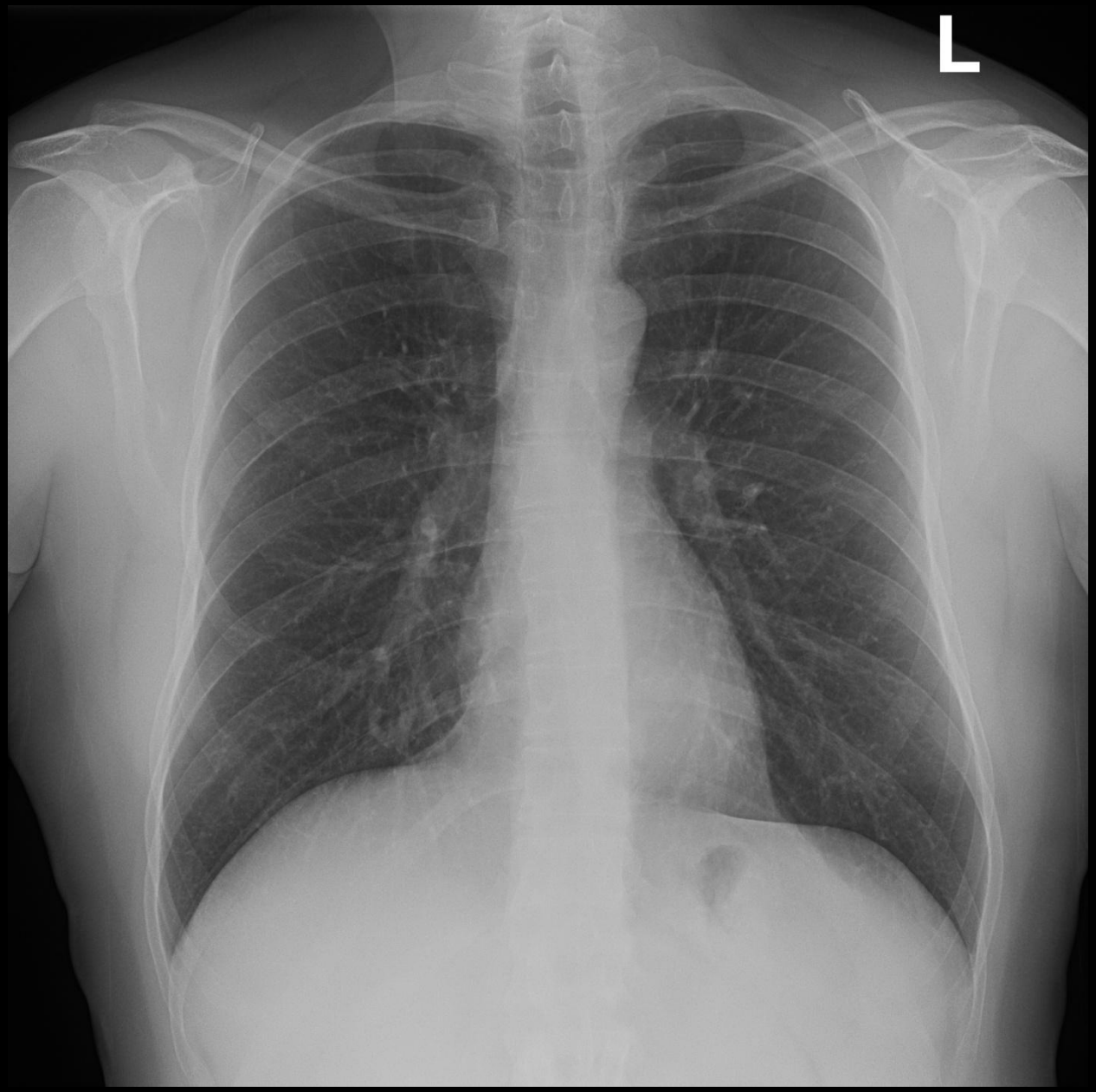
AP

Cross-sectional conventions



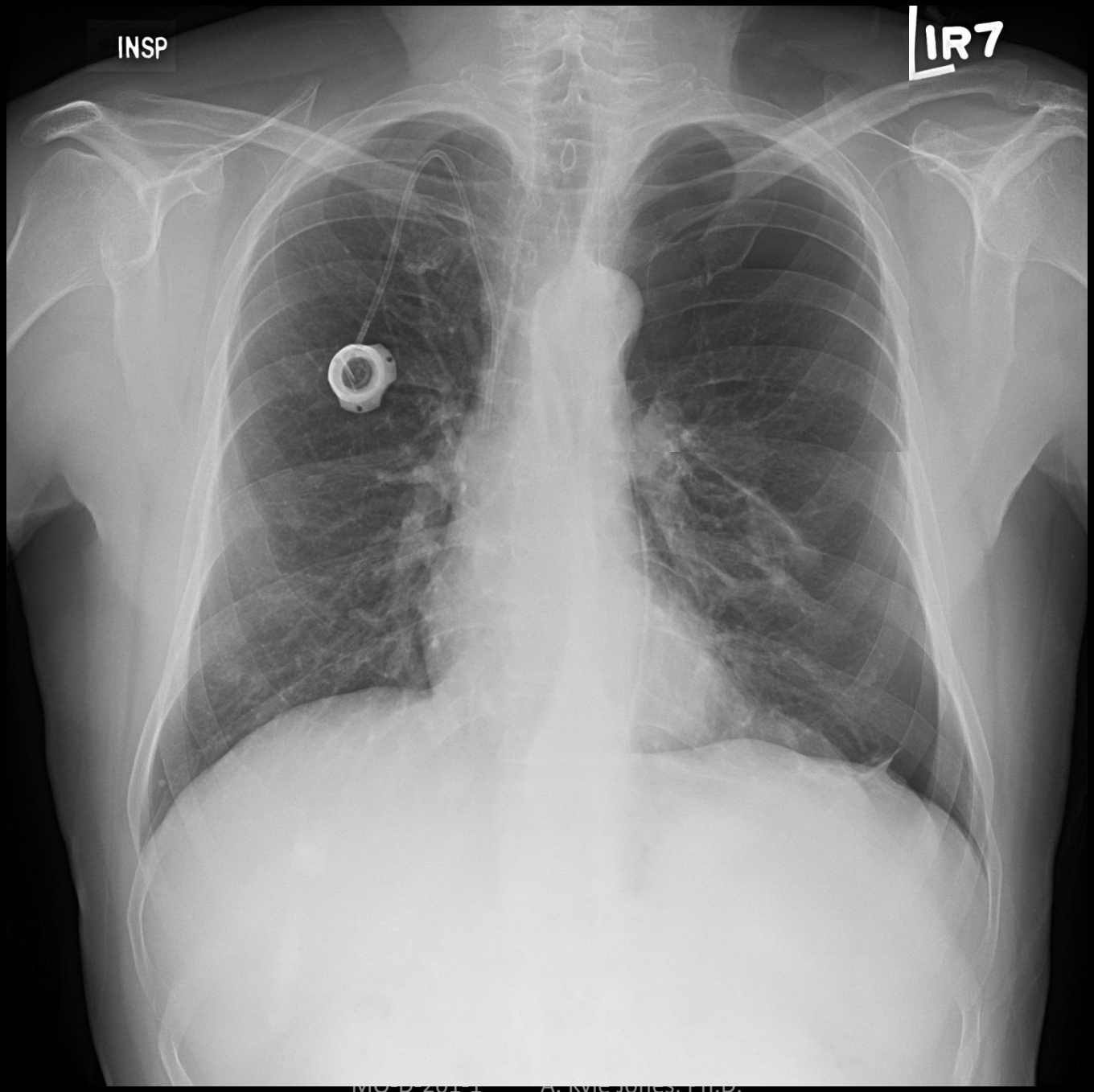

L
A6

THE CHEST



- Apex
- Cardiac shadow
- Aortic arch
- Hilum
- Carina
- Costophrenic angle
- Mediastinum
- Thoracic inlet

- Apex
- Aortic arch
- Trachea
- Retrosternal space
- Retrocardiac space
- Raider's triangle
- Hilum
- Mediastinum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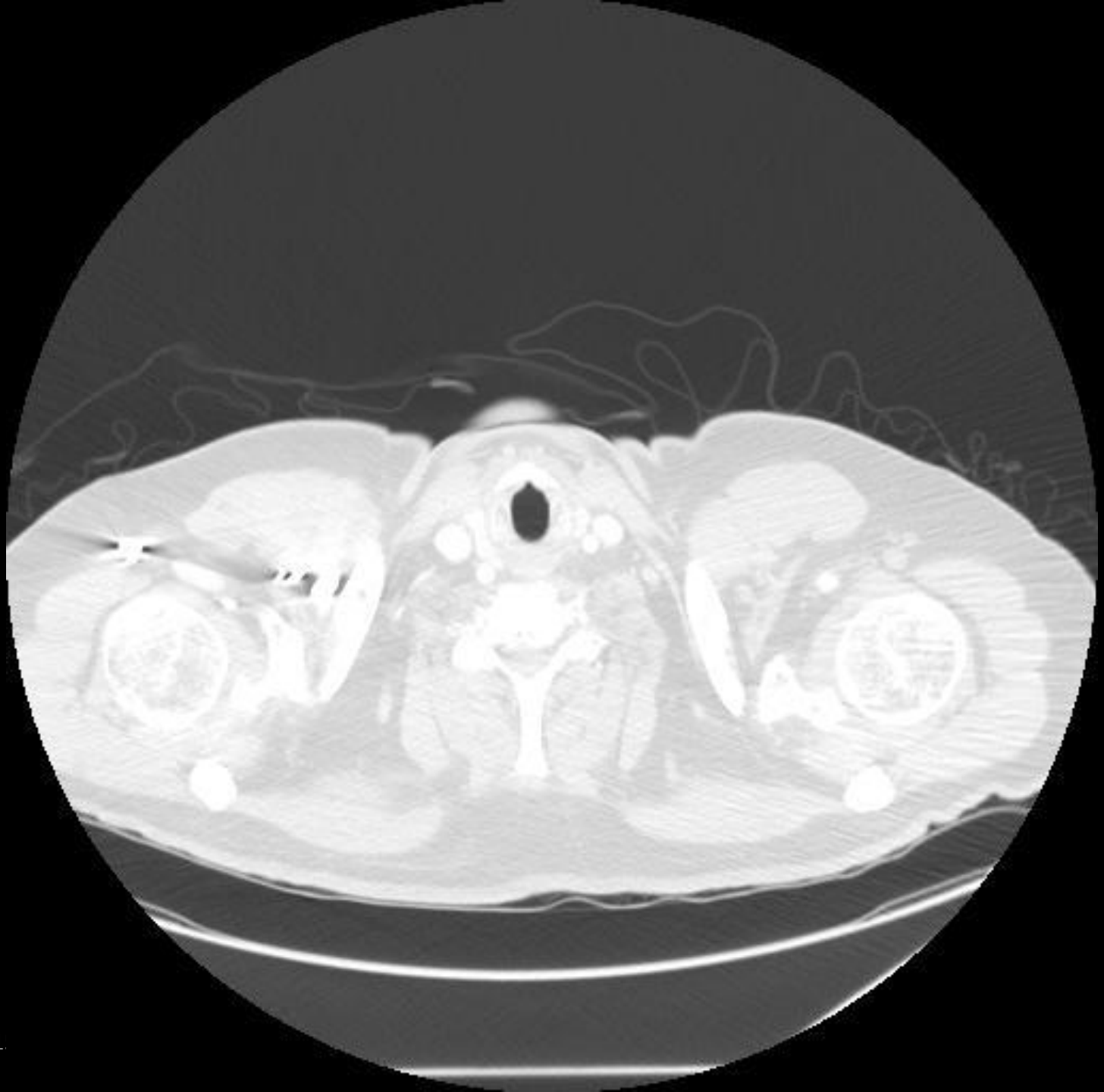
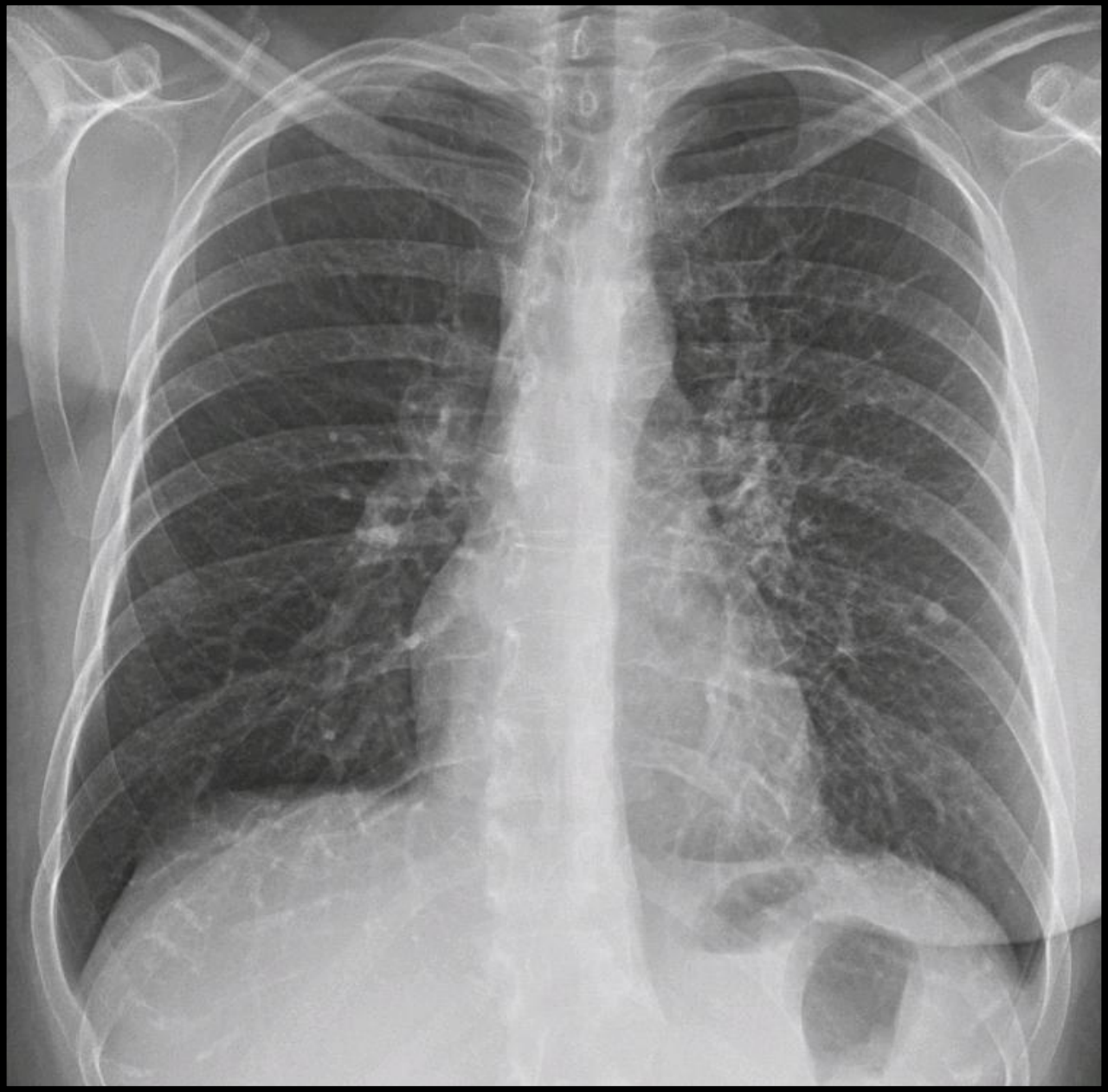
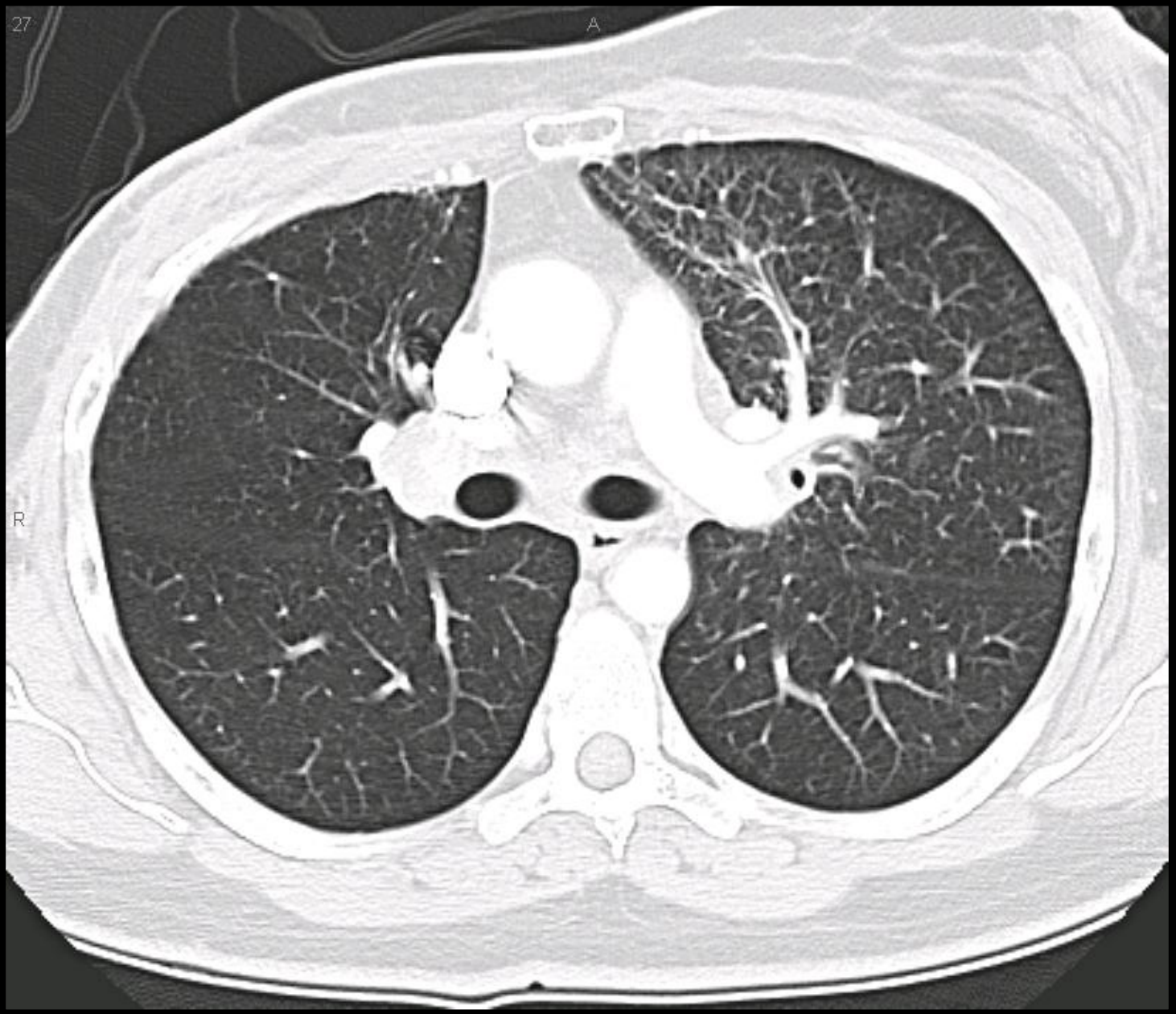
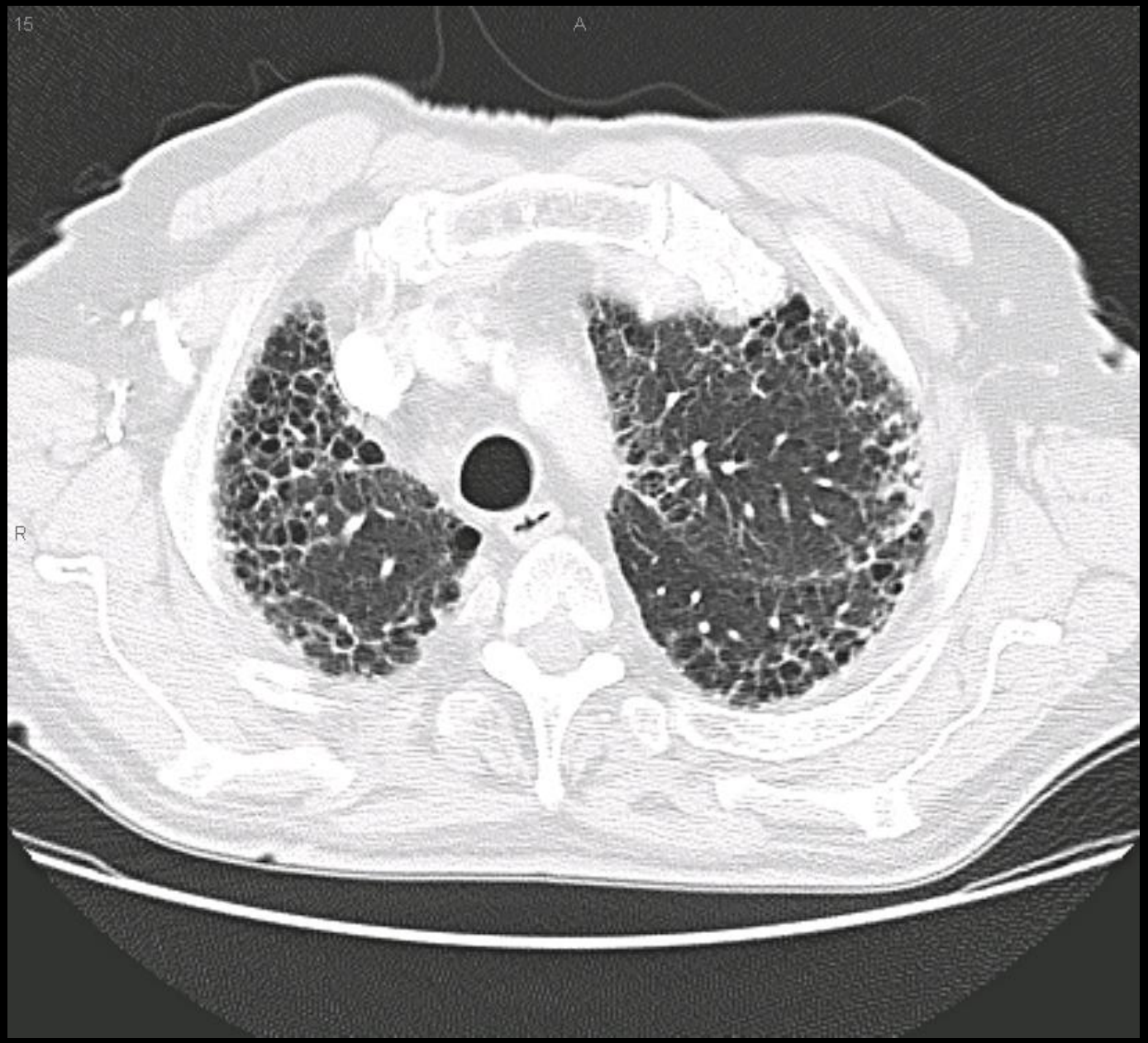
LIR7






27
A
R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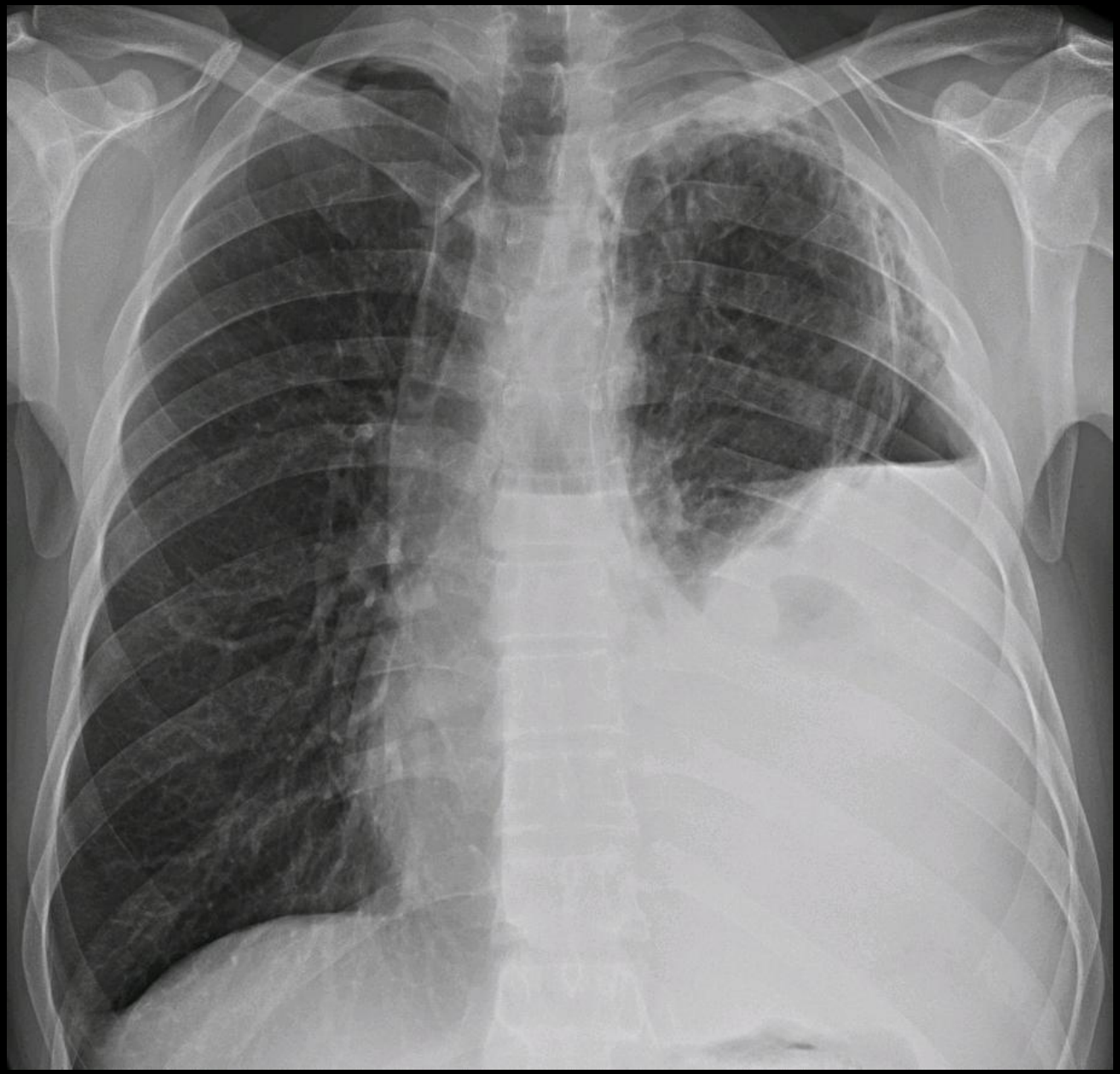
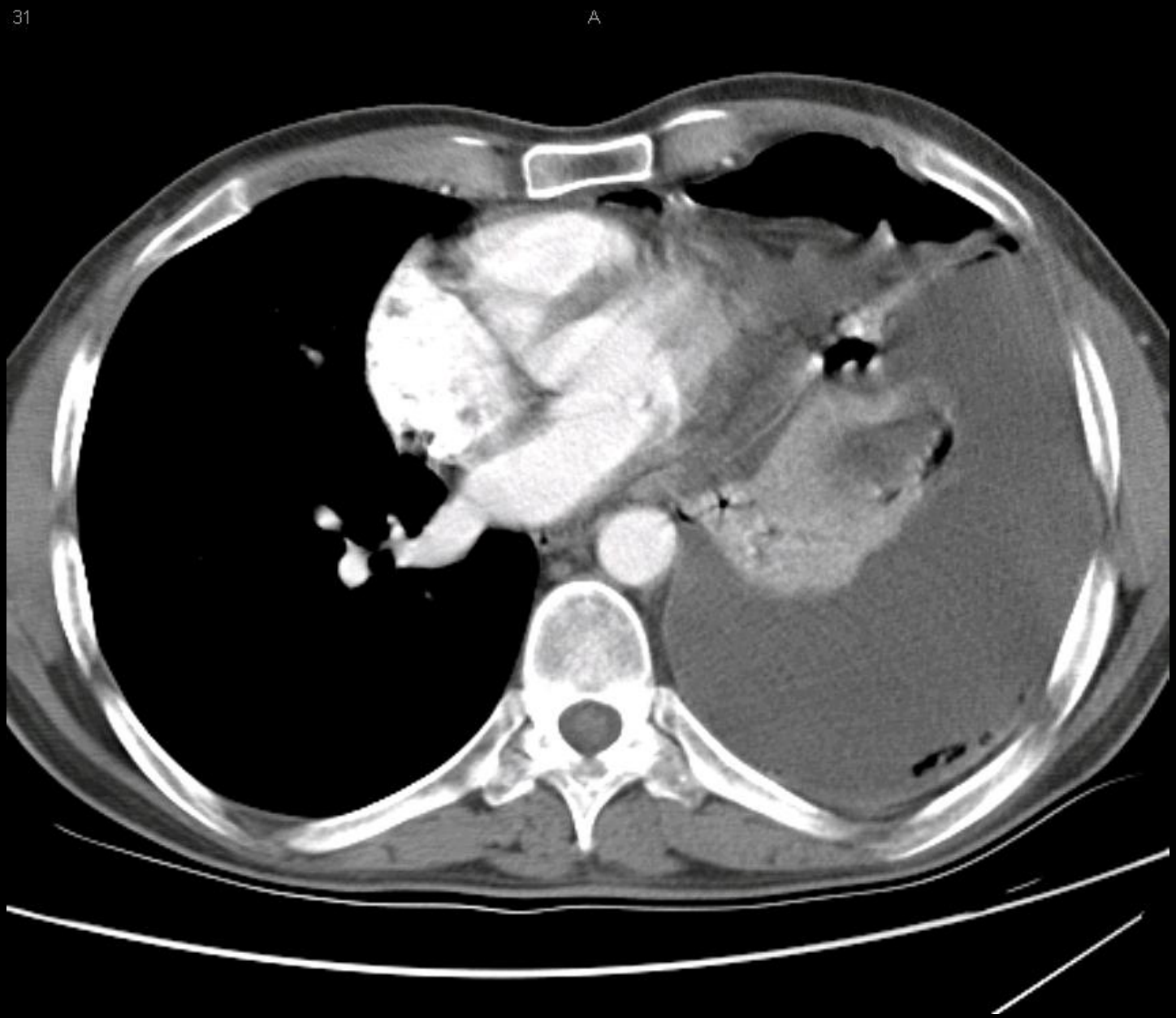
A
R

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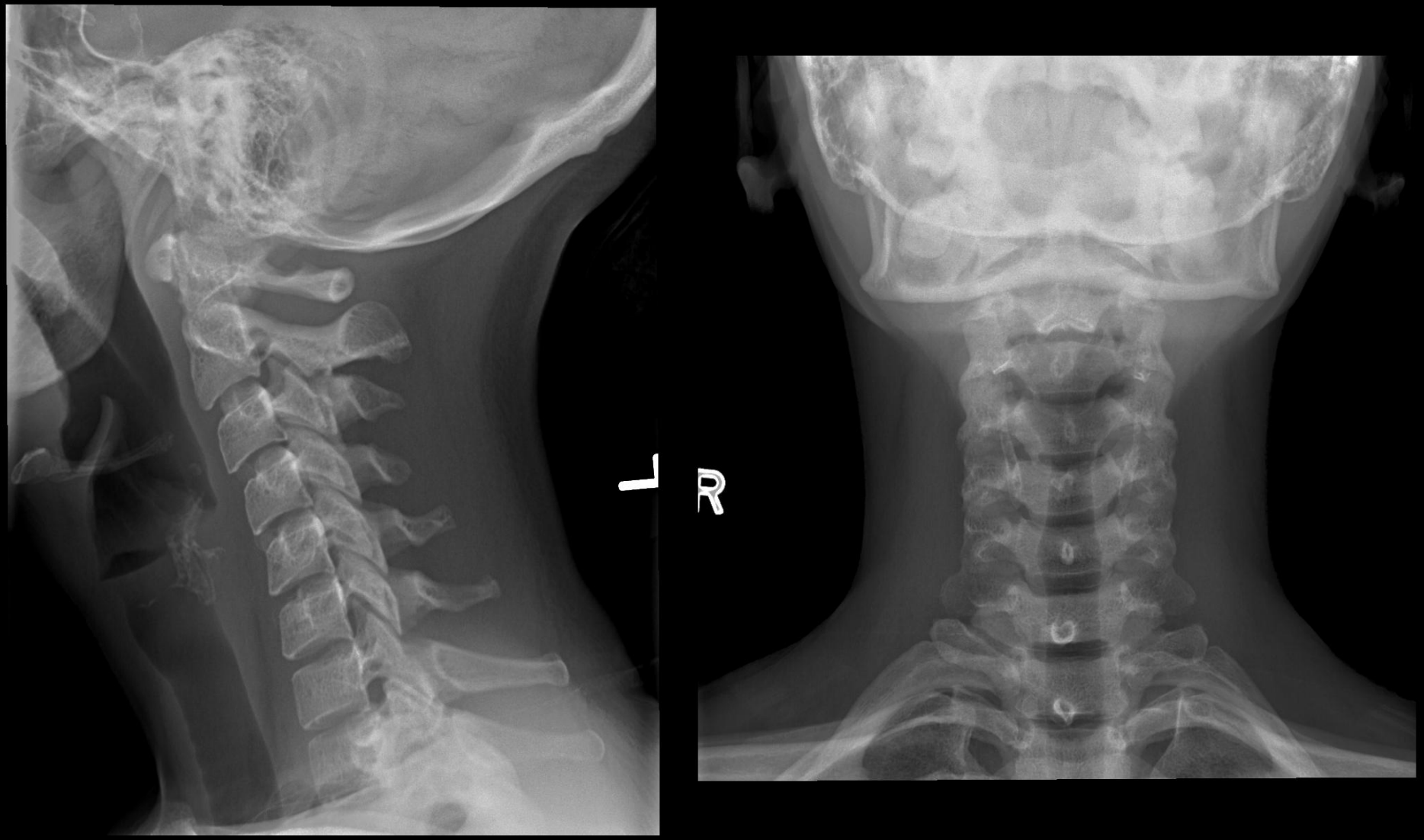
SKELETAL ANATOMY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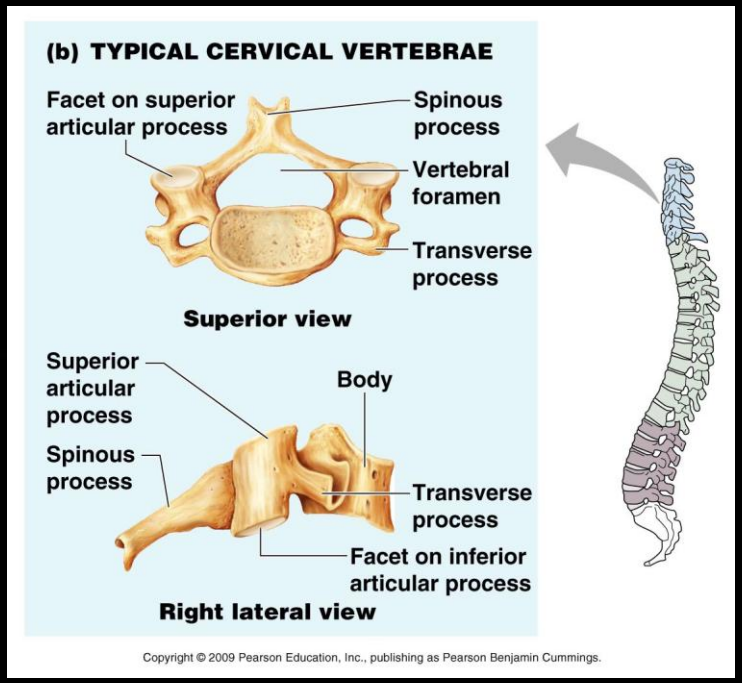
(b) TYPICAL CERVICAL VERTEBRAE
Facet on superior articular process
Spinous process
Vertebral foramen
Transverse process
Superior view
Superior articular process
Body
Spinous process
Transverse process
Facet on inferior articular process
Right lateral view
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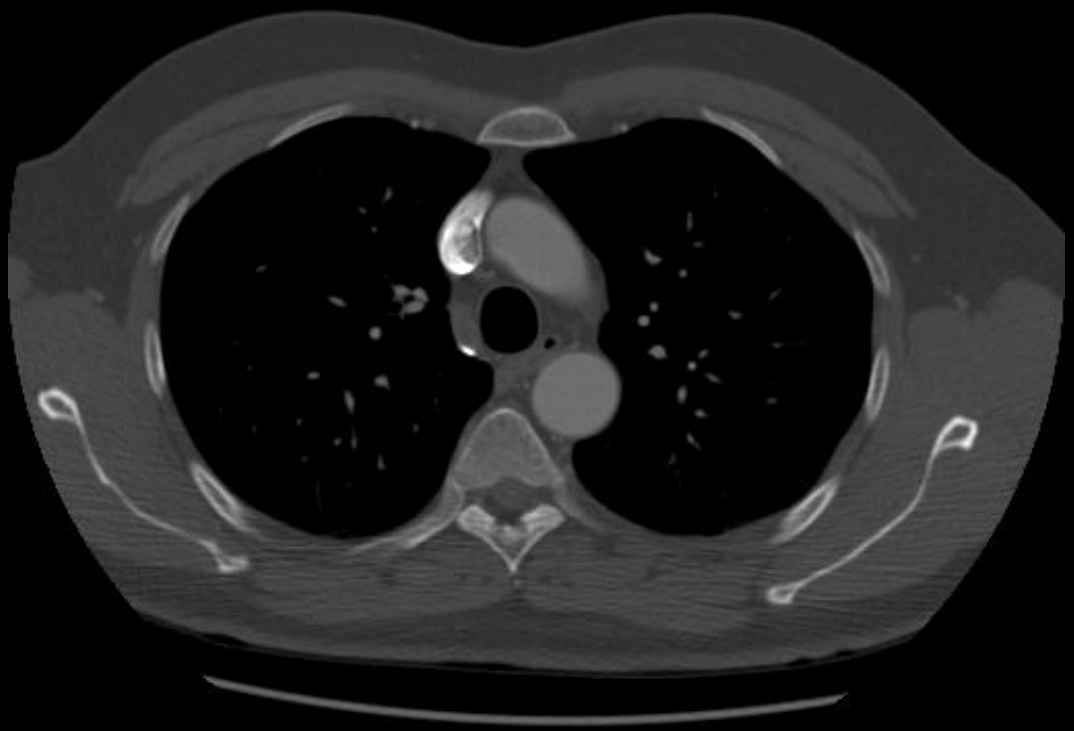
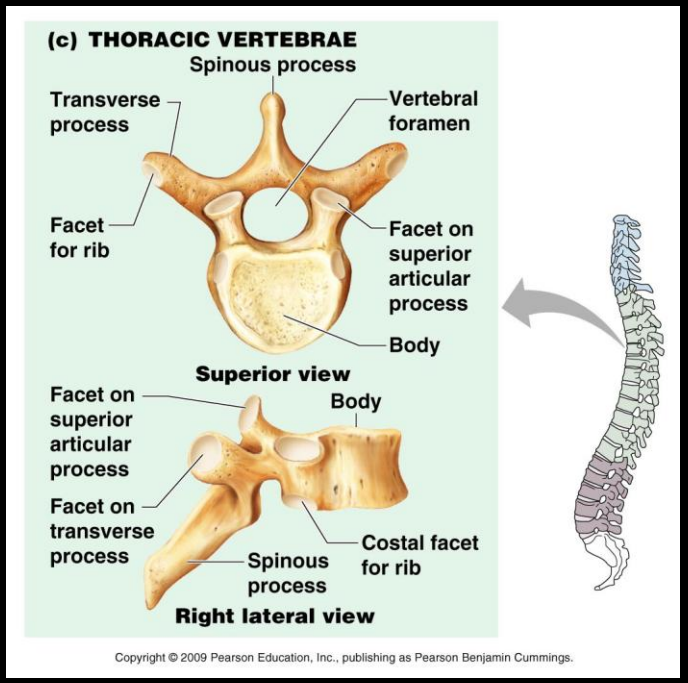
L




(c) THORACIC VERTEBRAE
Spinous process
Transverse process
Vertebral foramen
Facet for rib
Facet on superior articular process
Body
Superior view
Facet on superior articular process
Body
Facet on transverse process
Costal facet for rib
Spinous process
Right lateral view
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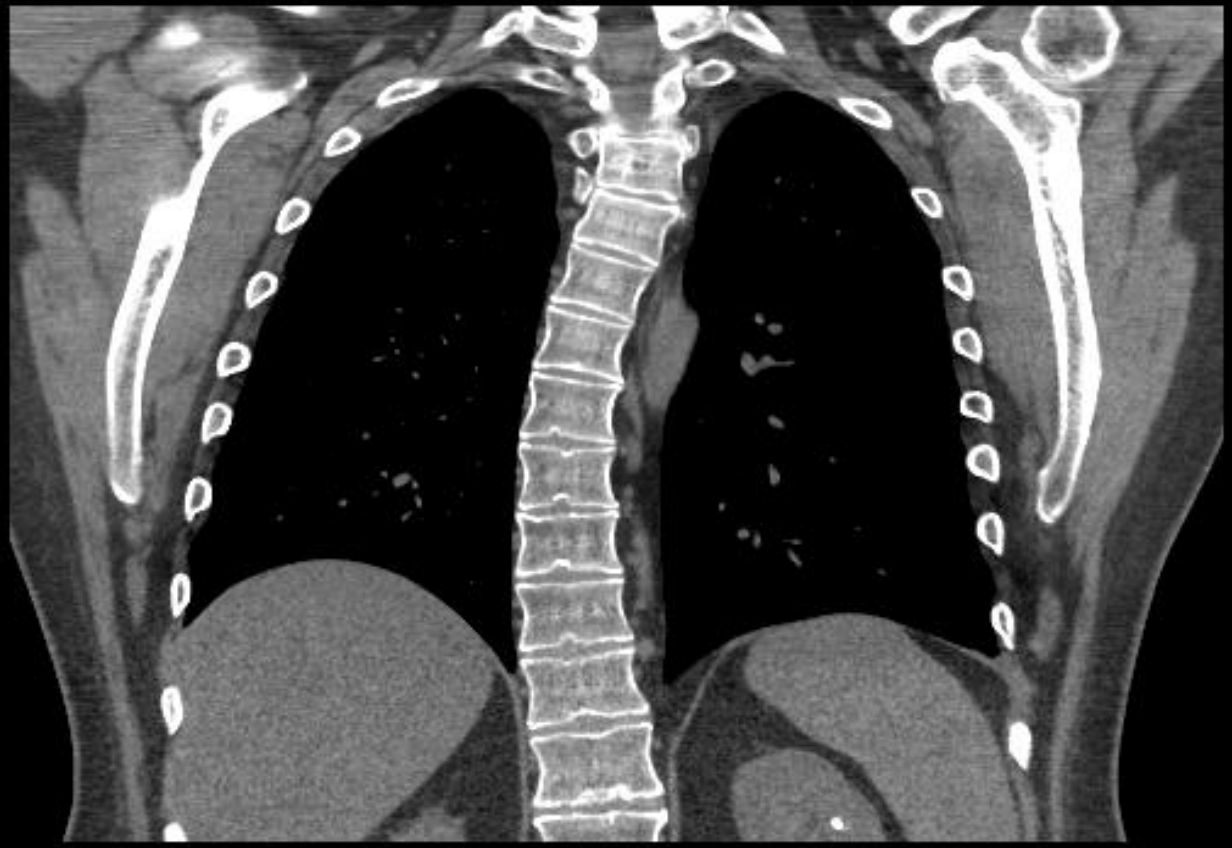

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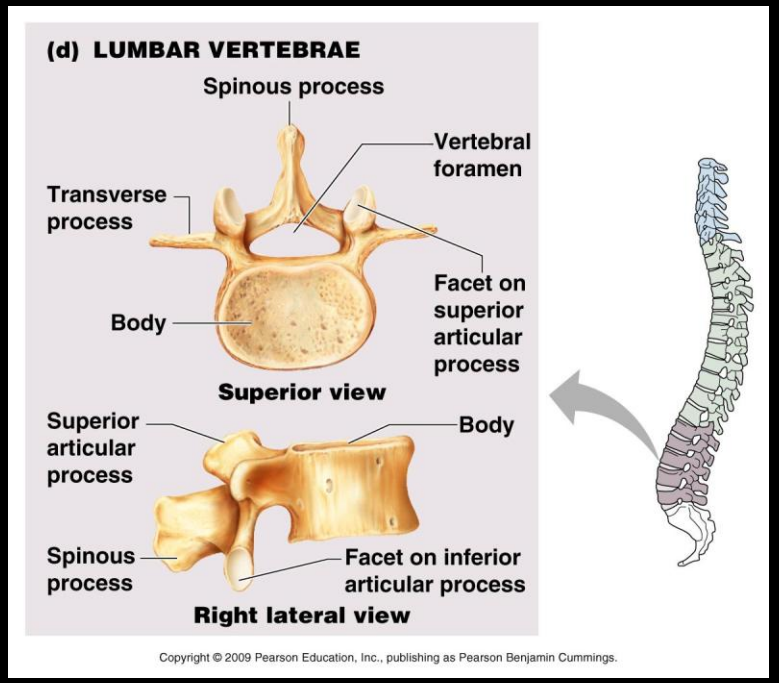
(d) LUMBAR VERTEBRAE
Spinous process
Vertebral foramen
Transverse process
Facet on superior articular process
Body
Superior view
Superior articular process
Body
Spinous process
Facet on inferior articular process
Right lateral view
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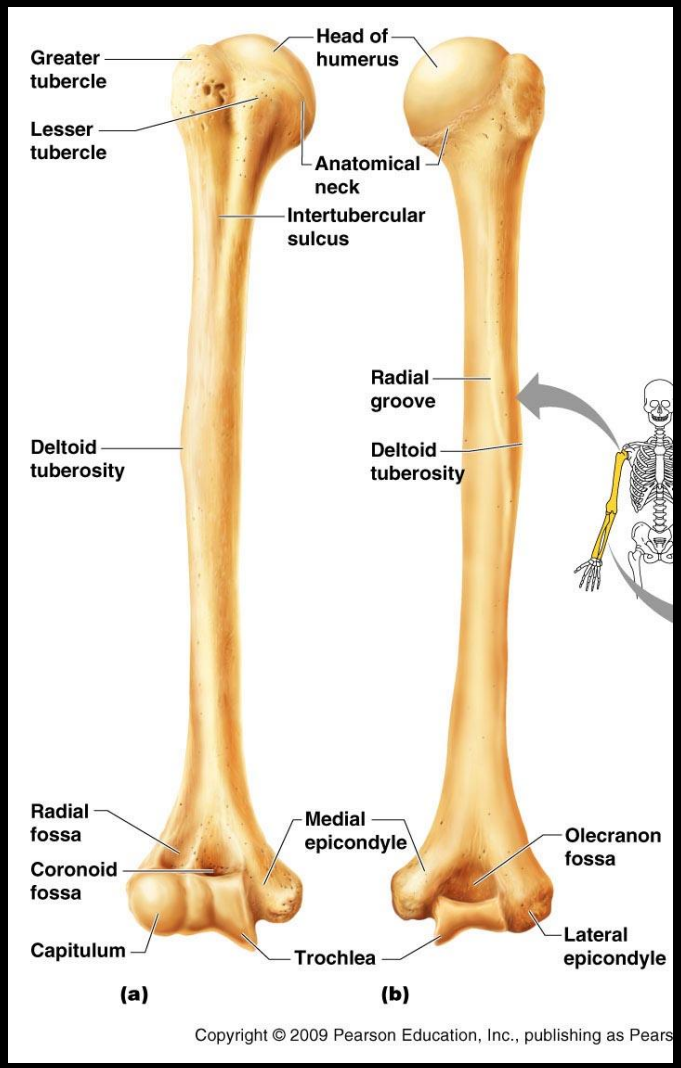
Greater tubercle
Head of humerus
Lesser tubercle
Anatomical neck
Intertubercular sulcus
Radial groove
Deltoid tuberosity
Deltoid tuberosity
Radial fossa
Medial epicondyle
Olecranon fossa
Coronoid fossa
Capitulum
Trochlea
Lateral epicondyle
(a)
(b)
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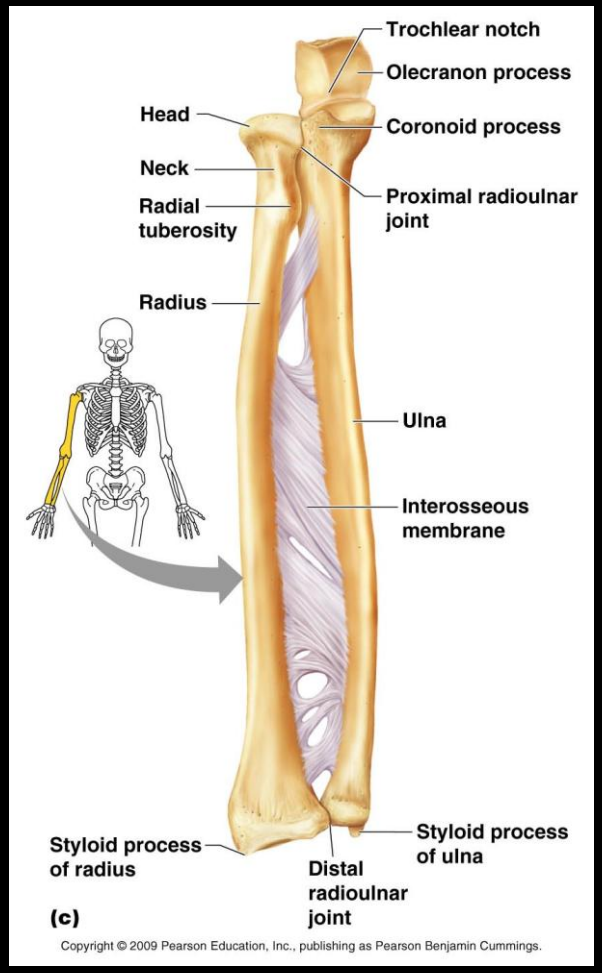
Trochlear notch
Olecranon process
Head
Coronoid process
Neck
Proximal radioulnar joint
Radial tuberosity
Radius
Ulna
Interosseous membrane
Styloid process of radius
Distal radioulnar joint
Styloid process of ulna
(c)
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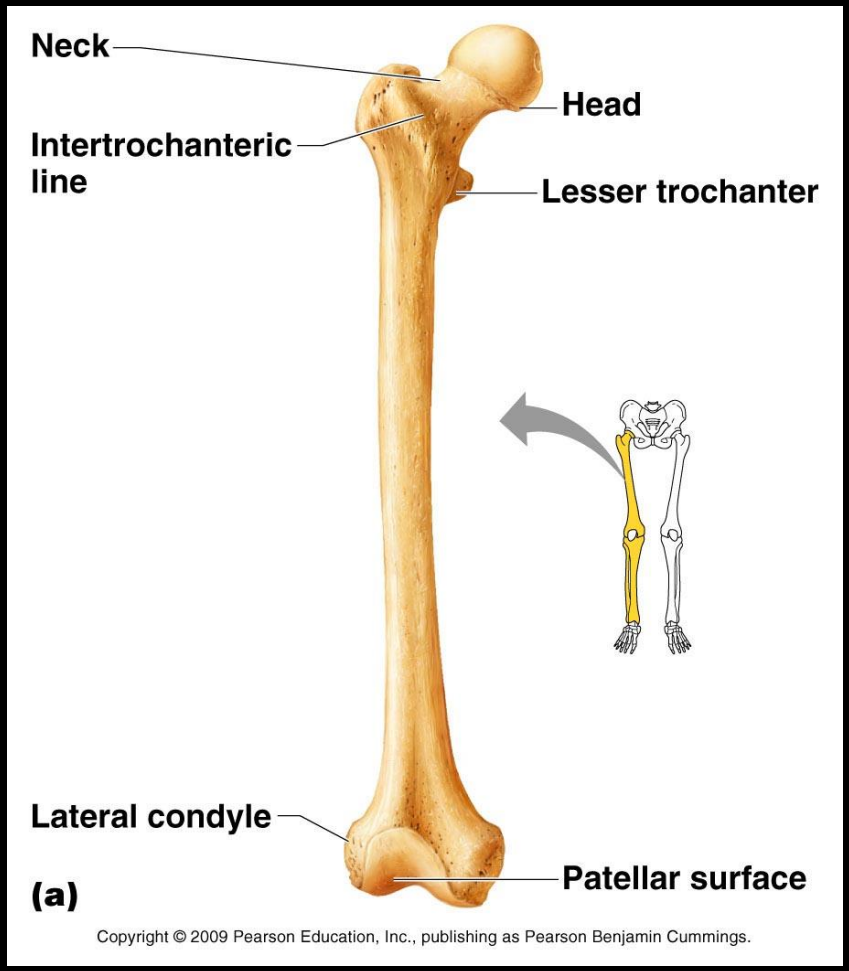
L
17

L

R

R
17


Neck
Head
Intertrochanteric line
Lesser trochanter
Lateral condyle
Patellar surface
(a)
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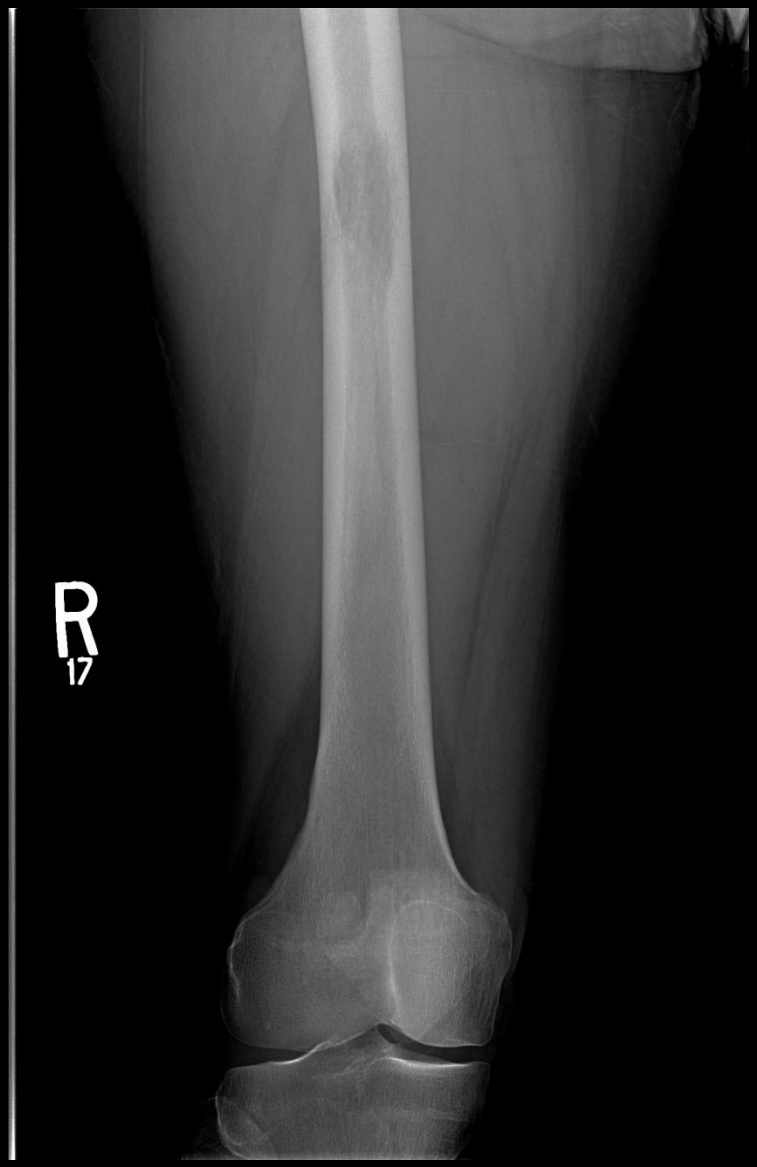
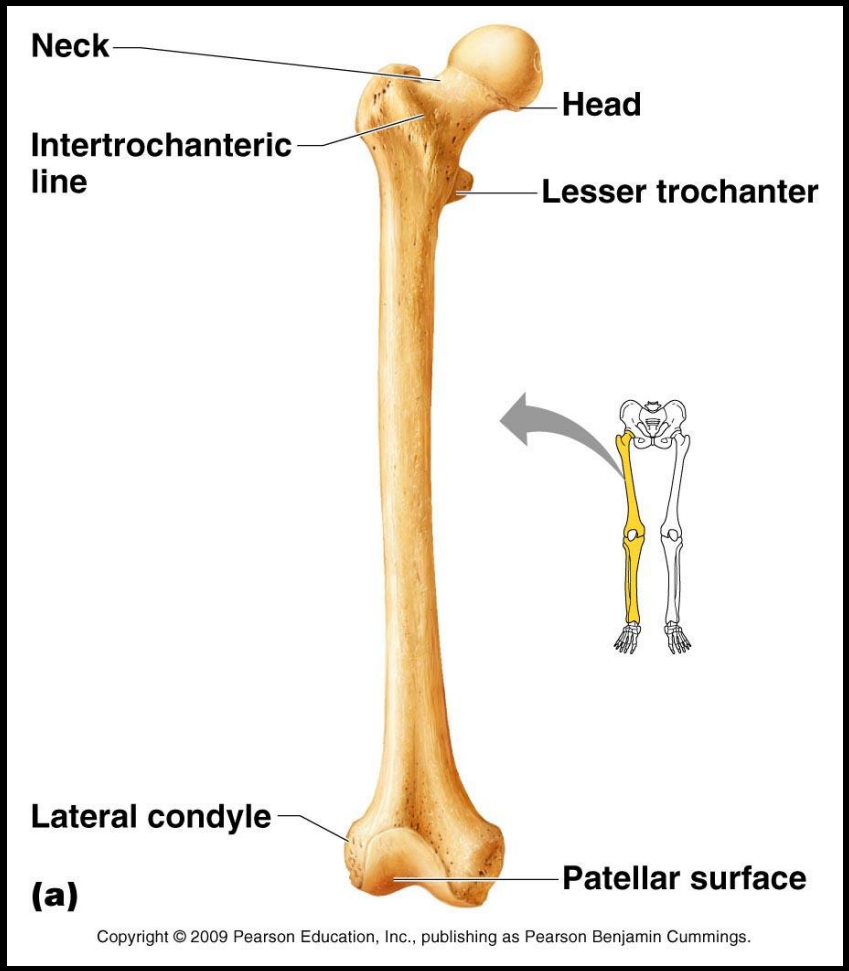

R
17


Neck
Head
Intertrochanteric line
Lesser trochanter
Lateral condyle
Patellar surface
(a)
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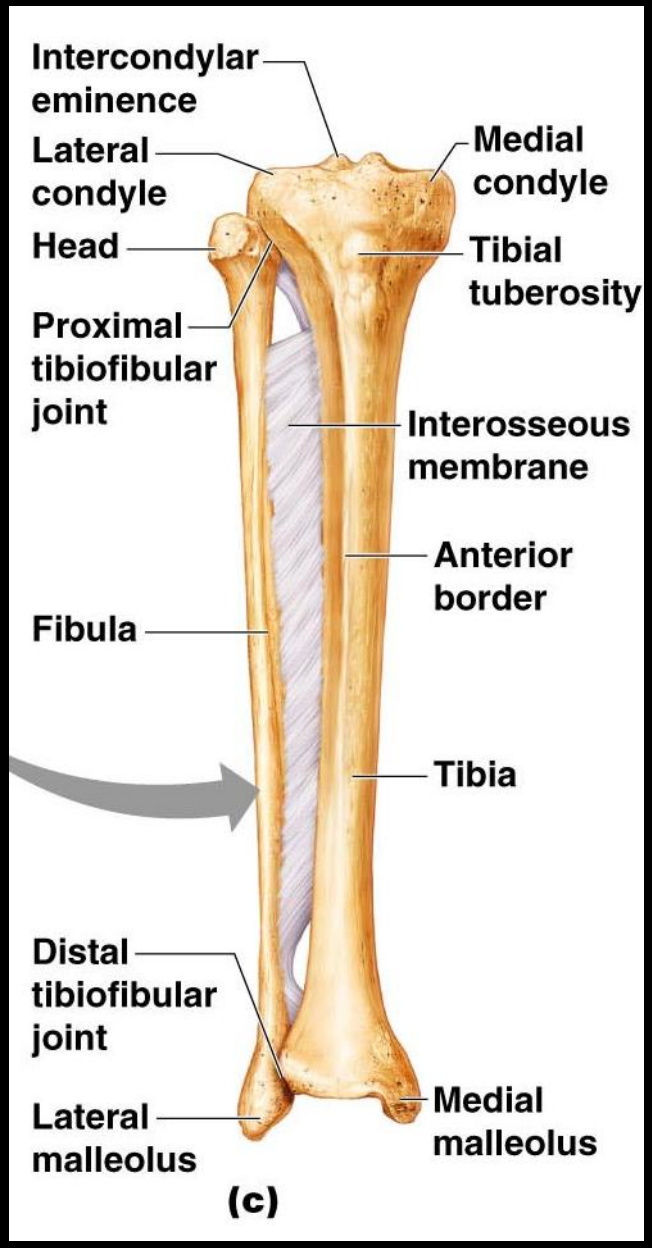
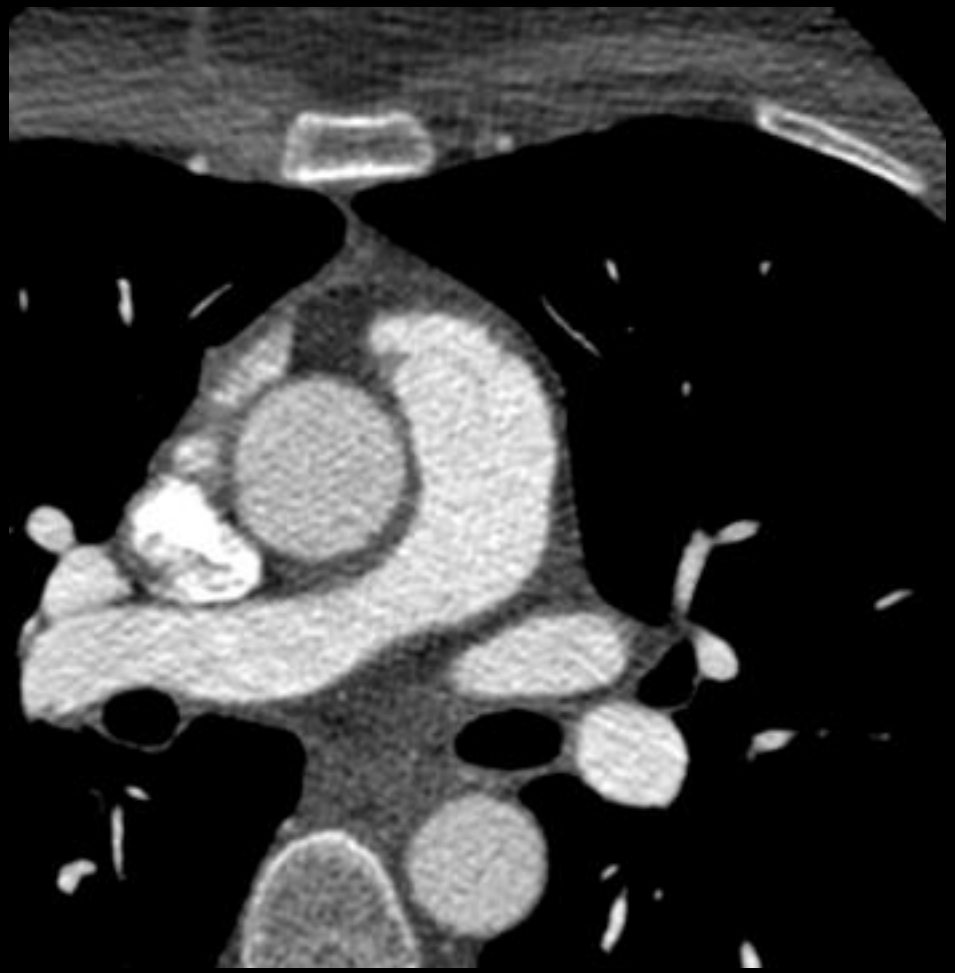

Intercondylar eminence
Lateral condyle
Head
Proximal tibiofibular joint
Fibula
Distal tibiofibular joint
Lateral malleolus
Medial condyle
Tibial tuberosity
Interosseous membrane
Anterior border
Tibia
Medial malleolus
(c)

VASCULAR ANATOMY

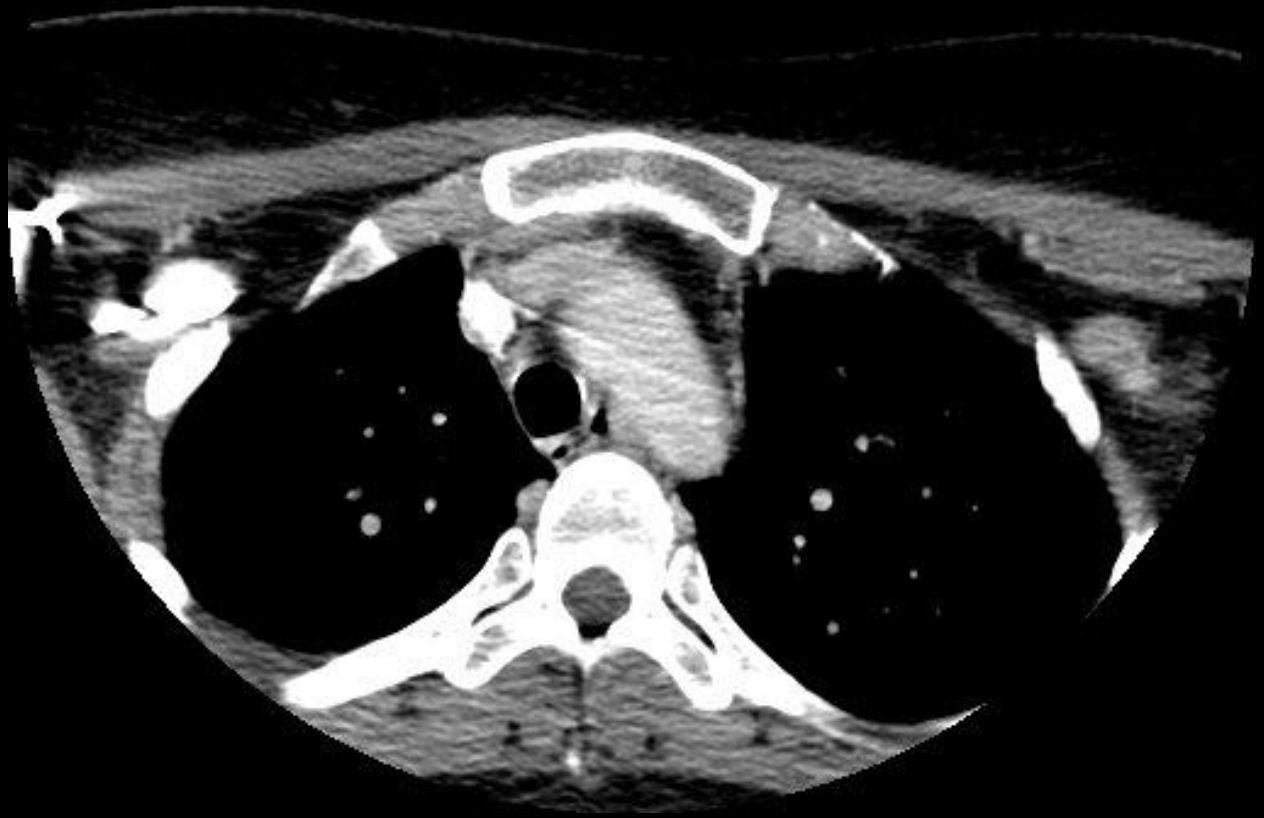
Coronary arteries



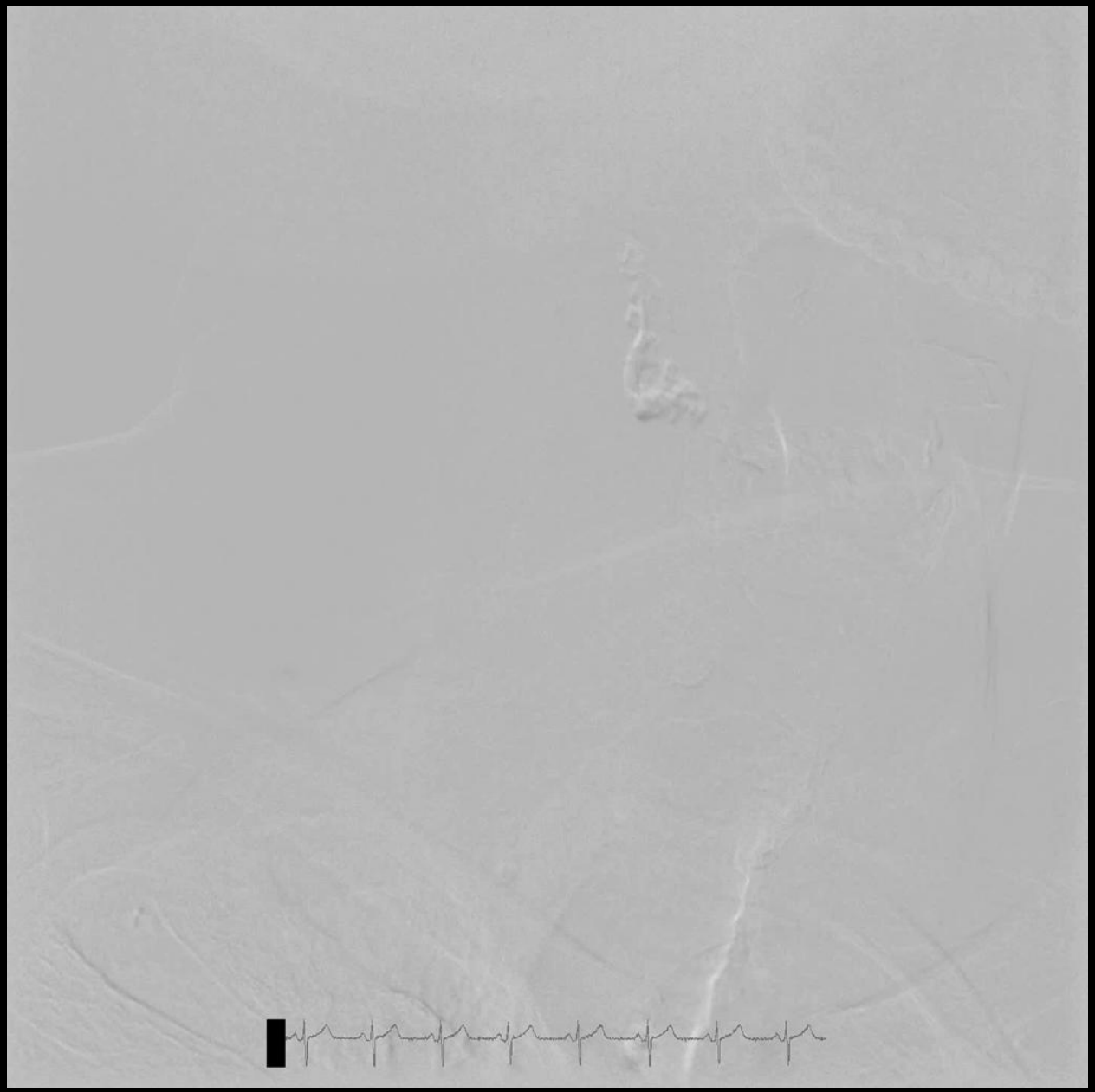
- Left main trunk (LCA)
- Left anterior descending
- Circumflex
- Right coronary artery (RCA)
- Posterior descending artery (PDA)
- Coronary sinus
- Tricuspid valve
- Mitral valve
- Aortic valve
- Papillary muscles

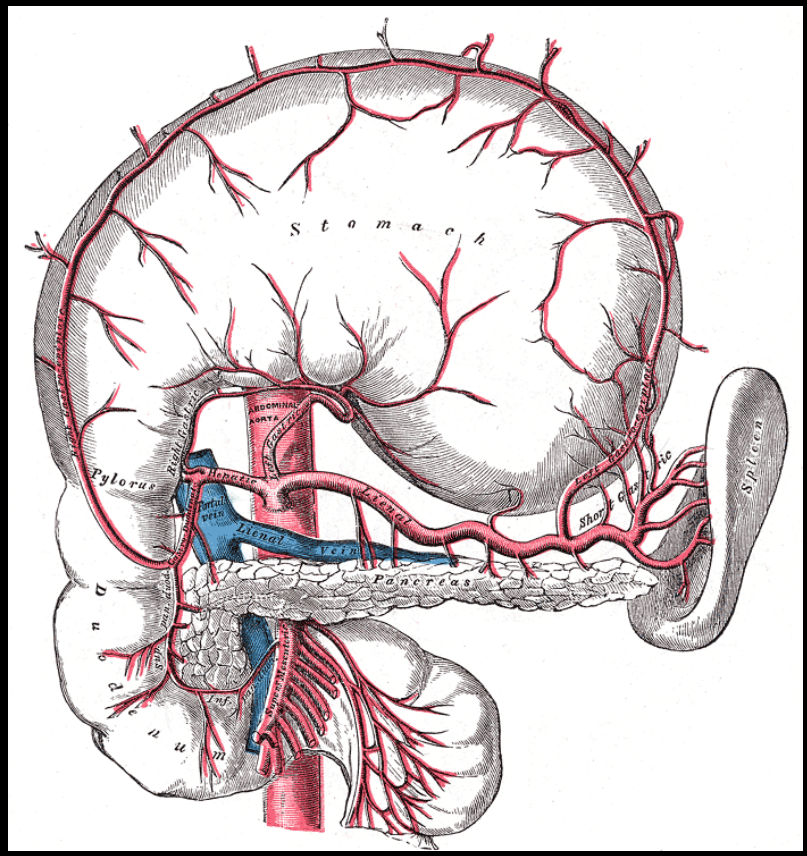
RCA LAO 36 caud 15

LCA LAO41 cran 232



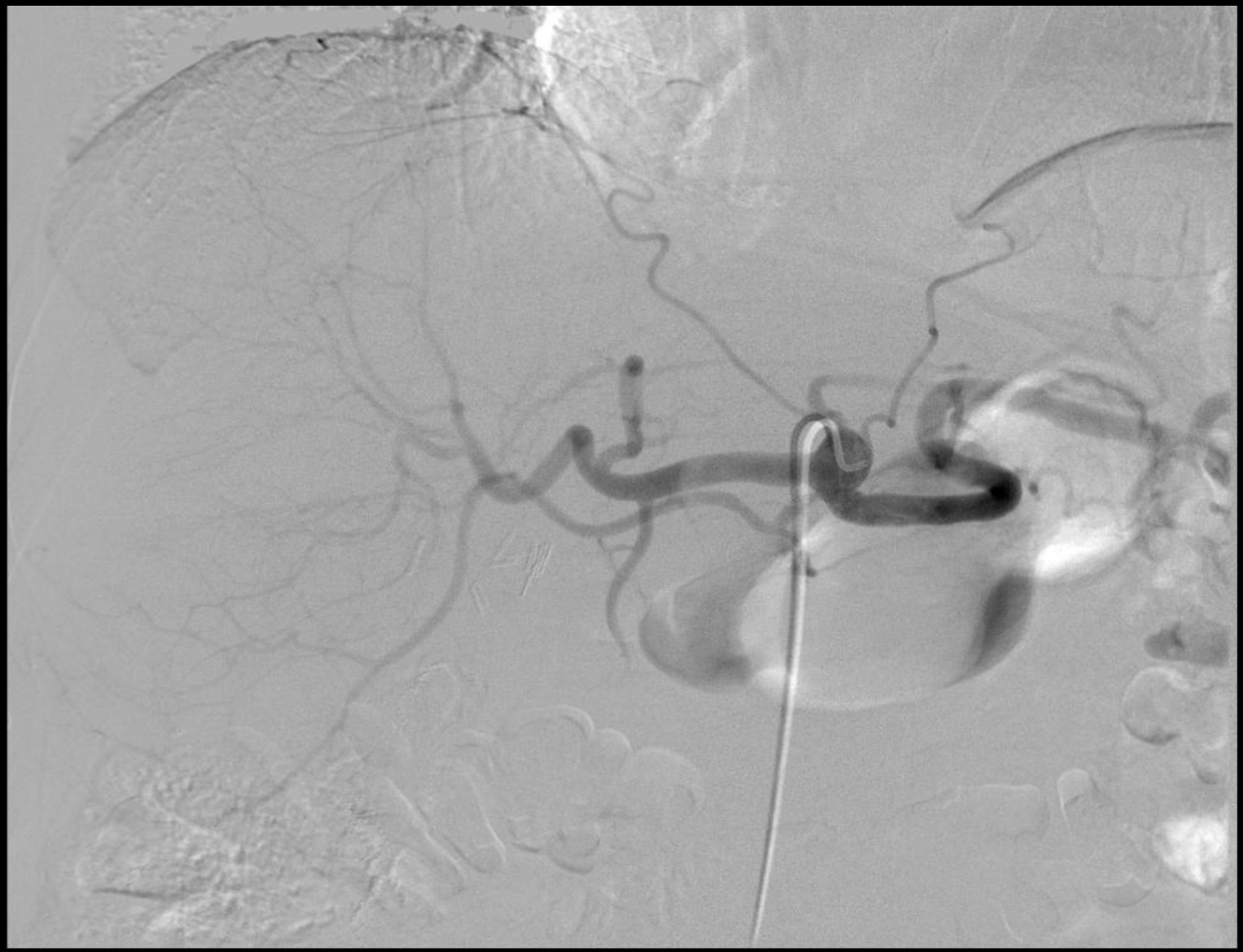
- Aortic arch
- Brachiocephalic a.
  - R common carotid a.
  - R subclavian a.
- L common carotid a.
- L subclavian a.
  - L vertebral a.

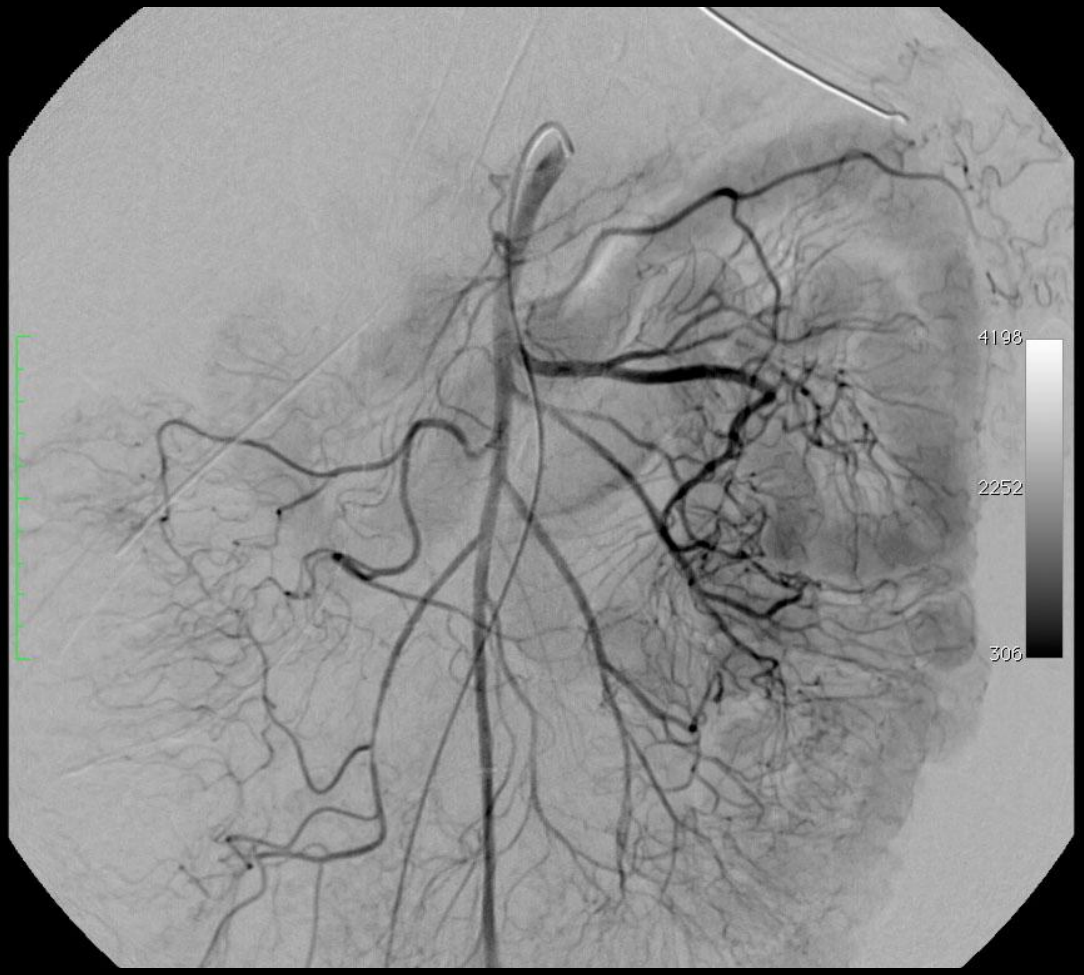




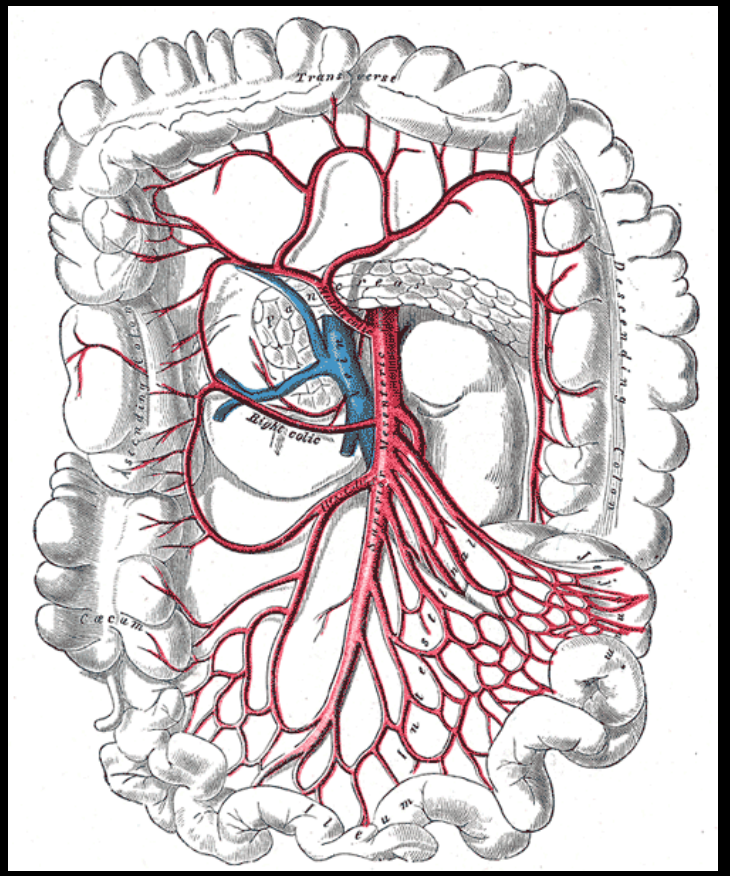
Gray's Anatomy

- Celiac a.
- L. gastric a.
- Common hepatic a.
- GDA
- Proper hepatic a.
- Splenic a.



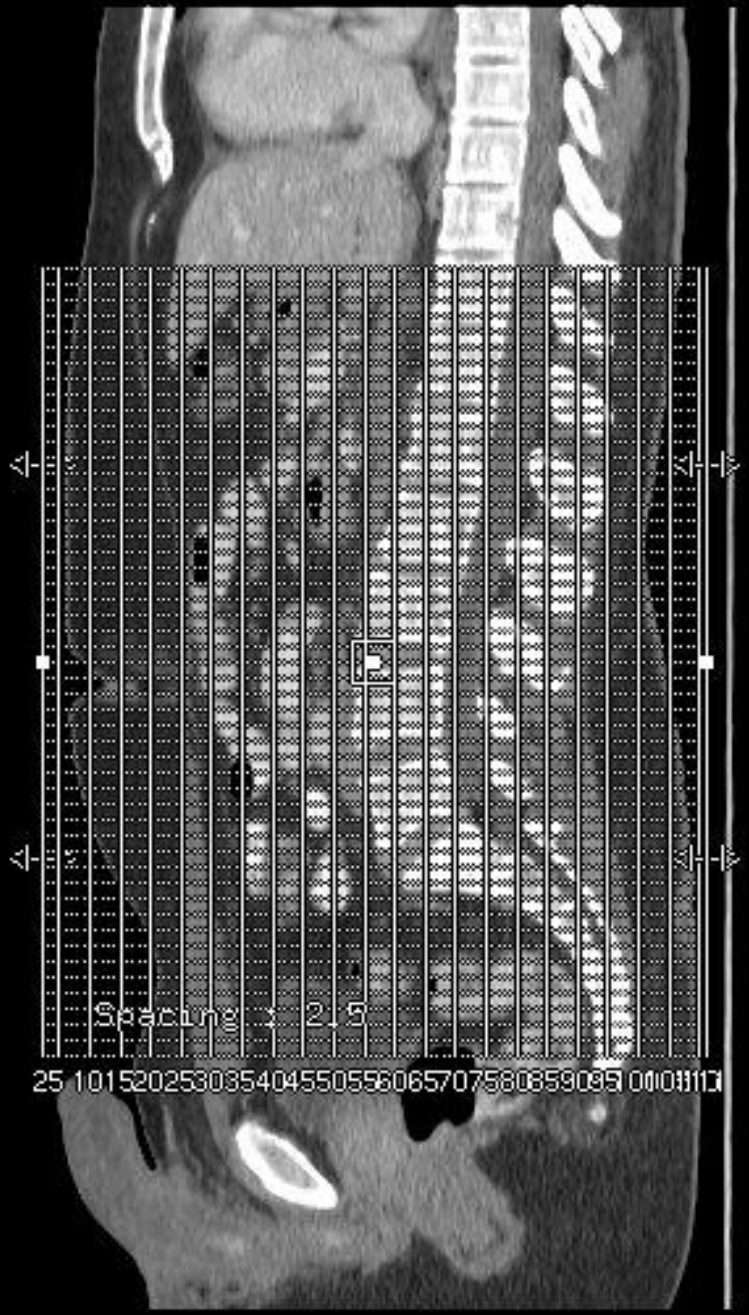


Stroeder J et al. Angiographic findings in non-occlusive mesenteric ischemia: an attempt of standardization. C-2114 ECR 2011



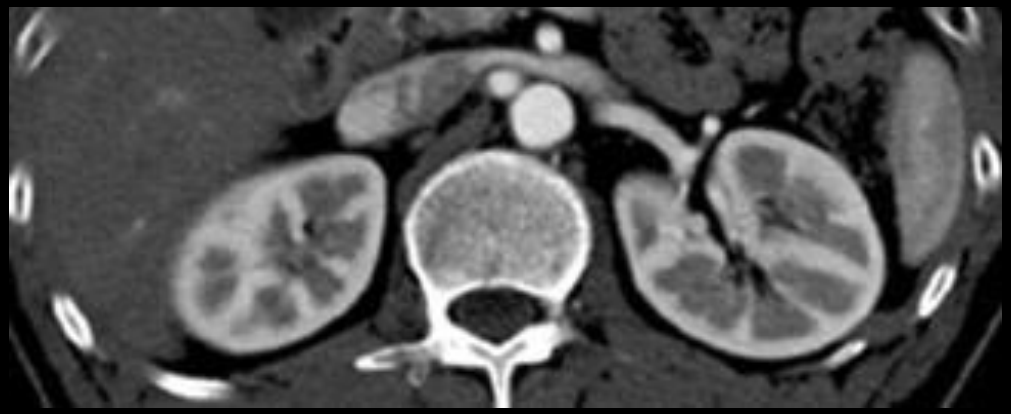
Gray's Anatomy

- Ileocolic a.
- Right colic a.
- Middle colic a.
- Intestinal a.
- Inferior pancreaticoduodenal a.

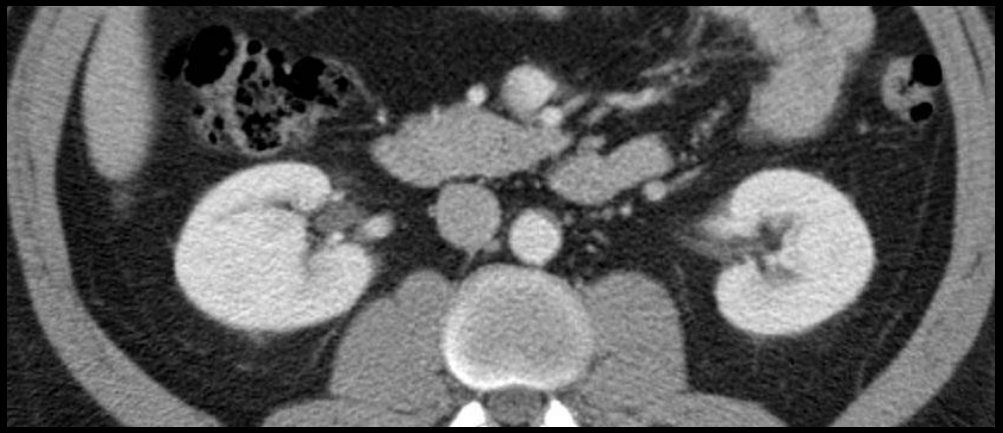

Spacing : 2.5
25 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 00 01 11

ABDOMINOPELVIC ANATOMY

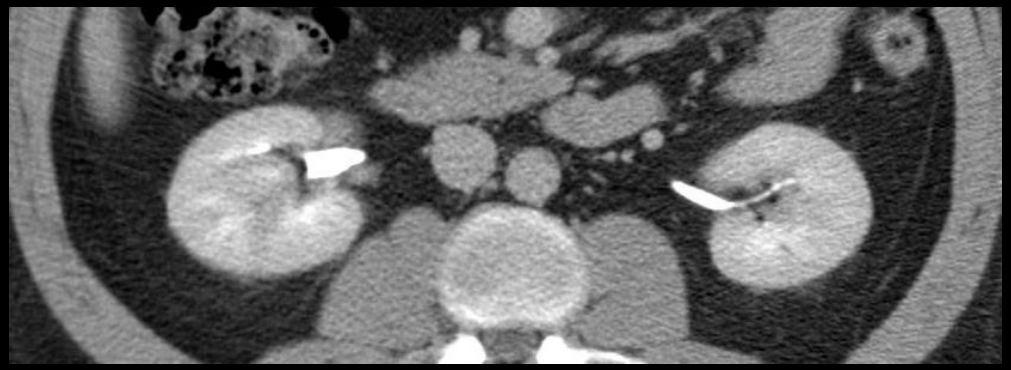
- Liver
- Spleen
- Stomach
- Pancreas
- Colon
- Small intestine
- Kidneys
- Portal vein
- IVC



Corticomedullary



Nephrographic



Excretory (delayed)

What radiographic projection is this?

45% 1. Left decubitus

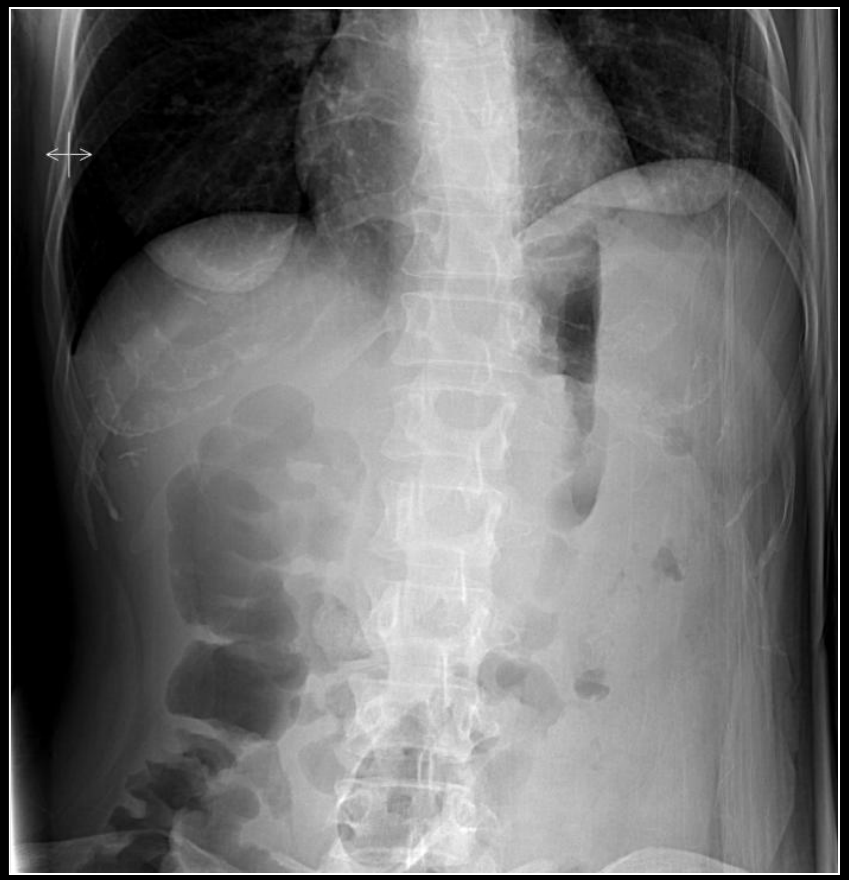
21% 2. Right decubitus

34% 3. AP

4. PA

What radiographic projection is this?

1. Left decubitus
2. Right decubitus
3. AP
4. PA

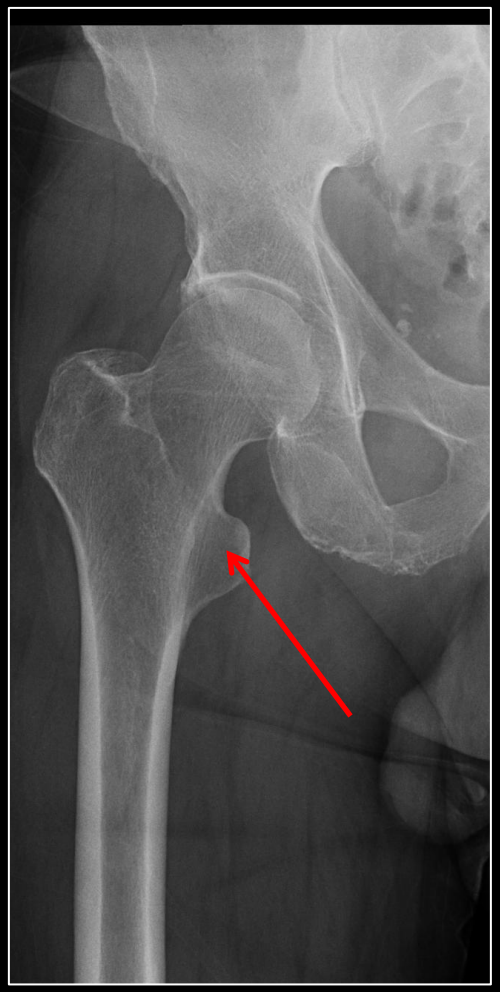


What structure is identified?

7%	1.	Olecranon
	2.	Greater tuberosity
18%	3.	Greater trochanter
4%	4.	Diaphysis
71%	5.	Lesser trochanter

What structure is identified?

1. Olecranon
2. Greater tuberosity
3. Greater trochanter
4. Diaphysis
5. Lesser trochanter



What vessel is identified?

4%	1.	Celiac a.
16%	2.	Jugular v.
20%	3.	Portal v.
8%	4.	Brachiocephalic a.
52%	5.	L common carotid a.

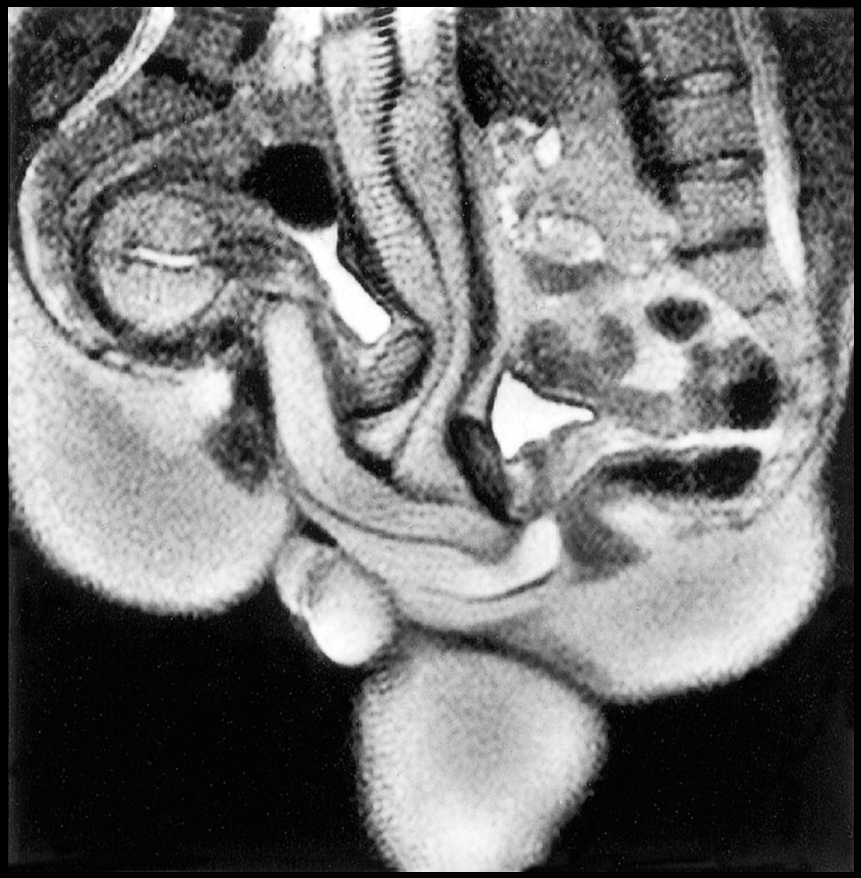
What vessel is identified?

1. Celiac a.
2. Jugular v.
3. Portal v.
4. Brachiocephalic a.
5. L common carotid a.

What region of the kidneys is enhanced in this image?

63%	1.	Cortex
27%	2.	Medulla
3%	3.	Renal pelvis
7%	4.	Capsule
	5.	Pole

What region of the kidneys is enhanced in this image?

1. Cortex
2. Medulla
3. Renal pelvis
4. Capsule
5. Pole

Bonus: What is depicted in this image?