

AMSER DIRT Curriculum

Question Bank: 10+ Questions Per Module with Explanations

Based on AMSER DIRT Combined Curriculum Videos and Readings

MODULE 1: General Radiology / Introduction to Radiology

1. Which property of tissue primarily determines its appearance (attenuation) on a CT scan?

- A) Water content only
- B) Density (electron density/atomic number)
- C) Temperature
- D) Vascularity

2. On a plain radiograph, which of the following appears most radiopaque (brightest)?

- A) Air
- B) Fat
- C) Soft tissue
- D) Cortical bone

3. When evaluating whether iodinated IV contrast is appropriate for a patient, which of the following is the most important contraindication to assess?

- A) Mild latex allergy
- B) Shellfish allergy alone
- C) Severe prior contrast reaction or renal insufficiency (elevated creatinine/GFR)
- D) Hypertension

4. Gadolinium-based contrast agents are used with which imaging modality?

- A) CT
- B) MRI
- C) Plain radiograph
- D) Nuclear medicine

5. What does the 'Which Test' feature on the UBC Radiology App help students learn?

- A) How to interpret CXR findings
- B) MRI safety protocols
- C) Appropriate imaging ordering for various clinical scenarios
- D) Radiation dosimetry calculations

6. The Hounsfield Unit (HU) scale is central to CT interpretation. Which value correctly pairs a tissue with its approximate HU range?

- A) Air $\approx$ +100 HU

- B) Water $\approx$ 0 HU
- C) Fat $\approx$ +80 HU
- D) Bone $\approx$ -200 HU

7. What is windowing (window level and width) used for in CT interpretation?

- A) Controlling radiation dose
- B) Selecting the slice thickness
- C) Injecting contrast at the right time
- D) Adjusting the display range of HU values to optimize visualization of specific tissues

8. MRI safety training (ACR Building Blocks) is critical because MRI uses which physical principle that poses unique safety risks?

- A) Ionizing radiation like X-rays
- B) A powerful magnetic field that can attract ferromagnetic objects at high velocity
- C) Radioactive isotopes
- D) Ultrasound waves at high frequency

9. Which of the following best describes the difference between ionizing and non-ionizing radiation in the context of medical imaging?

- A) MRI and CT both use ionizing radiation
- B) Ultrasound uses ionizing radiation; MRI does not
- C) X-rays and CT use ionizing radiation; MRI and ultrasound use non-ionizing forms of energy
- D) All medical imaging modalities use ionizing radiation

10. When a physician orders imaging, what is the primary principle guiding appropriate utilization?

- A) The cheapest study should always be ordered first
- B) The study must change management or provide diagnostic benefit that outweighs its risks/costs
- C) MRI is always preferred over CT
- D) Patient preference alone determines the study

11. The UBC Radiology App's 'Approach for CXR' module teaches students a systematic method for reading chest X-rays. Why is a systematic approach emphasized?

- A) To make reading faster regardless of thoroughness
- B) To match the radiologist's order of dictation
- C) Because regulations require a specific order
- D) To ensure no finding is missed by reviewing all anatomic regions in a consistent order

MODULE 2: Chest Radiology

1. On a chest X-ray, which of the following findings most reliably indicates an adequate inspiratory effort?

- A) The clavicles appear horizontal
- B) Visualization of 8–10 posterior ribs above the diaphragm
- C) The trachea is midline
- D) The heart is not enlarged

2. Cardiomegaly on a PA chest X-ray is defined as:

- A) Cardiac silhouette touching both pleural surfaces
- B) Heart diameter greater than 15 cm
- C) Cardiothoracic ratio greater than 0.5 on a PA film
- D) Visible pulmonary arteries beyond the hilum

3. A patient presents with acute dyspnea. CXR shows unilateral complete opacification of one hemithorax with contralateral mediastinal shift. What is the most likely diagnosis?

- A) Pneumothorax
- B) Large pleural effusion with mass effect
- C) Lobar pneumonia
- D) Lung collapse (atelectasis)

4. Which of the following CXR findings is most characteristic of congestive heart failure (CHF)?

- A) Unilateral consolidation with air bronchograms
- B) Hyperinflation with flattened diaphragms
- C) Pleural-based opacity with meniscus sign (unilateral)
- D) Cardiomegaly, cephalization of pulmonary vessels, Kerley B lines, and bilateral pleural effusions

5. What distinguishes airspace (alveolar) disease from interstitial disease on a chest X-ray?

- A) Airspace disease is always unilateral; interstitial is bilateral
- B) Only interstitial disease causes pleural effusions
- C) Airspace disease produces fluffy/cotton-ball opacities with air bronchograms; interstitial disease produces reticular, nodular, or reticulonodular patterns
- D) They are indistinguishable on plain film

6. A tall, thin 22-year-old male presents with sudden onset right-sided chest pain and dyspnea. CXR shows a thin pleural line with absence of lung markings beyond it. What is the diagnosis?

- A) Spontaneous pneumothorax
- B) Pneumomediastinum
- C) Pulmonary embolism
- D) Rib fracture

7. On a CXR, the right paratracheal stripe, aortopulmonary window, and subcarinal angle are all part of which structure's evaluation?

- A) Pleural space
- B) Lung parenchyma
- C) Mediastinum
- D) Bony thorax

8. An ICU patient has a CXR obtained after central venous catheter (CVC) placement. The tip of the catheter is projected over the right atrium. What is the appropriate action?

- A) No action needed; the right atrium is ideal
- B) Advance the catheter further
- C) Pull back the catheter — the tip should be in the distal SVC above the cavoatrial junction
- D) Obtain a CT scan immediately

9. Which CXR finding best represents 'Kerley B lines' in congestive heart failure?

- A) Vertical lines in the lung apex
- B) Short horizontal lines (<2 cm) at the lung periphery perpendicular to the pleural surface
- C) Circular opacities in the lower lobes
- D) Thickening of the major fissures

10. What is the significance of an 'air bronchogram' sign on CXR?

- A) It indicates pleural effusion
- B) It confirms a tension pneumothorax
- C) It indicates airspace disease surrounding patent, air-filled airways
- D) It is seen only in lung cancer

11. On a PA chest X-ray, which side is the diaphragm normally higher, and why?

- A) Right hemidiaphragm, because the liver sits beneath it
- B) Left hemidiaphragm, because the heart is on the left
- C) They are always at the same level
- D) Left hemidiaphragm, because the stomach pushes it up

12. A patient's CXR shows a unilateral homogeneous opacity in the lower lung zone that obscures the diaphragm with a concave upper border (meniscus sign). What is this most likely?

- A) Lobar pneumonia
- B) Pleural effusion
- C) Pulmonary embolism
- D) Pneumothorax

13. Which of the following findings on CXR most suggests a right upper lobe pneumonia specifically?

- A) Blunting of the right costophrenic angle
- B) Right lower zone opacity with air bronchograms
- C) Right upper zone consolidation with a sharp lower border at the minor fissure
- D) Left-sided opacity with contralateral tracheal shift

14. When reviewing an ICU portable AP CXR, which endotracheal tube (ETT) tip position is considered appropriate?

- A) At the level of the vocal cords
- B) 3–5 cm above the carina, with the neck in neutral position
- C) In the right mainstem bronchus
- D) At the thoracic inlet

MODULE 3: Body Imaging

1. On an abdominal X-ray (KUB), which of the following best distinguishes small bowel obstruction from large bowel obstruction?

- A) Small bowel obstruction shows gas in the rectum; large bowel does not
- B) Small bowel loops are central with thin folds (valvulae conniventes) crossing the full width; large bowel is peripheral with haustra crossing partial width
- C) They are indistinguishable on plain film
- D) Large bowel obstruction causes more severe pain

2. Free air (pneumoperitoneum) on an upright CXR appears as:

- A) Lucent (dark) crescents beneath the hemidiaphragms
- B) Air-fluid levels in the bowel
- C) Calcifications in the right upper quadrant
- D) A distended loop of bowel

3. On abdominal CT, what does the term 'retroperitoneal' mean, and which organs are retroperitoneal?

- A) Within the peritoneal cavity; includes the liver and stomach
- B) Below the peritoneum; includes the bladder only
- C) Posterior to the peritoneum; includes the kidneys, adrenal glands, aorta, IVC, pancreas, and retroperitoneal duodenum/colon
- D) Anterior to the peritoneum; includes the small bowel mesentery

4. When reviewing a CT of the abdomen/pelvis and windowing to find the appendix, in which of the three standard CT planes might you look for it?

- A) Axial plane only
- B) Sagittal plane only
- C) Coronal plane only
- D) All three: axial, sagittal, and coronal planes

5. Which of the following abnormal calcifications on abdominal KUB is considered a normal variant and requires no further workup?

- A) Nephrolithiasis
- B) Phleboliths (small oval pelvic calcifications with a radiolucent center)
- C) Gallstones
- D) Abdominal aortic aneurysm calcification

6. A patient presents with acute right lower quadrant pain. CT shows a tubular blind-ending structure arising from the cecum measuring 12 mm in diameter with surrounding fat stranding and a calcified appendicolith. What is the diagnosis?

- A) Normal appendix
- B) Crohn's disease
- C) Acute appendicitis
- D) Ovarian cyst

7. On CT of the abdomen, the 'triple-contrast' technique may use oral contrast, IV contrast, and rectal contrast. What is the primary purpose of oral contrast?

- A) To opacify the bowel lumen, distinguishing bowel from lymph nodes, mesentery, and soft tissue masses
- B) To evaluate the liver vascularity
- C) To assess renal function
- D) To prevent artifact from bowel gas

8. Which of the following is the best initial imaging study for suspected acute appendicitis in a young adult (non-pregnant)?

- A) MRI of the abdomen
- B) Plain abdominal radiograph
- C) CT of the abdomen and pelvis with IV contrast
- D) Upper GI series

9. On an abdominal CT using a standard protocol with IV contrast, the 'portal venous phase' (approximately 70–80 seconds after injection) best evaluates which structures?

- A) Arterial structures and highly vascular tumors (arterial phase)
- B) Liver parenchyma, portal vein, spleen, and most solid abdominal organs
- C) Urinary collecting system (delayed/urographic phase)
- D) Pancreatic duct anatomy

10. What is 'gallstone ileus,' and which CT findings would you expect?

- A) Obstruction of the cystic duct by a gallstone, causing cholecystitis
- B) Paralytic ileus caused by gallstone pancreatitis
- C) Colonic pseudo-obstruction related to cholelithiasis
- D) Mechanical SBO caused by a large gallstone eroding through the gallbladder wall; CT shows Rigler's triad: pneumobilia, SBO, and ectopic gallstone

11. On CT windowing, which window setting would best evaluate for subtle intrabdominal free air?

- A) Bone window
- B) Lung/air window (wide width, low level, e.g., W:1500, L:-500)
- C) Soft tissue window
- D) Liver window

12. A CT scan shows 'fat stranding' adjacent to the pancreas along with a dilated pancreatic duct and peripancreatic fluid. What is the most likely diagnosis?

- A) Pancreatic adenocarcinoma
- B) Splenic infarct
- C) Acute pancreatitis

D) Hepatocellular carcinoma

13. Which of the following is the most common cause of small bowel obstruction in adults?

- A) Adhesions from prior abdominal surgery
- B) Crohn's disease
- C) Hernia (without prior surgery)
- D) Gallstone ileus

14. Which of the following is an example of a retroperitoneal structure that can present as a 'soft tissue mass' on plain abdominal film?

- A) Sigmoid volvulus
- B) Cholecystitis
- C) Appendicitis
- D) Abdominal aortic aneurysm

MODULE 4: Ultrasound

1. Ultrasound uses sound waves to generate images. Which of the following best describes the principle of 'echogenicity'?

- A) The depth of a structure below the skin surface
- B) The relative brightness of a structure based on how much ultrasound it reflects
- C) The frequency of the ultrasound probe
- D) The amount of radiation emitted by the structure

2. Which ultrasound finding is most characteristic of a simple benign cyst?

- A) Internal echoes with irregular thick walls
- B) Hyperechoic with posterior shadowing
- C) Anechoic interior, thin smooth walls, and posterior acoustic enhancement
- D) Heterogeneous echogenicity with calcifications

3. On scrotal ultrasound, testicular torsion is a surgical emergency. Which Doppler finding is most consistent with torsion?

- A) Absent or markedly reduced intratesticular blood flow
- B) Increased bilateral blood flow
- C) Normal blood flow with a hypoechoic epididymis
- D) Hyperechoic testis with normal flow

4. In the evaluation of a female patient with acute pelvic pain, which ultrasound finding is most concerning for ovarian torsion?

- A) Small ovary with normal Doppler flow
- B) Follicular cyst < 3 cm with normal flow
- C) Free fluid in the pelvis only
- D) Enlarged ovary (>5 cm), peripheral follicles, and absent/diminished Doppler flow

5. Which of the following best describes 'posterior acoustic shadowing' on ultrasound, and when is it seen?

- A) Increased brightness behind a fluid-filled structure
- B) A dark shadow deep to a highly reflective or absorbing object
- C) Echogenic foci within a cystic lesion
- D) Reverberations artifact from bowel gas

6. What is the primary advantage of ultrasound over CT for initial evaluation of the biliary system?

- A) Better soft tissue contrast than CT
- B) Ability to evaluate retroperitoneal structures better
- C) No ionizing radiation, real-time capability, and high sensitivity for gallstones and biliary dilation
- D) Superior evaluation of the pancreatic parenchyma

7. On a renal ultrasound, which finding suggests hydronephrosis?

- A) An echogenic focus with shadowing in the cortex
- B) Anechoic dilation of the renal pelvis and calyces
- C) Cortical thinning without collecting system changes
- D) Increased echogenicity of the renal cortex

8. Which ultrasound probe type (transducer) is most appropriate for abdominal imaging of the liver, kidneys, and gallbladder?

- A) Curved array (curvilinear) low-frequency probe (2–5 MHz)
- B) High-frequency linear probe (7–15 MHz)
- C) Phased array cardiac probe
- D) Endovaginal high-frequency probe

9. In the evaluation of suspected acute cholecystitis on ultrasound, which finding is most diagnostic?

- A) Gallstones alone
- B) Pericholecystic fluid alone
- C) Gallbladder wall thickening alone
- D) Gallstones + gallbladder wall thickening (>3 mm) + pericholecystic fluid + positive sonographic Murphy's sign

10. Obstetric ultrasound in the first trimester is used for which of the following primary purposes?

- A) Determining fetal sex
- B) Evaluating placenta previa
- C) Confirming intrauterine pregnancy, establishing gestational age, and detecting early complications (ectopic pregnancy, miscarriage)
- D) Assessing fetal lung maturity

11. On gastrointestinal ultrasound, a 'target sign' (hypoechoic ring with central echogenicity) in a child's abdomen is most suggestive of:

- A) Appendicitis
- B) Intussusception
- C) Pyloric stenosis

D) Mesenteric adenitis

12. The ACR Building Blocks module on Abdominal Ultrasound emphasizes that ultrasound is operator-dependent. What does this mean in clinical practice?

- A) Only radiologists can perform ultrasound
- B) Results vary by machine brand only
- C) Image quality and diagnostic accuracy depend significantly on the operator's skill, technique, and clinical knowledge
- D) Patients must be sedated for adequate studies

13. Which of the following is NOT a typical ultrasound finding in cholelithiasis?

- A) Echogenic foci (stones) in the gallbladder lumen
- B) Posterior acoustic shadowing behind the stones
- C) Stone mobility with patient repositioning
- D) Dilated common bile duct (>6 mm)

14. What does 'Doppler ultrasound' add to standard grayscale (B-mode) imaging?

- A) Better depth penetration
- B) Information about blood flow direction and velocity within vessels and organs
- C) Elimination of bowel gas artifact
- D) The ability to measure Hounsfield Units

15. Which of the following structures is typically NOT well-visualized on standard transabdominal ultrasound due to bowel gas interference?

- A) Gallbladder
- B) Right kidney
- C) Distal ureters
- D) Liver

MODULE 5: Musculoskeletal Radiology

1. The ABCDE approach to musculoskeletal radiograph interpretation stands for which categories?

- A) Anatomy, Breaks, Calcification, Density, Effusion
- B) Alignment, Bone density, Cartilage/joint spaces, Soft tissue Disturbances, Extras
- C) Arteries, Bones, Cortex, Density, Edges
- D) Assessment, Borders, Calcification, Deformity, Enhancement

2. On a plain radiograph, which of the following fracture patterns is most consistent with a pathologic fracture (fracture through abnormal bone)?

- A) Transverse fracture of the femur shaft from a high-speed MVA
- B) Greenstick fracture in a child
- C) Fracture with minimal trauma, surrounding lytic/sclerotic lesion, and cortical destruction
- D) Stress fracture with periosteal reaction in an athlete

3. On knee MRI, the anterior cruciate ligament (ACL) normally appears as:

- A) A low signal (dark) band from the posterior lateral femoral condyle to the anterior tibial eminence
- B) A bright (T2 hyperintense) structure in the intercondylar notch
- C) A structure with no visible signal on T1 or T2
- D) A horizontal structure connecting the medial and lateral menisci

4. In osteoporosis, which radiographic finding indicates significant loss of bone density?

- A) Dense sclerotic bone with periosteal reaction
- B) Cortical thinning, accentuated vertical trabeculae, and vertebral compression (wedge or biconcave) fractures
- C) Lytic lesions with a sclerotic rim
- D) Periarticular osteopenia only

5. Which of the following best describes the radiographic difference between osteoarthritis (OA) and rheumatoid arthritis (RA) on joint radiographs?

- A) OA causes erosions; RA causes osteophytes
- B) They are indistinguishable on plain film
- C) RA preferentially affects the DIP joints; OA affects the MCP joints
- D) OA: asymmetric, large/weight-bearing joints, osteophytes, subchondral sclerosis; RA: symmetric, small joint erosions, periarticular osteopenia

6. A Colles' fracture is a common wrist fracture that occurs after a fall on an outstretched hand. Which of the following best describes this fracture?

- A) Fracture of the ulnar styloid only
- B) Fracture of the scaphoid
- C) Transverse distal radius fracture with dorsal angulation/displacement ('dinner fork deformity')
- D) Fracture through the radial neck

7. On a knee MRI, a meniscal tear is suspected when:

- A) The meniscus appears uniformly dark on all sequences
- B) There is increased T2/PD signal within the meniscus that extends to at least one articular surface

- C) The meniscus has slightly increased signal on T1 but not T2
- D) The meniscus is slightly smaller than the contralateral side

8. Which imaging modality is most sensitive for detecting stress fractures, particularly before they are visible on plain radiograph?

- A) Plain radiograph
- B) CT
- C) MRI
- D) Ultrasound

9. In the Radiology Masterclass trauma tutorials, the 'Ottawa Ankle Rules' help determine when ankle radiographs are indicated. Which of the following does NOT meet the Ottawa criteria for obtaining ankle X-rays?

- A) Bony tenderness at the posterior tip or inferior 6 cm of the fibula
- B) Bony tenderness at the posterior tip or inferior 6 cm of the tibia
- C) Inability to bear weight both immediately and in the ED (4 steps)
- D) Isolated soft tissue swelling without bony point tenderness and ability to bear weight (4 steps)

10. Which of the following MSK conditions is most classically associated with a 'lytic lesion with a narrow zone of transition and sclerotic rim' in a young adult?

- A) Osteosarcoma
- B) Non-ossifying fibroma (benign fibrous cortical defect)
- C) Ewing sarcoma
- D) Metastatic carcinoma

11. A 72-year-old man presents with back pain. Lumbar spine MRI shows a vertebral body with decreased T1 signal (dark), increased T2/STIR signal (bright), and loss of height compared to adjacent levels. What is the most likely diagnosis?

- A) Disc herniation
- B) Degenerative disc disease
- C) Acute vertebral compression fracture with bone marrow edema
- D) Schmorl's node

12. On MSK radiographs, periosteal reaction (new bone formation along the cortex) has different patterns. Which pattern is most associated with aggressive/malignant processes?

- A) Solid, well-defined periosteal reaction
- B) Undulating periosteal reaction
- C) Parallel periosteal reaction adjacent to a healing fracture
- D) Sunburst pattern or interrupted lamellated ('onion skin') periosteal reaction

13. During the UBC MSK Clinical Case review (cases 1, 6, 8, 12, etc.), you encounter a hip radiograph in an elderly woman post-fall with shortening and external rotation of the leg. Which fracture location should you specifically evaluate?

- A) Femoral shaft
- B) Femoral neck (intracapsular) or intertrochanteric region
- C) Acetabulum
- D) Tibial plateau

14. The 'Systematic Interpretation of Knee MRI' video emphasizes evaluating all structures in a standard order. Which of the following structures is NOT routinely evaluated on a knee MRI?

- A) ACL and PCL
- B) Medial and lateral menisci
- C) Articular cartilage and subchondral bone
- D) Sciatic nerve

15. What does the 'zone of transition' describe on an MSK radiograph, and why is it important?

- A) The border between normal and abnormal bone; narrow = benign; wide/permeative = malignant
- B) The growth plate in a pediatric patient
- C) The interface between cortical and medullary bone
- D) The margin of a joint effusion

MODULE 6: Neuroradiology

1. On a non-contrast head CT, acute hemorrhage appears as:

- A) Hypoattenuating (dark) relative to brain
- B) Hyperattenuating (bright/white) relative to adjacent brain parenchyma
- C) Isoattenuating to brain with surrounding edema
- D) Air-density (black)

2. On a non-contrast head CT, a hypodense (dark) region in the distribution of the middle cerebral artery (MCA) territory is most consistent with:

- A) Acute hemorrhage
- B) Calcification
- C) Acute or subacute ischemic infarction
- D) Epidural hematoma

3. Which of the following describes the classic CT appearance of an epidural hematoma (EDH)?

- A) Biconvex (lens-shaped/lenticular) hyperdense collection, usually temporal, often with temporal bone fracture
- B) Crescent-shaped hyperdense collection crossing suture lines
- C) Intraparenchymal hematoma with surrounding edema
- D) Subarachnoid blood filling the sulci and cisterns

4. A 55-year-old presents with the 'worst headache of life.' Head CT shows hyperdense material filling the basal cisterns and sulci. What is the most likely diagnosis and what should be done if CT is negative?

- A) Migraine; discharge with analgesics
- B) Subdural hematoma; neurosurgery consult
- C) Meningitis; broad-spectrum antibiotics
- D) Subarachnoid hemorrhage; if CT is negative, perform lumbar puncture to detect xanthochromia

5. In the VINDICATE mnemonic used for brain lesion differential diagnosis, what does the 'V' stand for, and give two examples?

- A) Vascular - stroke, hemorrhage, AVM
- B) Viral - encephalitis, abscess
- C) Volume - hydrocephalus, mass effect
- D) Vertebral - disc herniation, vertebral fracture

6. The learningneuroradiology.com module on 'How to Read a Head CT' recommends which systematic approach?

- A) Start with the bone windows, then soft tissue
- B) Review from inferior to superior slice only
- C) Use a systematic mnemonic such as 'Blood Can Be Very Bad' (Blood, Cisterns, Brain parenchyma, Ventricles, Bone)
- D) Begin with the most obvious abnormality and work outward

7. Normal pressure hydrocephalus (NPH) presents with the classic triad of symptoms. On head CT or MRI, what is the characteristic imaging finding?

- A. A) Cortical atrophy with ex vacuo ventricular enlargement proportionate to sulcal widening
- B. B) Enlarged ventricles disproportionately large relative to sulcal atrophy; tight high convexity sulci
- C. C) Bilateral basal ganglia calcifications
- D. D) Multiple periventricular white matter lesions

8. On a head CT, which finding is most consistent with a subdural hematoma (SDH)?

- A) Biconvex lenticular hyperdense collection
- B) Round intraparenchymal hematoma with surrounding edema
- C) Crescent-shaped collection following the inner table of the skull, crossing suture lines
- D) Blood in the fourth ventricle

9. On the Approach to CT Head in the UBC app, 'midline shift' is an important finding. What degree of midline shift is generally considered clinically significant and may indicate need for surgical intervention?

- A) Any shift > 0 mm
- B) Greater than 5 mm
- C) Greater than 15 mm
- D) Only if associated with tonsillar herniation

10. A posterior fossa mass in a child most commonly represents which tumor type?

- A) Medulloblastoma (vermian) or cerebellar pilocytic astrocytoma
- B) Glioblastoma multiforme
- C) Meningioma
- D) Pituitary adenoma

11. On CT, the Hounsfield Unit measurement of a brain lesion at +80 HU, along with surrounding edema and mass effect, is most consistent with:

- A) Calcification
- B) Acute hemorrhage (blood clot)
- C) Air/pneumocephalus
- D) Subacute stroke

12. In evaluating a stroke patient, what is the primary advantage of MRI DWI (diffusion-weighted imaging) over CT in the hyperacute period (0–6 hours)?

- A) MRI is faster than CT
- B) MRI uses less radiation
- C) DWI detects restricted diffusion (cytotoxic edema) within minutes of ischemic onset, long before CT shows hypodensity
- D) MRI is better at detecting hemorrhage

13. When describing a brain CT lesion for the Module 6 case report, which term describes a lesion that appears darker (less attenuating) than the surrounding brain?

- A) Hyperattenuating
- B) Hypoattenuating
- C) Isoattenuating
- D) Heterogeneous

14. The VINDICATE mnemonic is used in the Module 6 case report. Which category would best classify a brain abscess?

- A) Neoplastic (N)
- B) Infectious (I)
- C) Vascular (V)
- D) Autoimmune (A)

MODULE 7: Breast Imaging

1. What is the ACR BI-RADS (Breast Imaging Reporting and Data System) category that indicates findings requiring biopsy (highly suggestive of malignancy)?

- A) BI-RADS 0
- B) BI-RADS 2
- C) BI-RADS 3
- D) BI-RADS 5

2. Which of the following mammographic findings is most associated with malignancy?

- A) Round, circumscribed mass with uniform density
- B) Oval, low-density mass with well-defined margins
- C) Irregular, spiculated mass with associated pleomorphic microcalcifications
- D) Bilateral symmetric round densities

3. What is the primary difference between screening mammography and diagnostic mammography?

- A) Screening uses MRI; diagnostic uses X-ray
- B) Screening is for asymptomatic women; diagnostic evaluates a specific symptom or abnormal screening mammogram finding with additional tailored views
- C) Screening uses lower radiation dose than diagnostic
- D) Diagnostic mammography does not require a radiologist

4. Digital breast tomosynthesis (DBT), also called '3D mammography,' improves detection of breast cancer primarily by:

- A) Acquiring multiple low-dose images at different angles to create slices, reducing tissue overlap that can hide cancers
- B) Using higher radiation doses for better image quality
- C) Replacing ultrasound for all breast evaluations
- D) Adding contrast injection for vascular assessment

5. Gynecomastia on a male mammogram is a common finding. How does it appear, and what is the key differentiator from male breast carcinoma?

- A) They are indistinguishable on mammogram
- B) Gynecomastia shows a spiculated mass; carcinoma shows a circumscribed round mass.
- C) Gynecomastia: bilateral/unilateral subareolar fan-shaped tissue, no discrete mass; carcinoma: eccentric irregular spiculated mass
- D) Gynecomastia only occurs after age 70

6. In the 'Emergency Breast Conditions' video, which of the following is a true breast emergency requiring immediate evaluation?

- A) A new stable fibroadenoma
- B) Inflammatory breast cancer (presenting as breast erythema, edema, peau d'orange)
- C) Simple breast cyst
- D) Bilateral nipple discharge (bilateral, clear, non-bloody)

7. A stereotactic core needle biopsy (as shown in the Module 7 video) is performed for which type of mammographic finding?

- A) Palpable masses in young women
- B) Solid masses visible on ultrasound
- C) Suspicious microcalcifications or lesions only visible on mammogram (not detectable by ultrasound)
- D) Simple cysts requiring fluid aspiration

8. What is a 'needle localization' procedure in breast imaging, and when is it used?

- A) Placement of a wire or marker under imaging guidance to mark a non-palpable lesion for the surgeon prior to surgical excision
- B) Aspiration of a breast cyst with a needle
- C) Injection of contrast into the breast ducts
- D) Placement of a chemotherapy port

9. Breast MRI uses gadolinium contrast. What is the primary clinical indication for breast MRI beyond standard mammography?

- A) Routine screening for all women over 40
- B) Evaluating simple breast cysts
- C) Replacing mammography in all women with dense breasts
- D) High-risk screening (BRCA+ or lifetime risk >20%), extent of disease in newly diagnosed cancer, and problem-solving for equivocal cases

10. In the 'Breast RadPath Conference' video, what is the purpose of correlating radiology findings with pathology results?

- A) To increase the number of biopsies performed
- B) To verify that the biopsy pathology is concordant with the imaging appearance, and if discordant, consider rebiopsy
- C) To replace surgical excision
- D) To teach pathologists how to read mammograms

11. Which of the following describes the mammographic appearance of a benign fibroadenoma?

- A) Oval/round, circumscribed mass, possibly with coarse calcifications
- B) Irregular, spiculated mass with pleomorphic calcifications
- C) Linear branching calcifications in a segmental distribution
- D) Architectural distortion with no associated mass

12. Current American College of Radiology (ACR)/Society of Breast Imaging (SBI) guidelines recommend annual screening mammography beginning at age ___ for average-risk women.

- A) 35
- B) 40
- C) 50
- D) 25

13. Nipple discharge is a common breast symptom. Which type of nipple discharge is most worrisome for underlying malignancy?

- A) Bilateral milky discharge in a woman taking antipsychotics

- B) Bilateral multi-duct green/gray discharge
- C) Unilateral, spontaneous, single-duct, bloody or clear (watery) discharge
- D) Bilateral non-spontaneous serous discharge elicited only with squeezing

14. In breast ultrasound, which features of a breast mass suggest malignancy?

- A) Oval shape, circumscribed margins, posterior enhancement
- B) Well-defined thin capsule with homogeneous echogenicity
- C) Compressible, anechoic, no internal echoes
- D) Non-parallel (Taller-than-wide) orientation, irregular margins, posterior acoustic shadowing, and hypoechoic solid mass

15. The Breast RadPath and emergency breast videos emphasize that breast imaging findings must always be interpreted in clinical context. Which scenario would most appropriately result in BI-RADS 3 (probably benign, 6-month follow-up)?

- A) A 65-year-old with a new spiculated mass on mammogram
- B) A oval circumscribed hypoechoic solid mass on ultrasound in a 28-year-old with no risk factors
- C) A new area of architectural distortion in a post-lumpectomy patient
- D) Two similar appearing round circumscribed masses in the left breast and one similar appearing round circumscribed in the right breast on a screening mammogram, for which the masses are nonpalpable.

MODULE 8: Nuclear Medicine

1. A HIDA scan (hepatobiliary iminodiacetic acid scan) evaluates the hepatobiliary system. What radiopharmaceutical is used and how does it work?

- A) I-131
- B) Tc-99m IDA derivative
- C) FDG (fluorodeoxyglucose), D) Gallium-67]

2. On a HIDA scan, what finding indicates acute cholecystitis?

- A) Delayed hepatic uptake and no biliary excretion
- B) Prompt gallbladder visualization within 5 minutes
- C) Non-visualization of the gallbladder at 60 minutes (or 4 hours with morphine augmentation) with normal hepatocyte uptake and ductal excretion
- D) Radiotracer accumulation in the kidneys only

3. A bone scan uses Tc-99m MDP (methylene diphosphonate). What does increased uptake ('hot spots') on a bone scan indicate?

- A) Areas of decreased bone density
- B) Areas of increased osteoblastic activity/bone turnover
- C) Areas of bone marrow fat
- D) Purely normal bone remodeling with no pathological significance

4. A tagged red blood cell (tagged RBC) scan is used to detect which clinical condition?

- A) Pulmonary embolism
- B) Renal vascular disease

- C) Active gastrointestinal (GI) bleeding
- D) Hepatocellular carcinoma

5. A V/Q (ventilation/perfusion) scan is used to evaluate for pulmonary embolism. Which result pattern is most consistent with PE?

- A) Diffuse decreased ventilation and perfusion
- B) Segmental or lobar perfusion defects with normal ventilation in the same region
- C) Normal perfusion with areas of decreased ventilation
- D) Normal V/Q scan with no defects

6. A myocardial perfusion scan (MPS) using Tc-99m sestamibi evaluates coronary artery disease. What does a 'reversible perfusion defect' indicate?

- A) Stress-induced ischemia in a viable territory (reduced flow with stress, normalizes at rest = ischemia)
- B) Myocardial infarction with no viable tissue
- C) Normal myocardial perfusion
- D) Pericardial effusion

7. PET/CT using FDG (fluorodeoxyglucose) exploits which metabolic property of cancer cells?

- A) Increased fat metabolism in tumors
- B) Decreased glucose consumption in malignant cells
- C) Increased glucose uptake and glycolysis (Warburg effect)
- D) Selective uptake of iodine by all tumors

8. A MUGA (Multi-Gated Acquisition) scan is used to assess which cardiac parameter?

- A) Coronary artery anatomy
- B) Left (and right) ventricular ejection fraction (LVEF)
- C) Valvular regurgitation severity
- D) Pericardial effusion volume

9. In a patient with choledocholithiasis with CBD obstruction, which HIDA scan finding differentiates CBD obstruction from acute cholecystitis?

- A) Both show identical HIDA patterns
- B) CBD obstruction shows immediate gallbladder filling
- C) Cholecystitis shows no hepatic uptake
- D) CBD obstruction shows no excretion into duodenum OR gallbladder

10. Bone densitometry (DEXA scan) measures bone mineral density. What T-score defines osteoporosis?

- A) T-score ≥ 0
- B) T-score between -1 and -2.5 (osteopenia)
- C) T-score ≤ -2.5 (osteoporosis)
- D) T-score > -1 (normal)

11. The oncologic imaging Radtiorial (CREATERAD) describes how PET/CT is used in cancer staging. What does SUV (Standardized Uptake Value) represent?

- A) The size of a tumor lesion in centimeters

- B) A semi-quantitative measure of FDG uptake normalized to injected dose and body weight, used to assess metabolic activity
- C) The radiation dose received by the patient
- D) The number of positive lymph nodes

12. Which nuclear medicine study is most appropriate for evaluating a patient with thyroid cancer for metastatic disease?

- A) I-131 (radioiodine) whole body scan
- B) Tc-99m MDP bone scan
- C) FDG PET/CT
- D) V/Q scan

13. Which patient preparation is most critical before a bone scan to reduce background activity and improve image quality?

- A) Fasting for 12 hours
- B) Stopping all medications for 48 hours
- C) Adequate hydration and voiding before imaging to clear renal radiotracer excretion and reduce bladder activity
- D) Administration of Lugol's iodine to protect the thyroid

14. In oncologic FDG-PET imaging, which normal organ shows high physiologic FDG uptake and could be confused with disease?

- A) Liver only
- B) Skeletal muscle only
- C) Thyroid gland
- D) Brain, myocardium (variable), and urinary tract (FDG excreted renally)

15. Which of the following best describes the difference between planar scintigraphy and SPECT?

- A) Planar uses CT; SPECT uses MRI for anatomic correlation
- B) Planar scintigraphy produces 2D projection images; SPECT rotates the gamma camera around the patient to create 3D tomographic slices with better lesion contrast and localization
- C) SPECT uses positron emitters; planar uses gamma emitters
- D) They are identical techniques with different names

MODULE 9: Interventional Radiology

1. Interventional radiology (IR) is broadly categorized into which two major domains based on the vascular system?

- A) Diagnostic radiology and therapeutic radiology
- B) Vascular IR (arterial/venous procedures) and non-vascular IR (biopsies, drainages, biliary, GU interventions)
- C) Oncologic IR and trauma IR
- D) Inpatient IR and outpatient IR

2. Which of the following best describes the Seldinger technique, the foundation of vascular access in IR?

- A) Direct cut-down surgical access to the artery
- B) Blind insertion of a large-bore catheter
- C) Needle puncture of the vessel → guidewire insertion through needle → needle removal → catheter/sheath advancement over guidewire
- D) Ultrasound-guided direct catheter insertion without a wire

3. Uterine Fibroid Embolization (UFE) treats symptomatic fibroids by:

- A) Surgically removing the uterus (hysterectomy)
- B) Occluding both uterine arteries with embolic agents, causing fibroid ischemia and infarction while preserving the uterus
- C) Injecting chemotherapy directly into the fibroids
- D) Performing laparoscopic laser ablation of fibroids

4. Prostate Artery Embolization (PAE) is performed for which condition?

- A) Benign prostatic hyperplasia (BPH) causing symptomatic lower urinary tract symptoms (LUTS)
- B) Prostate cancer with bony metastases
- C) Acute prostatitis
- D) Erectile dysfunction

5. In image-guided percutaneous biopsy (a non-vascular IR procedure), which imaging modalities are commonly used for guidance?

- A) Plain radiograph only
- B) MRI only (for all biopsies)
- C) PET/CT only
- D) CT, ultrasound, and fluoroscopy — choice depends on lesion location, depth, and visibility on each modality

6. A transjugular intrahepatic portosystemic shunt (TIPS) is used to treat which condition?

- A) Hepatic artery thrombosis after liver transplant
- B) Hepatocellular carcinoma
- C) Portal hypertension complications (refractory variceal hemorrhage, refractory ascites, hepatorenal syndrome)
- D) Biliary obstruction

7. In interventional oncology, thermal ablation (radiofrequency ablation, microwave ablation, or cryoablation) is used for treating small tumors. What is the general size threshold beyond which ablation is less effective for hepatic tumors?

- A) >1 cm
- B) >3–5 cm (optimal candidates are tumors ≤3 cm; effectiveness decreases for larger lesions)
- C) >10 cm
- D) There is no size limitation for ablation

8. Peripheral arterial disease (PAD) treated by IR typically involves which procedures?

- A) IV thrombolytics only
- B) Surgical bypass only
- C) Percutaneous angioplasty (PTA) ± stenting of stenotic/occluded peripheral arteries, and catheter-directed thrombolysis for acute occlusions
- D) Embolization of peripheral arteries

9. Which of the following is a common complication of percutaneous nephrostomy (PCN) placement, a procedure covered in the non-vascular IR module?

- A) Pneumothorax and hemothorax only
- B) Intestinal obstruction
- C) Aortic injury
- D) Hematuria, urinary tract infection/urosepsis, tube dislodgement, and potential injury to adjacent bowel or pleura

10. The CIRSE curriculum describes two pathways to becoming an IR physician in the United States. What are they?

- A) Fellowship-only pathway and general surgery residency
- B) Integrated IR (DR/IR) residency (6-year program directly from medical school) and Independent pathway (5-year DR residency + 1-year IR fellowship)
- C) Radiology residency and then cardiology fellowship
- D) IR is only accessible after a surgery residency

11. During clinical observation of a vascular IR procedure, you witness diagnostic angiography. What does this procedure involve?

- A) CT scan of the blood vessels using oral contrast
- B) MRI evaluation of vessel wall without contrast
- C) Injection of iodinated contrast through a selectively positioned catheter under fluoroscopic guidance to map vascular anatomy
- D) Ultrasound evaluation of vessel diameter

12. A patient presents with acute lower GI hemorrhage uncontrolled by endoscopy. Which IR intervention is most appropriate?

- A) TIPS procedure
- B) Mesenteric angiography with super-selective embolization of the bleeding vessel
- C) Inferior vena cava filter placement
- D) Biliary drainage

13. What is a biliary drainage procedure (percutaneous transhepatic cholangiography/PTCD), and when is it indicated?

- A) IV injection of contrast to image the bile ducts
- B) Surgical bypass of the common bile duct
- C) Percutaneous placement of a drainage catheter into the biliary tree to relieve biliary obstruction when ERCP is technically impossible or has failed
- D) Radiofrequency ablation of the bile duct

14. Inferior vena cava (IVC) filter placement is an IR procedure. What is the primary indication for IVC filter placement?

- A) Prevention of DVT in all post-surgical patients
- B) DVT/PE in patients with contraindication to anticoagulation, or recurrent PE despite therapeutic anticoagulation
- C) Treatment of varicose veins
- D) Management of portal hypertension

MODULE 10: Pediatric Radiology

1. Which of the following best describes why radiation dose reduction is especially important in pediatric patients?

- A) Children have smaller body habitus, requiring less radiation to obtain images
- B) Pediatric X-ray units use higher kV than adult units
- C) Children have rapidly dividing cells, higher radiosensitivity, and longer life expectancy — the same dose confers greater lifetime cancer risk than in adults
- D) Children receive the same dose as adults on all studies

2. The 'Game of Unknowns: Pediatric Edition' activity on the curriculum covers common pediatric diagnoses. Which of the following pediatric conditions classically presents with a 'double bubble sign' on abdominal X-ray?

- A) Hypertrophic pyloric stenosis
- B) Duodenal atresia
- C) Malrotation with midgut volvulus
- D) Intussusception

3. A 3-week-old male infant presents with projectile vomiting after feeds. Ultrasound shows a pyloric muscle thickness >4 mm and pyloric channel length >17 mm. What is the diagnosis?

- A) Hypertrophic pyloric stenosis (HPS)
- B) Gastroesophageal reflux
- C) Duodenal atresia
- D) Intussusception

4. Non-accidental trauma (NAT) / child abuse imaging follows specific ACR guidelines. Which skeletal survey finding is considered 'high specificity' for child abuse?

- A) Clavicle fracture in a newborn
- B) Toddler's fracture of the tibia in a walking child
- C) Greenstick fracture of the radius
- D) Classic metaphyseal lesion (bucket-handle or corner fracture) in an infant, posterior rib fractures, and complex skull fractures

5. A child presents with sudden onset colicky abdominal pain, vomiting, and 'currant jelly' stool. Ultrasound shows a target sign. What is the diagnosis and first-line treatment?

- A) Appendicitis; emergent appendectomy
- B) Malrotation; emergent Ladd procedure
- C) Intussusception; pneumatic (air) or hydrostatic (contrast) enema reduction under fluoroscopic guidance
- D) Meckel's diverticulum; Tc-99m pertechnetate scan

6. The Cleveland Clinic Pediatric Radiology online modules include various topics. Which pediatric lung pathology is characterized by diffuse bilateral granular opacities and air bronchograms in a premature infant?

- A) Transient tachypnea of the newborn (TTN)

- B) Respiratory distress syndrome (RDS) / Hyaline membrane disease due to surfactant deficiency
- C) Meconium aspiration syndrome
- D) Neonatal pneumonia

7. ACR Building Blocks 'Special Considerations when Imaging Children' emphasizes that children are not 'small adults.' Which approach minimizes radiation in pediatric CT?

- A) Using adult protocols but with smaller image fields of view
- B) Performing CT without IV contrast in all children
- C) Replacing CT entirely with plain radiographs for all pediatric conditions
- D) Using weight/size-adjusted protocols with reduced kV, mAs, noise index adjustments, and iterative reconstruction (ALARA/Image Gently principles)

8. A 2-year-old presents with an abdominal mass. Ultrasound shows a large heterogeneous intrarenal mass. What is the most likely diagnosis?

- A) Wilms' tumor (nephroblastoma)
- B) Neuroblastoma
- C) Hepatoblastoma
- D) Rhabdomyosarcoma

9. Transient tachypnea of the newborn (TTN) is a common neonatal respiratory condition. What is its characteristic chest X-ray appearance, and how does it differ from RDS?

- A) They are identical on CXR
- B) TTN shows pneumothorax; RDS shows consolidation
- C) TTN: perihilar streaky densities, fluid in fissures, mild cardiomegaly, normal or high lung volumes, resolves in 24–48h; RDS: diffuse granular opacification with air bronchograms and low lung volumes
- D) TTN affects premature infants; RDS affects term infants

10. The Radiopaedia pediatric radiology playlist includes a case of a child with an elbow injury. The CRITOE mnemonic helps remember the sequence of elbow ossification centers. What does CRITOE stand for?

- A) Coronoid, Radial, Intercondylar, Trochlear, Olecranon, Epicondyle
- B) Capitellum, Radial head, Internal (medial) epicondyle, Trochlea, Olecranon, External (lateral) epicondyle — in order of ossification
- C) Cortex, Radial shaft, Interosseous, Trochlear groove, Olecranon fossa, Epicondyles
- D) Cuboid, Radius, Insertion, Tendon, Ossification, Epiphysis

11. In suspected pediatric non-accidental trauma (NAT), what is a skeletal survey, and why is it performed?

- A) A single X-ray of the most injured area only
- B) A standardized series of 20+ views covering all skeletal regions to identify occult fractures, especially those in multiple stages of healing
- C) MRI of the entire body without radiation
- D) CT of the chest and abdomen only

12. A child with cystic fibrosis presents with worsening respiratory symptoms. Which of the following CXR findings is most expected in advanced cystic fibrosis lung disease?

- A) Normal CXR
- B) Unilateral pleural effusion

- C) Hyperinflation, bronchiectasis (ring shadows and tramline opacities), peribronchial thickening, mucus plugging, upper lobe predominance
- D) Bilateral hilar adenopathy with no parenchymal changes

13. The ACR Approach to Pediatric Radiology Building Blocks module emphasizes which unique consideration when using iodinated IV contrast in neonates?

- A) Neonates require double the adult contrast dose per kilogram
- B) Neonatal thyroid is sensitive to iodine load from contrast, risking transient hypothyroidism — thyroid function should be monitored after contrast administration
- C) Iodinated contrast is absolutely contraindicated in all neonates
- D) Neonates never develop contrast-induced nephropathy

14. In pediatric radiology, the 'football sign' on an abdominal radiograph is associated with which condition?

- A) Massive pneumoperitoneum —
- B) Intussusception
- C) Meconium ileus
- D) Duodenal atresia