Interventional Radiology

Interventional radiology is now a primary specialty that is closely aligned with diagnostic radiology. Diagnostic radiologists must demonstrate in-depth knowledge related to basic image-guided procedures and must have an understanding of the indications, contraindications, and complications of more complex interventional radiology procedures. In addition, diagnostic radiologists must demonstrate knowledge of imaging findings pertinent to the domain of interventional radiology. The Qualifying (Core) Exam assesses the candidate’s knowledge of imaging, procedural, and clinical aspects of interventional radiology pertinent to the safe and effective practice of diagnostic radiology.

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Domain Critical Concepts

1. Possess knowledge of tools of interventional radiology including imaging modalities used for diagnosis and intervention
2. Be familiar with vascular IR tools and techniques related to embolization, locoregional tumor management, recanalization, and management of thromboembolic disease
3. Understand non-vascular IR techniques and devices: biopsy, aspiration, drainage, ablation, biliary drainage, urinary drainage, and gastrointestinal intervention
4. Understand radiation and biohazard safety related to IR
5. Be familiar with patient care issues including physical exam, consent, sedation, pre-, peri- and post-procedure care.
6. Understand pharmacology related to IR procedures
7. Diagnose emergencies related to IR procedures
8. Identify imaging findings of vascular diseases pertinent to IR

Domain Blueprint

1. Fundamentals of image-guided intervention and invasive diagnostic procedures: 15%-20%
   a. Imaging modalities used to guide procedures
      i. Fluoroscopy
      ii. US
      iii. CT
      iv. MR
      v. DSA
   b. Basic tools
      i. Needles
      ii. Guidewires
      iii. Catheters
c. Access techniques
   i. Arterial
   ii. Venous
   iii. Hollow organ
   iv. Solid organ
d. Devices and techniques for complex vascular intervention
   i. Arterial/venous embolization
   ii. Arterial/venous recanalization
   iii. Locoregional management of malignancy
   iv. Management of thromboembolic disease
   v. Foreign body retrieval
e. Devices and techniques for nonvascular interventions
   i. GI
   ii. GU
   iii. Biliary
   iv. Biopsy
   v. Drainage
   vi. Ablation
f. Patient care in interventional radiology
   i. Focused history and physical
   ii. Informed consent
   iii. Sedation
   iv. Contrast agents
   v. Pharmacologic agents pertinent to IR
   vi. Management of emergencies: contrast allergy, oversedation, bleeding, sepsis
   vii. Peri-procedural patient care and follow up
2. Vascular imaging and diagnosis: 15%-20%
a. Normal and variant vascular anatomy
   i. Arterial
   ii. Venous
   iii. Pulmonary
   iv. Portal
b. Vascular pathophysiology imaging findings
   i. Angiographic findings of vascular disease – examples are stenosis, occlusion, aneurysm, dissection
   ii. Arterial disorders
   iii. Venous disorders
   iv. Vascular malformations
3. Systemic arterial interventions¹ (territories include the aorta and its branches in the thorax, abdomen, pelvis and extremities): 20%
a. Indications
i. Trauma
ii. Iatrogenic injury
iii. Hemorrhage
iv. Acute or chronic ischemia
v. Benign or malignant tumor
vi. High flow vascular malformation
vii. Aneurysmal disease

b. Techniques
   i. Angiography
   ii. Angioplasty
   iii. Stent placement – bare, covered
   iv. Embolization – plug, coil, particulate (permanent, temporary), liquid, sclerosant
   v. Chemoembolization
   vi. Lysis / Thrombectomy
   vii. Arterial closure; management of access site complications

4. Nonarterial vascular intervention and invasive diagnostic procedures\(^1\): 20%
   a. Systemic venous intervention indications
      i. Chronic central venous occlusion
      ii. Deep venous thrombosis
      iii. Venous insufficiency – pelvic, gonadal, lower extremity
      iv. Malfunction of hemodialysis graft/fistula
      v. Retained foreign body
      vi. Low flow vascular malformation
      vii. Need for diagnostic information
      viii. Need for central venous access
   b. Systemic venous intervention techniques
      i. Venography
      ii. Angioplasty
      iii. Stent placement
      iv. Lysis/thrombectomy
      v. Caval filtration
      vi. Embolization/sclerosis
      vii. Foreign body retrieval
      viii. Venous sampling
      ix. Transvenous biopsy
      x. Venous access device placement
   c. Portal venous interventions
      i. TIPS
      ii. Variceal obliteration
      iii. Recanalization / angioplasty / stent placement
   d. Pulmonary artery interventions
      i. Management of pulmonary emboli – lysis, thrombectomy
ii. Arteriovenous malformation management

e. Lymphatic interventions
   i. Lymphangiography
   ii. Thoracic duct embolization

5. Nonvascular interventions and invasive diagnostic procedures\(^1\):25%
   a. Percutaneous biopsy
   b. Abscess drainage
   c. Tumor ablation – hepatic, renal, lung
   d. Management of noninfected fluid collections
      i. Simple drainage
      ii. Tunneled catheter
      iii. Sclerosis
   e. Gastrointestinal interventions
      i. Enteral access for feeding or decompression
      ii. Stricture management
   f. Biliary interventions
      i. Percutaneous transhepatic cholangiography
      ii. Transhepatic biliary drainage
      iii. Cholecystostomy tube placement
      iv. Biliary stone management
      v. Biliary stricture management
   g. Renal and urinary tract interventions
      i. Percutaneous nephrostomy
      ii. Nephroureteral stent / ureteral stent
      iii. Ureteroplasty
      iv. Suprapubic cystostomy
   h. Reproductive tract interventions
      i. Hysterosalpingography
      ii. Fallopian tube interventions

\(^1\)The exam will assess the candidate’s knowledge of the procedural technique and imaging findings, as well as procedural indications, contraindications, pre-procedure work-up, post-procedure follow-up, and potential procedural complications.

**Domain Overview**

1. **Basic Procedures**
   Questions will assess whether the candidate possesses the knowledge and skills needed for safe and effective care before, during, and after the procedure. Candidates are expected to have a detailed knowledge of the procedure, as well as pre- and post-procedure care. Candidates should know how to recognize and manage complications of these procedures.
1. Biopsies and aspirations: neck, chest, abdomen, pelvis, and extremities, including thyroid, lung, chest wall, liver, pancreas, renal, retroperitoneal, pelvic, and extremity. Note: breast biopsies will be covered in the mammography section. Bone biopsies will be covered in the musculoskeletal section and lumbar punctures will be covered in the neuroradiology section.

2. Abscess drainage: uncomplicated chest, abdomen, pelvic, and superficial abscesses

3. Catheter injections: cholangiography, abscessogram, nephrostograms, and feeding tube checks

4. Central venous access: PICCs and uncomplicated non-tunneled catheters

5. Extremity venography

2. Complex Procedures

Because these procedures are typically performed by radiologists with more specialized training, Qualifying (Core) Exam candidates are not expected to possess the knowledge, skills, and abilities required to perform these procedures. However, candidates are responsible for a general knowledge of these procedures. Test items will also cover pre- and post-procedure care in more detail because general radiologists are often the first to encounter patients whose clinical presentation and imaging findings warrant these complex interventions. Candidates are also expected to correctly distinguish between expected and unexpected clinical and imaging findings after these procedures.

1. Arteriography and arterial interventions, including angioplasty, stent placement, stent graft placement, embolization, thrombectomy, and lytic therapy

2. Central venography and venous interventions, including inferior vena cava (IVC) filter placement, IVC filter retrieval, angioplasty, stent placement, lysis, thrombectomy, sclerosis, tunneled/implanted catheter placement, dialysis interventions, and TIPS.

3. Biliary interventions, including percutaneous transhepatic cholangiography (PTC), internal/external drainage, stent placement, stone removal, and percutaneous cholecystostomy

4. Nephrostomy and ureteral stent placement, manipulation, and exchange

5. Locoregional tumor management (radiofrequency, cryoablation, bland embolization, chemoembolization, and radioembolization)

6. Feeding tube placement, manipulation, and exchange

7. Complicated drainages, including transrectal drainage, tunneled catheter placement for pleural/peritoneal collections, and pediatric procedures