

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

- iv. Contrast agents
 - 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 procedures¹: 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 procedures¹:25%
 - 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

¹The 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