

ACGME Program Requirements for Graduate Medical Education in Vascular and Interventional Radiology

Effective: January, 2005

In addition to complying with the Program Requirements for Graduate Medical Education in the Subspecialties of Diagnostic Radiology, programs must comply with the following requirements, which in some cases exceed the common requirements.

I. Introduction

I.A. Definition and Scope of the Subspecialty

- I.A.1. The unique clinical and invasive nature of practice in vascular and interventional radiology requires special training and skills.
- I.A.2. The educational program in the subspecialty of vascular and interventional radiology must be organized to provide comprehensive, full-time training and a supervised experience in the evaluation and management of patients potentially requiring diagnostic vascular imaging guided interventional procedures.
- I.A.3. The training must include a supervised experience in performance of imaging-guided diagnostic and interventional procedures used to treat a variety of disorders.
- I.A.4. Vascular and interventional procedures are guided by a number of imaging modalities, including fluoroscopy, angiography, computed tomography, ultrasonography, magnetic resonance imaging, radionuclide scintigraphy, and others included within the specialty of radiology.
- I.A.5. The training program must be structured to enhance substantially the subspecialty fellows' knowledge of the application of all forms of imaging to the performance and interpretation of vascular and interventional procedures.
- I.A.6. The program in vascular and interventional radiology must be structured to enhance the subspecialty fellows' knowledge of the signs and symptoms of disorders amenable to diagnosis and/or treatment by percutaneous techniques.
- I.A.7. The program must ensure that the fellow is proficient in taking a history and in the performance of an appropriate physical exam.
- I.A.8. The significance of the signs and symptoms must be understood, as well as the pathophysiology and natural history of the disorders.
- I.A.9. Fellows must know the indications for, contraindications to, and risks of vascular and interventional procedures, and understand the medical and surgical alternatives to those procedures.

- I.A.10. The vascular and interventional radiologist must have a complete understanding of imaging methods used to guide percutaneous procedures.
- I.A.11. Fellows must learn and participate in appropriate follow-up care, including inpatient rounds and longitudinal management of outpatients via clinic visits.
- I.A.12. Fellows must become skilled in the technical aspects of percutaneous procedures.
- I.A.13. The fundamentals of radiation physics, radiation biology, and radiation protection should all be reviewed during the vascular and interventional training experience.
- I.A.14. In addition, training should provide opportunities for research into new technologies and evaluation of the clinical outcomes of interventional radiology.

I.B. Duration and Scope of Education

- I.B.1. The program shall offer 1 year of graduate medical education in vascular and interventional radiology.
- I.B.2. Prerequisite training for entry into a diagnostic radiology subspecialty program should include the satisfactory completion of a diagnostic radiology residency program accredited by the Accreditation Council for Graduate Medical Education (ACGME) or the Royal College of Physicians and Surgeons of Canada (RCPSC), or other training judged suitable by the program director.

I.C. Faculty/Fellow Numbers

To ensure an adequate educational experience, as well as adequate supervision and evaluation of a fellow's academic progress the faculty-to-fellow, ratio must not be less than one full-time faculty person for every fellow.

II. Program Director/Faculty

II.A. Program Director

The program director must be certified by the American Board of Radiology in Diagnostic Radiology or Radiology and have subspecialty certification (CAQ) in Vascular and Interventional Radiology from the American Board of Radiology, or possess qualifications judged to be acceptable by the RRC.

II.B. Faculty

- II.B.1. There should be sufficient qualified professional personnel to constitute a teaching faculty.

- II.B.2. The faculty should comprise at least two full-time vascular and interventional radiologists, including the program director.
- II.B.3. While the expertise of any one faculty member may be limited to a particular aspect of vascular and interventional radiology, the training program must provide experience that includes all aspects of vascular and nonvascular interventional radiology, and including both the technical aspects as well as clinical patient evaluation and management.
- II.B.4. The faculty must provide didactic teaching and direct supervision of fellows' performance in clinical patient management, as well as in the procedural, interpretative, and consultative aspects of vascular and interventional radiology.
- II.B.5. The faculty must demonstrate a commitment to the subspecialty of vascular and interventional radiology.
- II.B.5.a) Such commitment includes membership in professional societies in this field, publications in this field, and/or a minimum of 30 hours of CME Category I credit per year.

III. Facilities and Resources

III.A. Space and Equipment

- III.A.1. Modern imaging/procedure rooms and equipment in adequate space must be available to permit the performance of all vascular and interventional radiologic procedures.
- III.A.2. Imaging modalities in the department should include fluoroscopy, digital subtraction angiography, computed tomography, ultrasonography, magnetic resonance imaging, and radionuclide scintigraphy.
- III.A.3. Fluoroscopic equipment should be high resolution and have digital display with post-procedure image processing capability.
- III.A.4. Rooms in which vascular and interventional procedures are performed must be equipped with physiologic monitoring and resuscitative equipment.
- III.A.5. Suitable recovery and patient holding areas should be available.
- III.A.6. Adjacent to or within procedure rooms, there should be facilities for storing catheters, guide wires, contrast materials, embolic agents, and other supplies.
- III.A.7. There must be adequate space and facilities for image display, image interpretation, and consultation with other clinicians.
- III.A.8. Space, separate from the procedure rooms, should be available for patient consultations and non-procedural follow-up visits.

- III.A.9. The space should be conducive to patient privacy and the conducting of physical examinations.
- III.A.10. There must be adequate office space and support space for vascular and interventional radiology faculty or staff and fellows.
- III.B. Patient Population
 - III.B.1. The institution's patient population must have a diversity of illnesses from which a broad experience in vascular and interventional radiology can be obtained.
 - III.B.2. There must also be an adequate variety and number of interventional procedures for each fellow.
 - III.B.3. Fellows must document their direct participation in a minimum of 500 vascular and interventional procedures that cover the entire range of the specialty.
 - III.B.4. These procedures should be recorded in a personal case log that should be reviewed quarterly with the program director.
 - III.B.5. Clinical experience may be supplemented by training affiliations to other institutions.
- III.C. Library
 - III.C.1. Teaching resources must include a medical library with access to a variety of textbooks and journals in radiology, vascular and interventional radiology, and related fields.
 - III.C.2. There should be a coded vascular and interventional radiology learning file.
 - III.C.3. Fellows should have access to computerized literature search facilities.
- III.D. Support Services
 - III.D.1. Pathology and medical laboratory services and consultation must be regularly and conveniently available to meet the needs of patients, as determined by the medical staff. Services should be available 24 hours a day.
 - III.D.2. At least one qualified medical technologist must be on duty or available at all times.
 - III.D.3. Diagnostic laboratories for the noninvasive assessment of peripheral vascular disease also must be available.
 - III.D.4. Nursing support must be readily available.

III.E. Research Facilities

The institution should provide laboratory and ancillary facilities to support research projects. These laboratory facilities and research opportunities may be made available to vascular and interventional radiology fellows through cooperative arrangements with other departments or institutions.

IV. The Educational Program

IV.A. Clinical Components

IV.A.1. The training program curriculum must include didactic and clinical experiences that encompass the full clinical spectrum of vascular and interventional radiology.

IV.A.1.a) Fellows must have the opportunity to carry out all of the following under close, graded responsibility and supervision:

IV.A.1.a).(1) clinical pre-procedure evaluation of patients;

IV.A.1.a).(2) interpretation of diagnostic studies;

IV.A.1.a).(3) consultation with clinicians on other services;

IV.A.1.a).(4) performance of vascular and interventional procedures;

IV.A.1.a).(5) generation of formal consultation reports;

IV.A.1.a).(6) procedural reports;

IV.A.1.a).(7) follow-up communications with referring physicians; and,

IV.A.1.a).(8) delivery of both short- and long-term follow-up care, including both in-patient rounds and scheduled out-patient clinical responsibilities.

IV.A.1.b) The continuity of care must be of sufficient duration to enable fellows to obtain appropriate comment regarding the management of patients under their care.

IV.A.2. Both vascular and nonvascular interventional procedures must be included in the training program.

IV.A.2.a) Examples of vascular procedures include but are not limited to:

IV.A.2.a).(1) arteriography;

IV.A.2.a).(2) venography;

IV.A.2.a).(3) lymphography;

- IV.A.2.a).(4) angioplasty;
- IV.A.2.a).(5) vascular stenting;
- IV.A.2.a).(6) percutaneous revascularization procedures;
- IV.A.2.a).(7) embolotherapy;
- IV.A.2.a).(8) transcatheter infusion therapy;
- IV.A.2.a).(9) intravascular foreign body removal; and,
- IV.A.2.a).(10) percutaneous placement of endovascular prostheses such as stent grafts and inferior vena cava filters and insertion of vascular access catheters.

- IV.A.2.b) Examples of nonvascular procedures include, but are not limited to:
 - IV.A.2.b).(1) percutaneous imaging-guided biopsy;
 - IV.A.2.b).(2) percutaneous gastrostomy;
 - IV.A.2.b).(3) percutaneous nephrostomy;
 - IV.A.2.b).(4) ureteral stenting and other transcatheter genitourinary procedures for diagnosis and for treatment of lithiasis, obstruction, and fistula;
 - IV.A.2.b).(5) percutaneous transhepatic and transcholecystic biliary procedures;
 - IV.A.2.b).(6) percutaneous drainage for diagnosis and treatment of infections and other fluid collections; and,
 - IV.A.2.b).(7) percutaneous imaging-guided procedures such as ablation of neoplasms and cysts.

- IV.A.2.c) Fellows must have specific clinical time dedicated to the performance and interpretation of vascular ultrasound studies, magnetic resonance angiograms, and CT angiograms.

- IV.A.3. The responsibility or independence given to fellows must depend on an assessment of their knowledge, manual skill, and experience. In supervising fellows during vascular and interventional procedures.
 - IV.A.3.a) Faculty members should reinforce the understanding gained during fellowship training of x-ray generators, image intensifiers, film processing, ultrasonography, computed tomography, and other imaging modalities.

- IV.A.3.b) Fellows must be provided with instruction in the use of needles, catheters, guide wires, balloons, stents, and other interventional devices, and must be directly supervised and given graduated responsibility in the performance of procedures as competence increases.
- IV.A.3.c) A thorough understanding of the clinical indications, risks, interpretation, and limitations of vascular and interventional procedures is essential to the practice of vascular and interventional radiology.
- IV.A.3.c).(1) Fellows must be instructed in these areas.
- IV.A.3.d) Fellows should also be instructed in proper use and interpretation of laboratory tests and in methods that are adjunctive to vascular and interventional procedures, such as use of physiologic monitoring devices, noninvasive vascular testing, and noninvasive vascular imaging.
- IV.A.3.e) There shall be specific instruction in the clinical aspects of patient assessment, patient treatment, planning, and patient management related to vascular and interventional radiology in both inpatient and outpatient settings.
- IV.A.3.f) There also should be instruction in the use of analgesics, antibiotics, and other drugs commonly employed in conjunction with these procedures.
- IV.A.3.g) Fellows must be thoroughly familiar with all aspects of administering and monitoring sedation of the conscious patient. They also must have advanced cardiac life support training and certification.
- IV.A.4. Fellows must be given graded responsibility with respect to longitudinal inpatient and outpatient care for disease processes diagnosed and treated by interventional radiology.
- IV.A.4.a) Fellows should serve as consultants under the supervision of staff vascular and interventional radiologists.
- IV.A.4.b) Direct interactions of residents with patients must be closely observed to ensure that appropriate standards of care and concern for patient welfare are strictly maintained.
- IV.A.4.c) Communication, consultation, and coordination of care with the referring clinical staff and clinical services must be maintained and documented with appropriate notes in the medical record.

- IV.A.4.d) Reports for the medical record generated by fellows should be closely reviewed by faculty for accuracy of content, grammar, style, and level of confidence.
- IV.A.4.e) The vascular and interventional fellows should also assist and train diagnostic radiology residents in the performance and interpretation of procedures.
- IV.B. Didactic Components
 - IV.B.1. There shall be scheduled intradepartmental conferences as well as conferences with related clinical departments in which fellows participate on a regular basis.
 - IV.B.1.a) These should include one or more specific weekly departmental conferences and at least one interdisciplinary conference per week at which attendance is required.
 - IV.B.1.b) In particular, interdepartmental conferences with the surgical specialties should be an important teaching component.
 - IV.B.1.c) The fellows' teaching experience should include conferences with medical students, graduate medical staff, and allied health personnel.
 - IV.B.1.d) Scheduled presentations by fellows during these conferences should be encouraged.
 - IV.B.2. Clinical and basic sciences as they relate to radiology and vascular and interventional radiology should be part of the didactic program.
 - IV.B.2.a) This should include but not be limited to the anatomy, physiology, and pathophysiology of the hematological, circulatory, respiratory, gastrointestinal, genitourinary, and musculoskeletal systems.
 - IV.B.2.b) Relevant pharmacology, patient evaluation and management skills, and diagnostic techniques also should be addressed.
 - IV.B.3. There must be documented regular review of all mortality and morbidity related to the performance of interventional procedures.
 - IV.B.3.a) Fellows must participate actively in this review, which should be held not less frequently than monthly.
 - IV.B.3.b) Fellows should be encouraged to attend and participate in local extramural conferences and to attend at least one national meeting or postgraduate course in interventional radiology while in training.
 - IV.B.3.c) Participation in local or national vascular and interventional radiology societies should be encouraged.

IV.B.3.d) Fellows should be encouraged to present the radiologic aspects of cases that are discussed in multi-disciplinary conferences.

IV.B.3.e) They also should prepare clinically or pathologically proven cases for inclusion in the learning file.

IV.C. Participation of Fellows in Research

IV.C.1. The program should provide instruction in the fundamentals of experimental design, performance, and interpretation of results.

IV.C.2. They should participate in clinical, basic biomedical or health services research projects, and should be encouraged to undertake at least one project as principal investigator.

IV.C.3. They should submit at least one scientific paper or exhibit to a regional or national meeting.

IV.C.4. The opportunity also must be provided for fellows to develop their competence in critical assessment of new imaging modalities and of new procedures in vascular and interventional radiology.

V. Board Certification

The Residency Review Committee will consider as one measure of a program's quality the performance of its graduates on the examination of the American Board of Radiology for subspecialty certification in Vascular and Interventional Radiology. All program graduates should take the examination.

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