How Vascular Surgery Programs Differ From Interventional Radiology and Interventional Cardiology Programs

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Disclosures

• I’m a vascular surgeon
• I’m a program director
How do you train to be a vascular surgeon?

- Independent fellowship (5+2 pathway)
- Integrated Residency (0+5 pathway)
- Alternative pathways
  - Early specialization (4+2)
  - Independent (3+3)
5 years of general surgery residency (+/- ADT)

Followed by a 2 year vascular surgery fellowship

Previously, the most common training pathway

- Vast majority of VS trained this way
- 2018 - 96 fellowship programs (121 spots)

Allows for ABS certification in both:

- General Surgery (primary certificate)
- Vascular Surgery (CAQ - certificate of added qualification)
Vascular Surgery Training – Integrated Residency (0+5 pathway)

• VS made a primary certificate in 2006 (ABS)
  – General Surgery ABS certification no longer required for VS certification
  – Cannot be General Surgery “board certified”

• In 2007 the first THREE vascular residencies appeared
  – 2018 - 54 integrated programs

• 24 months of “core” General Surgery

• Remainder = Vascular Surgery Training (open and endovascular)
Vascular Surgery Training – 4+2, 3+3

• **Early Specialization (4+2) - ESP**
  – Must be done at a single institution
  – 4 years of general surgery training (-1 year)
  – Basically followed by a traditional VS fellowship
  – Allows for ABS Certification in both GS and VS
  – Only 4-5 programs have this pathway

• **Independent (3+3)**
  – 3 years of GS, followed by 3 years of VS
  – ABS Certification in VS only
  – Least common pathway
The vascular surgeon must have advanced knowledge and experience with the management of vascular problems including:

1. All elements of clinical evaluation, including non-invasive testing such as plethysmography, duplex ultrasonography, magnetic resonance imaging, CT scans, angiography, and other diagnostic tests utilized in the diagnosis of vascular disease.

2. Comprehensive management of vascular disease to include screening and surveillance, medical management, drug therapy, risk factor management, and wound management including amputations, as well as other adjunctive procedures.

3. Indications and techniques relating to the open and endovascular treatment of vascular disorders, to include the entire spectrum of interventions used to treat vascular disorders, including such disorders as occlusive, aneurysmal, and inflammatory disease, trauma, and neurovascular compressive syndromes involving the arteries and veins of the body (excluding the intracranial and coronary arteries). These include the aorta and its branches, as well as the arteries of the neck, pelvis and upper and lower extremities, and the venous system.

4. The critical care of the vascular surgery patient.
What’s VS training consist of?

- AAA
- PAD
- HD access
- CVOD
- Peripheral aneurysm
- Arterial/venous trauma
- TAA
- TAAA

- AVM
- Venous disease
- Mesenteric disease
- TOS
- Amputations
- Operate in
  - All extremities
  - Chest
  - Abdomen
  - Head/neck
Vascular Surgery

- ‘The sickest of the sick’
- Patient diversity
- Continuity of care (VS as a primary physician builds long-term relationships w/ patients/families)
- Procedural/technical versatility: ‘VS is not “one-size-fits-all” surgery. Each patient presents an individual vascular problem requiring individualized solutions. Vascular surgeons train to respond with various modalities:
  – Open surgical procedures
  – Endovascular procedures
  – Medical therapies
How do you train to be an Interventional Radiologist?

- **Traditional Pathway**
  - Clinical internship + 4 years of Diagnostic Radiology + 1y IR Fellowship

- **DIRECT Pathway (Diagnostic and Interventional Radiology Enhanced Clinical Training)** – allows up to two years of clinical training to count toward the DR certificate and subspecialty VIR certificate.

- **Clinical Pathway**
  - Provides a broader and more in-depth experience in the clinical diagnosis and care of patients with diseases commonly treated by interventional radiologists.
  - Allows the trainee an opportunity to become more familiar with and/or participate in research to further the field of interventional radiology.
The current IR training structure is undergoing a shift toward the IR Residency.

On or before July 1, 2020, the ‘old’ IR training pathways (Direct Pathway, Clinical Pathway, Traditional Pathway) will no longer be available, and all future IR trainees will have to go through the IR Residency, of which three separate pathways will exist.
The IR residency has two formats: Integrated and Independent.

- **Integrated IR Residency (N=74)**
  - 5 years in length
  - Curriculum is concentrated on diagnostic radiology (Y1-3) and IR (Y4-5)
  - Available to medical students

- **Independent IR Residency**
  - 2 years in length
  - Available to graduates of DR

- Some diagnostic radiology residency programs may offer additional training in IR during the DR residency. This advanced training is termed **Early Specialization in IR (ESIR)**

- Both formats require a preliminary **clinical internship (PGY one year)**. Internship training can be in surgery, internal medicine, pediatrics, a surgical subspecialty or a transitional year.
<table>
<thead>
<tr>
<th>YEAR</th>
<th>Integrated IR Residency</th>
<th>Traditional Pathway</th>
<th>Independent IR Residency</th>
<th>Independent IR Residency with ESIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGY-1</td>
<td>1 year of ACGME approved non-radiology clinical training (internship)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGY-2</td>
<td>Diagnostic radiology training + 3 IR rotations</td>
<td>Diagnostic radiology residency</td>
<td>Diagnostic radiology residency</td>
<td>Diagnostic radiology residency with ESIR: Program requires completion of 12 IR or IR-related rotations and, at least, 500 image-guided procedures within the IR domain.</td>
</tr>
<tr>
<td>PGY-3</td>
<td>2 years of IR training</td>
<td>1 year of IR fellowship training</td>
<td>2 years of IR residency training</td>
<td></td>
</tr>
<tr>
<td>PGY-4</td>
<td></td>
<td>N/A</td>
<td>1 year of IR residency training</td>
<td>N/A</td>
</tr>
<tr>
<td>PGY-5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGY-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGY-7</td>
<td>N/A</td>
<td>N/A</td>
<td>2 years of IR residency training</td>
<td></td>
</tr>
<tr>
<td>Total years of training</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>
Interventional Radiology

An interventional radiologist combines competence in imaging, image-guided minimally invasive procedures, and periprocedural patient care to diagnose and treat benign and malignant conditions of the thorax, abdomen, pelvis, and extremities. Therapies include embolization, angioplasty, stent placement, thrombus management, drainage, and ablation, among others.

Exam Categories

Eighteen categories are included on the exam:

<table>
<thead>
<tr>
<th>Breast Imaging</th>
<th>Thoracic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac Imaging</td>
<td>Urinary</td>
</tr>
<tr>
<td>Gastrointestinal Imaging</td>
<td>Vascular</td>
</tr>
<tr>
<td>Interventional Radiology</td>
<td>Computed Tomography</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>Magnetic Resonance</td>
</tr>
<tr>
<td>Neuroradiology</td>
<td>Radiography/Fluoroscopy</td>
</tr>
<tr>
<td>Nuclear Radiology</td>
<td>Ultrasound</td>
</tr>
<tr>
<td>Pediatric Radiology</td>
<td>Physics</td>
</tr>
<tr>
<td>Reproductive/Endocrinology</td>
<td>Safety</td>
</tr>
</tbody>
</table>
What does IR Training Consist of?

- Endovascular procedures
- PTC
- Percutaneous nephroscopy
- Cholecystostomy
- TIPS
- Percutaneous gastrostomy
- Many other nonvascular procedures

Little to no clinic or inpatient management – *intention of new training model* to enhance clinical care
• Only one training pathway!
• Three years of internal medicine
• Three years of Cardiovascular Medicine
  – Cardiology Fellowship
• One year of Interventional Cardiology
What does Interventional Cardiology Training Consist of?

• Inpatient and clinic management of general medical problems
• Inpatient and clinic management of cardiovascular problems
• Cardiac catheterizations
  – Right and left heart
  – Structural heart
• Little (if any) peripheral vascular and venous training
<table>
<thead>
<tr>
<th>Medical Content Category</th>
<th>% of Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case Selection and Management</td>
<td>20%</td>
</tr>
<tr>
<td>Procedural Techniques</td>
<td>20%</td>
</tr>
<tr>
<td>Complications of Coronary Intervention</td>
<td>8%</td>
</tr>
<tr>
<td>Catheter-Based Management of Noncoronary Disease</td>
<td>13%</td>
</tr>
<tr>
<td>Basic Science</td>
<td>6%</td>
</tr>
<tr>
<td>Anatomy, Anatomic variants, Anatomic pathology</td>
<td>6%</td>
</tr>
<tr>
<td>Pharmacology</td>
<td>12%</td>
</tr>
<tr>
<td>Cardiac Imaging and Assessment</td>
<td>9%</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>6%</td>
</tr>
</tbody>
</table>
## Summary of Training Pathways

<table>
<thead>
<tr>
<th>Vascular</th>
<th>IR</th>
<th>Int Cardiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>5+2 (7)</td>
<td>1+4+1</td>
<td>3+3+1 (7)</td>
</tr>
<tr>
<td>0+5 (5)</td>
<td>Int: 1+3+2 (6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ind: 1+4+2 (7)</td>
<td></td>
</tr>
</tbody>
</table>
Board Exam Content – Patient Care in Non-cardiac Vascular

- Vasc: 70
- IR: 5
- Int Card: 5
Board Exam Content – Venous Disease

- Vasc: 8
- IR: 2
- Int Card: 0
<table>
<thead>
<tr>
<th></th>
<th>IR</th>
<th>Int Card</th>
<th>Vasc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thoracic Outlet</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>AAA</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Thoracic Aorta</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Vascular Trauma</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Vascular Medicine</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Upper Ext</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Mesenteric</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Dialysis</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
End Result of IR Training
End Result of IC Training
End Result of VS Training
Thank You