How to Build a Vascular Ultrasound Lab Program-- A Physician's Perspective

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Venarum
Vascular Therapies

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So, You Want To Start a Vascular Laboratory?

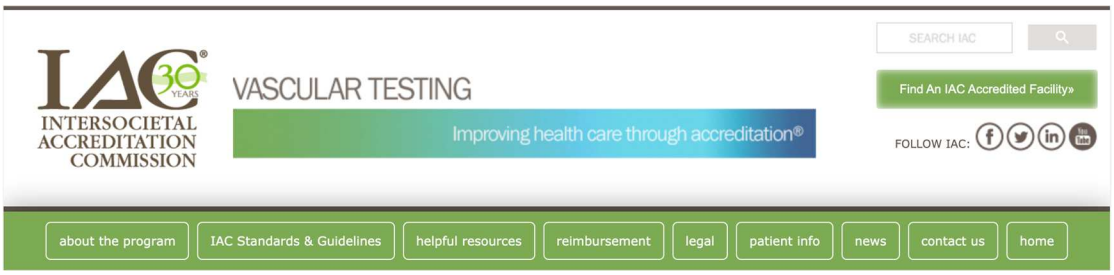
What's Your Motivation?

- Starting a new vascular practice
- Starting a new job where you have been recruited to form and lead a vascular laboratory
- Build your clinical practice
- Interested in clinical research in vascular laboratory testing

There are many factors to consider…

Factors Prior to Starting a Vascular Lab

- Have you been adequately trained?
- Do you have the optimal certification?
- How committed are you to quality?
- Do you have the financial backing?
  - Space
  - Equipment
  - Hiring power
  - Financial/accounting/billing/ administrative support
- Courage (after all, this is a highly competitive endeavor)



Start With The Guidance You Need

What Does It Take to be a Medical Director

- Licensed M.D. or D.O. in the jurisdiction where lab will exist
- Must Meet *One* of the Following:
  - RPVI *or*
    - ASN (if only performing cerebrovascular testing)
  - Formal training (completion of residency/fellowship including didactics)
  - Informal training (combination of CME and supervision (minimum of 8 hours per modality))
  - Established practice (worked in a facility for at least 3 years)

Case Volumes Required

- **Formal and Informal Training**
  - Extracranial Carotid (100 cases)
  - Intracranial Cerebrovascular (100 cases)
  - Peripheral Artery Physiologic (100 cases)
  - Peripheral Artery Duplex (100 cases)
  - Venous Duplex Ultrasound (100 cases)
  - Visceral Vascular Duplex Ultrasound (100 cases)

Informal Training CME Requirements

- 40 hours of relevant Cat 1 CME within prior 3 years
- 20 hours on
  - Techniques
  - Limitations
  - Accuracies
  - Methods
- 20 hours on
  - Clinical topics relevant to non-invasive testing
- 8 hours per modality

Case Volumes Required

- **Established Practice**
  - Extracranial Carotid (300 cases)
  - Intracranial Cerebrovascular (300 cases)
  - Peripheral Artery Physiologic (300 cases)
  - Peripheral Artery Duplex (300 cases)
  - Venous Duplex Ultrasound (300 cases)
  - Visceral Vascular Duplex Ultrasound (300 cases)

Responsibilities of a Medical Director

- All services provided in the lab
- Oversight of quality
- Oversight of all operations
- Credentialing and supervision of medical staff
- Maintaining compliance with accreditation/certification
- Ongoing proficiency
  - Interpret minimum of 5 exams/modality/month
- Ongoing CME
  - 15 hours Cat 1 CME q3 years
    - At least 1 hour focused on work-related musculoskeletal disorders

The Most Important Step You Will Take As You Establish Your Vascular Laboratory

- Find the BEST Technical Director around
  - Don't skimp on salary
  - Do your homework
    - Absolutely check references
    - Watch the tech perform examinations
    - Ask for samples of reports/images from prior patients
    - Determine interest/capabilities for leadership

Financial Considerations

- Space
- Reporting system
  - Templates
  - Electronic (ideally cloud-based)
  - Uniform interpretation criteria
  - Reports must include
    - Patient ID/Date of exam/Appropriate clinical indication/name and description of exam
    - Description of positive/negative findings
      - Velocity data in appropriate exams (i.e. arterial/venous duplex US)
      - Location/severity of abnormalities
      - Incidental findings
      - Reasons for technically limited exams
      - Comparison with prior exams
      - Interpreting physician name/signature
      - Date of Signature

Financial Considerations

- Space
- Reporting system
- Administrative/Clerical Support
- Billing/Personnel (Tech, Nursing, Physician, Environmental)
- Quality Oversight

Quality Programs

- Must be in writing
- Components
  - Appropriateness
  - Technical quality
  - Interpretive quality review
  - Report completion and timeliness
  - Case review

Quality Case Review

- Case review with
  - Any appropriate correlation
    - Axial imaging results
      - CT
      - MR
    - Surgical Findings
    - Clinical outcome
  - Minimum of four cases/year
    - At least 2/modality
  - Must be a mechanism for educating referring physicians to improve appropriateness of testing

What Referring Physicians Want a Vascular Lab to Tell Them About Their Patient?

- Does the patient have vascular disease?
- What is the best therapy for the patient?
- How has a prior intervention worked?
- Can you figure out the problem without exposure to radiation, contrast, intravenous/intra-arterial access?

Vascular Diagnostic Testing

- Peripheral Artery Disease
- Carotid Artery Disease
  - Extracranial
  - Intracranial
- Venous Thromboembolic Disease
- Renal Artery Disease

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Vascular Lab Tests in Evaluation of PAD

- Segmental Limb Pressures
- Pulse Volume Recordings
- Doppler Waveforms
- Exercise Treadmill Testing
- Distal perfusion assessment
  - $TcP0_2$
  - Intrinsic foot perfusion

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Diagnosis of Extracranial Carotid Artery Disease

- Complete neurologic history and physical examination
- Complete medical history and physical examination
- **Carotid Duplex Ultrasonography**
  - **+/- TCD**
- (?) Magnetic Resonance Arteriography
- (?) CT Angiography
- (?) Arteriography

The Best Vascular Technologists Don't Copy Numbers off a Screen….They Go the Distance to Answer the Question/Explain the Abnormality

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- **Venous Thromboembolic Disease**
- Renal Artery Disease

Venous Thromboembolic Disease

- Deep venous thrombosis assessment
  - Consider the test you want to routinely offer
    - Through the popliteal vein
    - Through the deep veins of the calf
    - Willingness to offer assessment of iliac veins/IVC pre/post-intervention
- Venous reflux testing
  - Diagnostic
  - Assistance with superficial vein ablation

Vascular Diagnostic Testing

- Peripheral Artery Disease
- Carotid Artery Disease
  - Extracranial
  - Intracranial
- Venous Thromboembolic Disease
- **Renal Artery Disease**

Diagnostic Tests for Renal Artery Stenosis

- Rapid Sequence IVP
- Radionuclide Imaging
  - Without/With ACE Inhibitor
- Plasma Renin Activity
- **Renal Artery Duplex Ultrasonography**
- Renal Vein Renin Ratios
- Magnetic Resonance Arteriography
- Computerized Helical CT Scan
- Digital Subtraction Arteriography

What Makes A Great Vascular Diagnostic Lab?

- Well organized, highly committed physician, technical, administrative team
- All exams performed with a comprehensive testing protocol
- Technologists and physicians strive to answer the clinical question posed and any abnormalities identified
- All interpretations use lab-specific criteria
- Comprehensive, reproducible, reportable quality assurance for all testing modalities
  - All staff participate
  - Results made public

How To Be Competitive?

- Build your lab on three components
  - Skill and expertise
  - Timeliness of
    - Appointments
    - Results
  - Quality that is transparent and constantly working to improve