Building an Endovascular Training Program: What Should We Require?

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Disclosures

• SNIS Board - Neurology Member at Large
• Local PI – Swift Prime, STRATIS
• Steering committee – POSITIVE study
“Observe, record, tabulate, communicate. Use your five senses. Learn to see, learn to hear, learn to feel, learn to smell, and know that by practice alone you can become expert.”

William Osler
What makes a Great Training Program?

• Technical
  – Volume and variety of cases
  – Opportunity to be primary operator

• Cognitive
  – Teaching more than just catheter skills
  – Procedure decision making
  – Pre and post procedure decision making

• Role as teacher (residents, support staff)

• Multidisciplinary input
  – Neurology, Neurosurgery, and Neuroradiology
Volume of Cases

• Little specific data on Endovascular Surgical Neuroradiology training and procedural complications or outcomes

• Extrapolating from other procedural areas (interventional cardiology, procedures in gastroenterology)
  — Larger the number of procedures = lower complications and better outcomes

• Decision making
  — Complex disease
  — Ischemic diseases vs. hemorrhagic diseases
High Volume Centers

• High volume centers have less complications and better outcomes
  – Stroke: Faster times to imaging, time to treatment, better recanalization, outcome (Gupta et al. JNIS 2013)
  – SAH: Less inpatient mortality in high volume centers (Prabhakaran et al, Neurosurgery 2014)
  – Unruptured Aneurysms (Hoh et al., AJNR 2003)
A Changing Landscape

Transparency

Value

Volume to

Costs Are

Unsustainable

Declining

Reimbursements
The New Realities

• Moving from Fee for Service to Value based care
  – Value = Outcome/cost

• Quality

• Cost conscious
Accreditation

- ACGME
- CAST
ACMGE

• Residency and fellowship programs are essential dimensions of the transformation of the medical student to the independent practitioner

• One year fellowship in Endovascular Surgical Neuroradiology
  – All 3 background specialties have requirement for a preparatory year
  – performing and interpreting a minimum of 100 diagnostic neuroangiograms
  – Background training in preparatory year for radiation safety, imaging, neurosurgery, vascular neurology, and neurocritical care training based background
ACMGE

- Fellows must perform a minimum of 100 therapeutic endovascular procedures

- Range of diseases
  - Aneurysms
  - arteriovenous malformation
  - atherosclerotic disease of the cervical vessels
  - occlusive vascular disease and acute infarction;
  - intracranial neoplasms
  - vascular anomalies of the head and neck
  - neoplasms of the head and neck
  - vascular anomalies of the spine
  - neoplasms of the spine
  - traumatic vascular lesions of the CNS, head, neck and spine
ACMGE milestones

• What are Milestones?
  — Significant point in development.
  — Competency-based developmental outcomes (e.g., knowledge, skills, attitudes, and performance)
  — Progressive over the course of fellowship
Milestone Levels

• Level 1: milestones expected of an incoming fellow.

• Level 2: fellow advancing, demonstrating additional milestones, not yet performing at a mid-fellowship level.

• Level 3: Majority of milestones targeted for fellowship.

• Level 4: Substantially demonstrates the milestones targeted for fellowship. This level is designed as the graduation target.

• Level 5: Exceptional. Expected that only a few fellows will reach this level.
Milestone Domains

- MK – Medical Knowledge
- PC – Patient Care
- SBP – Systems Based Practice
- PBL – Problem Based Learning
- PROF – Professionalism
- ICS – Interpersonal and Communication Skills
<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
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<tbody>
<tr>
<td>Understands pathogenesis of arterial occlusive disease including Moya Moya, atherosclerosis, and dissection</td>
<td>Understands medical treatment options based on AOD etiology</td>
<td>Familiar with seminal literature and evidence-based guidelines regarding medical, surgical and endovascular options for carotid disease and Internal Carotid Artery Dissection</td>
<td>Integrates clinical findings, imaging results, and pattern of collateralization to inform a plan of care</td>
<td>Publishes in the Peer-Reviewed Literature on AOD</td>
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<td>Understands Symptoms of stroke and transient ischemic attack (TIA)</td>
<td>Demonstrates knowledge of clinical syndromes associated with compromise of anatomic vascular distributions</td>
<td>Demonstrates knowledge of treatment options for AOD based on anatomic location including risk and benefit profiles</td>
<td>Understands the range of procedure-related complications, their signs, symptoms and management</td>
<td>Participates in the development of new devices for treatment of AOD including participation in clinical trials</td>
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<td>Demonstrates knowledge of imaging features of different vascular modalities and selection of appropriate imaging based on clinical situation</td>
<td>Understands the acquisition and utility of perfusion and other advanced imaging methods</td>
<td>Recognizes imaging findings associated with common AOD pathology including Moya Moya, atherosclerosis and dissection</td>
<td>Demonstrates knowledge of long-term outcomes and need for surveillance imaging in AOD</td>
<td>Participates as faculty in the training of other physicians and learners in the management of AOD</td>
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<td>Understands patterns of vascular collateralization</td>
<td>Identifies key clinical collaterals in AOD</td>
<td>Understands physiologic responses to drive perfusion</td>
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</table>

Comments:

Selecting a response box in the middle of a level implies that milestones in that level and in lower levels have been substantially demonstrated.

Selecting a response box on the line in between levels indicates that milestones in lower levels have been substantially demonstrated as well as some milestones in the higher level(s).
CAST

- Few programs have participated in ACGME accreditations
- Majority of graduating fellows are from non-accredited programs
- Organized Neurosurgery offering an additional pathway through CAST system
  - Open for all subspecialities
  - Informal committee from all subspecialties reviewed requirements (representatives from CV section, SVIN and SNIS)
CAST

• Similar requirements for a preparatory year

• 100 catheter-based diagnostic and/or interventional cerebral angiographic procedures as primary operator.

• Background training in preparatory year for radiation safety, imaging, neurosurgery, vascular neurology, and neurocritical care training based background
CAST

• 12 month Endovascular Fellowship

• Program is required to have at least 350 therapeutic procedures/year

• 250 “interventional” procedures as primary operator.
  – 40 aneurysm treatments including 10 ruptured
  – 25 intracranial embolizations (AVM, AVF, Tumor)
  – 25 extracranial or intracranial stent placements
    – At least 5 of each category
  – 10 acute ischemic stroke treatments
  – 10 intracranial infusions (e.g. vasospasm, stroke, chemotherapy)
  – 5 extracranial embolizations
  – 5 spinal angiograms/embolizations
CAST

• To be overseen by Neuroendovascular Surgery Fellowship Review Committee (NES-FRC)
  – 9 members, 3 from each subspecialty

• Credentialing for individuals
  – Certificate for those graduating from CAST accredited program
  – Though ABNS, develop MOC program (? Board exam as well)
  – Grandfathering period
Simulators

• Recognized that simulators may be helpful in improving catheter skills

• Encouraged but no requirement
  – CAST suggesting 20-50 simulations before first patient contact
Didactic teaching

• Lectures
  – Incorporating with neuroradiology, vascular neurology and neurocritical care

• Journal clubs

• City wide rounds
Should we be training?

• Estimated there are 800-1000 practicing Neurointerventionists in the US (2012)

• 12,000 endovascular stroke interventions per year
  – 12 strokes per interventionalist per year (1 per month)

• 20,000 aneurysms treated endovascularly per year
  – 20 aneurysms per interventionalist per year (<2 per month)

• General consensus to reduce training slots

• Do the new trials change the situation?
Thank you!