

**AMERICAN ACADEMY OF NEUROLOGY
INTERVENTIONAL NEUROLOGY
FELLOWSHIP CORE CURRICULUM**

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Background:

Endovascular Neurology is a relatively new subspecialty, evolving along similar pathways in Neurosurgery (i.e., Endovascular Neurosurgery, NES) and Neuroradiology (i.e., Interventional Neuroradiology, INR). During the past two decades, significant advances have been made in this field of minimally invasive therapy for the treatment of intracranial cerebral aneurysms; acute stroke therapy; cerebral arteriovenous malformations; carotid cavernous sinus fistulas; head, neck, and spinal cord vascular lesions; and other complex cerebrovascular disorders. Although advanced post-residency fellowship programs in NES/INR have been established in North America, Europe, and Japan, it is only very recently that neurologists have begun to gain access to this type of training. In general, training in Endovascular Neurology is a natural evolution and growth from training in Vascular and Critical Care Neurology. Ideally, an Endovascular Neurologist is someone with the following qualifications: 1) Trained in Clinical Neurology; 2) Trained in Vascular and Critical Care Neurology, and 3) Trained in Endovascular Neurology. Thus, the first two items constitute the logical pre-requisites for training in Endovascular Neurology and so the latter complements them and rounds them off. In general, endovascular neurologists should have competence in: 1) The selection of patients for neuroendovascular therapy, 2) Their care prior to, during and after the procedure, 3) Management of any complications that may occur, 4) Performing the required endovascular interventions, and 5) Deciding when and why neurovascular patients need endovascular procedures.

Goals and Objectives:

The goal of the core curriculum is to provide guidelines for training programs that will prepare neurologists to competently practice Endovascular Neurology. In addition, to provide the blueprint for a pathway that will assure neurologists a place among neurosurgeons and neuroradiologists with similar interests and skills. The training is based on supervised clinical work with progressively increasing independence and responsibility for patient care.

The overall objective of the training program in Endovascular Neurology is to provide the skills and knowledge necessary to:

1. Provide high quality care in the context of the application of neuroendovascular procedures.
2. Interact effectively with specialists with analogous backgrounds and interests.

3. Develop the capacity to pursue an academic career based upon the practice of Endovascular Neurology
4. Become instructors in Endovascular Neurology.

Curriculum

The training program must offer didactic and clinical experiences that encompass the following topics

1. Anatomical and physiologic basic knowledge
 - a) Basic knowledge in arterial angiographic anatomy of the brain, spine, spinal cord, head and neck
 - b) Venous angiographic anatomy of the brain, spine, spinal cord, head and neck
 - c) Collateral circulation
 - d) Dangerous anastomosis
 - e) Cerebral blood flow
 - f) Cerebral Autoregulation
 - g) Pharmacology of CNS vasculature
2. Technical aspects of neuroendovascular therapy, including:
 - a) Catheter and delivery systems
 - b) Embolic agents in cerebral, spinal, head and neck embolization
 - c) Flow controlled embolization
 - d) Complication of cerebral embolization
 - e) Flow control between the extracranial and intracranial circulation
 - f) Electrophysiologic Monitoring
 - g) Provocative testing (pre-therapeutic evaluation)
 - h) Complications of head and neck, brain, and spine and spinal cord embolization
 - i) Imaging of vascular systems
3. Pharmacology
 - a) Contrast materials
 - b) Provocative testing with anesthetics and barbiturates
 - c) Anticoagulants
 - d) Thrombolytics
4. Coagulation Cascade
5. Cerebral and spinal vascular pathology (i.e. arteriovenous malformation, arteriovenous fistulas, cerebral aneurysms, ischemic stroke)
 - a) Classification
 - b) Clinical presentation
 - c) Natural history
 - d) Epidemiology
 - e) Hemodynamic basis
 - f) Indications for treatment

- g) Contraindications for treatment
 - h) Therapeutic modalities
 - i) Combined therapies
6. Revascularization for occlusive vascular diseases
 - a) Arteriopathies
 - b) Atherosclerotic lesions
 - c) Techniques of revascularization: balloon angioplasty, thrombolytics, and stenting
 7. Embolization for epistaxis or other causes of hemorrhage
 8. Invasive functional testing