Introduction to Neurosurgical Subspecialties:
Vascular and Endovascular Neurosurgery

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Vascular Neurosurgery

- Vascular neurosurgeons treat patients with:
  - Cerebral aneurysms
  - Brain and spinal AVMs
  - Dural AVFs
  - Cavernous malformations
  - Intracerebral hemorrhage
  - Ischemic stroke / Carotid stenosis
Vascular Neurosurgery

• Fellowship not required, but some neurosurgeons opt for further specialized training in open vascular surgery via fellowship

• Frequently combined with specialized training in endovascular neurosurgery

• While neurosurgeons only can do open intracranial vascular surgery, radiologists and neurologists can also do fellowship training in endovascular treatment
Case Illustration #1

- 45 yo female with incidental MCA aneurysm
Case Illustration #1

Tandem clipping technique of MCA aneurysm
Case Illustration #2

• 15 yo male with seizure; left MCA aneurysm

Large fusiform left MCA aneurysm incorporating frontal M2 branch (arrow)

STA-MCA bypass (arrow) + aneurysm clipping
Case Illustration #3

- 70 yo female with enlarging giant left MCA aneurysm s/p previous coiling
Case Illustration #3

Recurrent giant left MCA aneurysm s/p coiling

Radial artery high flow bypass (arrows) + aneurysm trapping
Case Illustration #4

- 12 yo girl presents with headache, nausea, vomiting, ataxia, lethargy, and right hemiparesis; Brainstem cavernous malformation on MRI
Case Illustration #4

- Subtemporal craniotomy + petrosectomy for resection of brainstem cavernous malformation

Post-op MRI
Endovascular Neurosurgery

- Endovascular neurosurgeons treat patients with:
  - Cerebral aneurysms
  - Vasospasm
  - Brain and spinal AVMs
  - Dural AVFs
  - Ischemic stroke
  - Carotid stenosis
  - Tumors
  - Head and neck bleeding
Endovascular Neurosurgery

- Neurosurgeons, neurologists, and neuroradiologists can specialize in endovascular surgery.
- Fellowship is typically required.
Endovascular Neurosurgery

Case Illustration #1

- 67 year old woman with SAH from ruptured basilar tip aneurysm
Endovascular Neurosurgery

Case Illustration #2

- 69 year old woman with left CN3 palsy
- Treated with Pipeline stent, left CN3 palsy resolved
Endovascular Neurosurgery

Case Illustration #3

- Patient POD#5 s/p clipping of ruptured right MCA aneurysm develops left hemiparesis
- Balloon angioplasty
Endovascular Neurosurgery

Case Illustration #4

- 59 year old woman with ischemic stroke presenting with left facial droop, left hemiparesis, dysarthria
Endovascular Neurosurgery

Case Illustration #4

- Endovascular embolectomy
Endovascular Neurosurgery

Case Illustration #5

- 68 year old man s/p neck surgery and radiation therapy for neck cancer, now with TIAs of right hemiparesis
- Angioplasty and stenting
Conclusions

• Vascular neurosurgery is an large and intensive subspecialty of neurosurgery
• Vascular patients can be extremely critically ill
• Endovascular techniques are an indispensable part of vascular neurosurgery
• Fellowship training is required for endovascular privileges.
• While not required, many surgeons do opt for further fellowship training for open vascular surgery as well