



Neurovascular Service: Brain Aneurysm Treatment

An aneurysm is an abnormal bulge in the wall of an artery due to weakness or injury to one or more of the three layers of tissue. Most are the result of a genetic alteration, although infection, trauma, or atherosclerosis can cause aneurysms. There are about 30,000 patients in the U.S. each year with ruptured aneurysms. 40% of patients may have warning signs such as localized headache, cranial nerve paralysis, nausea or vomiting. They may have severe headache, photophobia, neck stiffness or even loss of consciousness resulting from the intracranial hemorrhage. 20% are multiple and cigarette smoking may play a role in aneurysm development.

Potential cases are reviewed by a multidisciplinary team including Neurosurgery and Neurology members in our weekly Cerebrovascular conference. Patients with unruptured aneurysms are usually referred to the Interventional Neuroradiology or Vascular Neurosurgery clinic and are often evaluated in a combined office setting. When a patient with an appropriate clinical history suggesting subarachnoid hemorrhage presents to the MGH Emergency Room, he or she is examined, stabilized and brought to the Radiology department for CT/CTA of the brain. Patients are offered the treatment which best addresses their particular aneurysm and clinical situation with consideration given to the potential risks.

Endovascular closure of an aneurysm is done through a catheter inside the artery. The Neurointerventionalist places a catheter in the femoral artery in the groin, which is brought up to the neck using fluoroscopic x-ray guidance. A microcatheter is then brought through this guide catheter and navigated into the aneurysm. Small platinum coils are then passed through this system to fill the aneurysm and prevent arterial pressure from causing a bleed. In complicated aneurysms a temporary balloon or a stent may be placed to hold the coils in place. For giant aneurysms we may consider a flow diversion device to decrease the pressure on the aneurysm wall which remodels to a normal configuration over the following time. The neurosurgical alternative is to place a clip across the neck of the aneurysm excluding it from the circulation.

The International Subarachnoid Aneurysm Trial (ISAT) data suggests that patients who can be treated by either method have a better outcome than those treated surgically. The relative and absolute risk reductions in dependency or death after allocation to an endovascular versus neurosurgical treatment were 22.6% (95% CI 8.9-34.2) and 6.9% (2.5-11.3), respectively. In some cases occlusion of the artery with reliance on collateral circulation or bypass may be the treatment of choice. These procedures are done under general anesthesia. Patients with unruptured aneurysms usually stay in the hospital for three days, the first of which is spent in the Neuro-intensive care unit for close monitoring. Patients with ruptured aneurysms need to stay in the hospital for at least 14 days to be watched for several important medical reasons including the grade of the initial bleed, hydrocephalus and vasospasm.

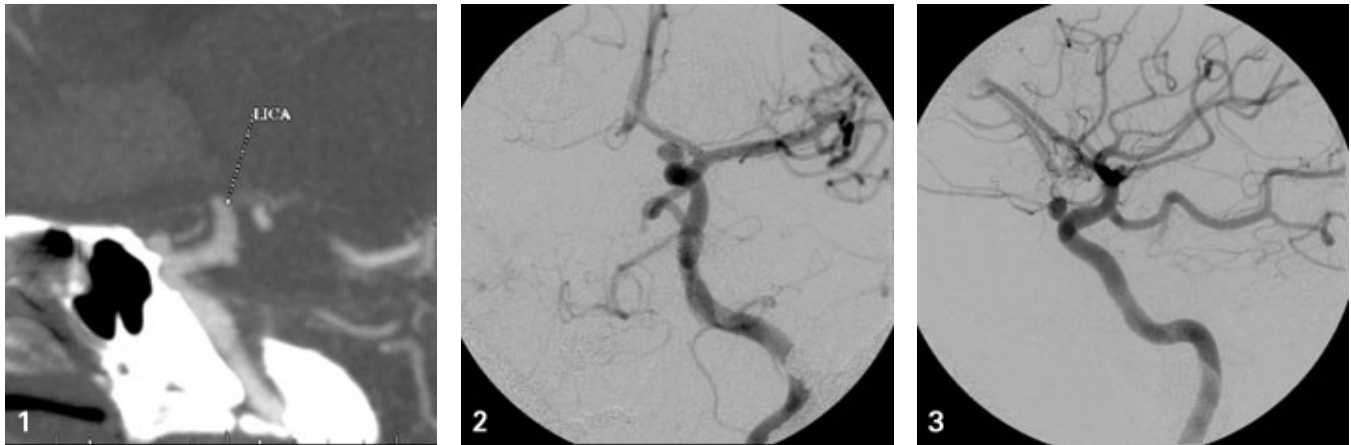
Interventional Neuroradiology Program, Neurovascular Service

Massachusetts General Hospital

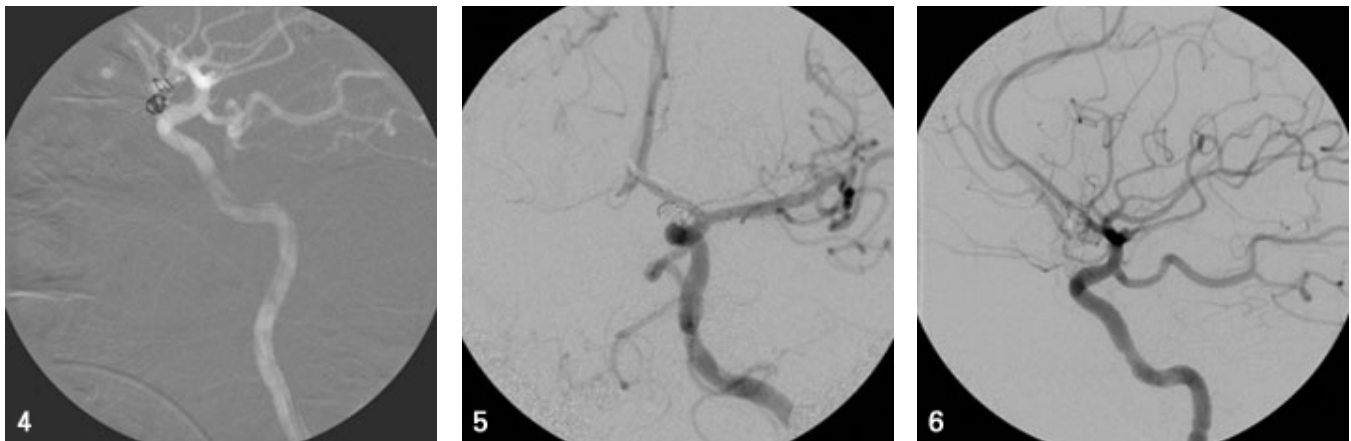
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Follow up after aneurysm treatment is done in the office at three weeks post procedure. Aneurysm surveillance is done by angiography or MRA at intervals of 6 months, and then 1, 3 and 5 years to look for aneurysm regrowth or any new aneurysms.



(1) CT angiogram shows an aneurysm in the ophthalmic segment of the left internal carotid artery adjacent to the anterior clinoid process. (2,3) Lateral and oblique angiograms show the aneurysm and the ophthalmic artery arising at the base of the lesion.



(4) Intraprocedural roadmap angiogram shows a coil being placed into the aneurysm through a microcatheter. (5,6) Final angiograms show the aneurysm completely occluded by platinum coils.

The Neurovascular Service at Massachusetts General Hospital provides a multidisciplinary approach to patient care that combines neurosurgery, neurology and interventional neuroradiology. Based in the Department of Radiology, the Neurovascular Service's Interventional Neuroradiology Program uses minimally invasive procedures to treat a range of neurovascular disease and spinal disorders. For more information, visit www.mgh-interventional-neurorad.org

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