



Neurovascular Service: Cerebral Vasospasm

Patients who present to Massachusetts General Hospital with subarachnoid hemorrhage may have a range of neurologic status from wide-awake and minimal headache to comatose. Because of the 4% risk of rebleeding patients are treated within 24 hours to secure the aneurysm. These patients are watched in the Neuro-intensive care for 14 days for several reasons. These include hydrocephalus (fluid build up), fevers, infections, cardiac abnormalities, and vasospasm, which is a reaction of the arteries in the brain to blood products. Approximately one third of patients experience vasospasm, which can lead to stroke if blood flow to the brain is significantly impaired. Patients are watched for signs of clinical deterioration such as decreased awareness, focal neurologic deficit or rising velocity of the Transcranial Doppler Ultrasound studies. MRI, MR angiography/perfusion or CT angiography/perfusion studies may also be helpful.

Clinically, these patients are treated with a combination of hypertension, hypervolemia and hemodilution. Some patients need additional therapy to prevent strokes, and the Interventional Neuroradiology department can help these patients by delivering treatment through catheter systems. Under general anesthesia, diagnostic arteriography is done to confirm the diagnosis. Medications such as intra-arterial Nicardipine or Milrinone can be administered to relax the arterial spasm or in some cases balloon angioplasty can be used in the larger arteries. Some patients may require more than one treatment.

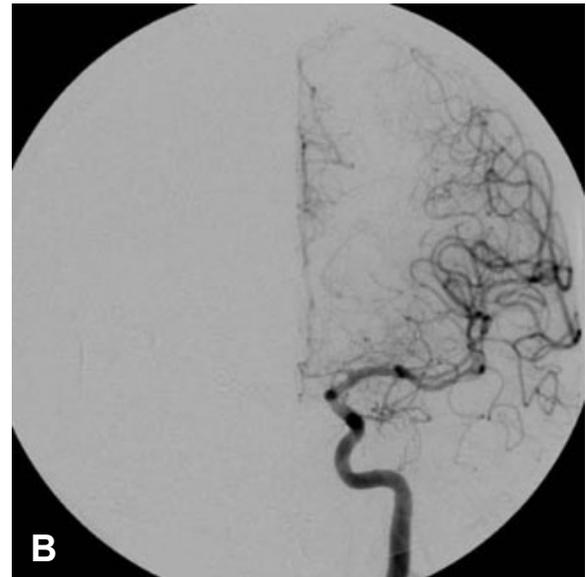
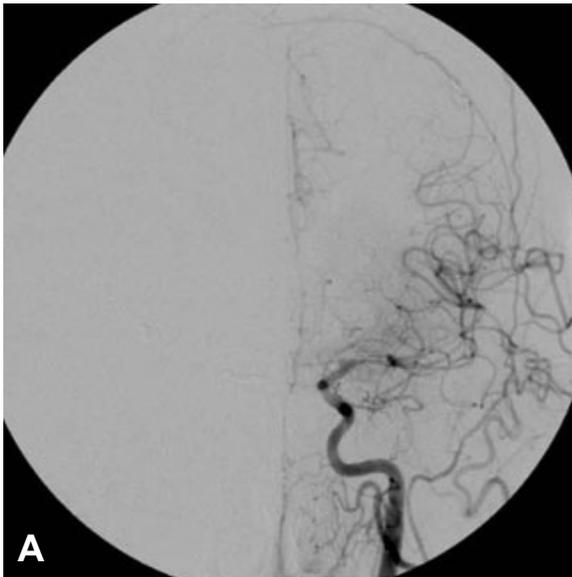
Some patients may present with intracranial artery narrowing from other cases such as reversible cerebral vasoconstriction syndrome (RCVS) in patients with severe thunderclap headaches. It is known that exposure with SSRI medications and severe hypertension such as in pre-eclampsia related to pregnancy can result in narrowing of the cranial blood vessels. In many cases, oral or IV anti-hypertensive medications may be enough to treat effectively. However, if it is severe, patients may be considered for intra-arterial therapy.

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- (A)** Left carotid angiogram showing severe vasospasm with narrowing of the left middle cerebral and anterior cerebral arteries on day 8 following subarachnoid hemorrhage from aneurysm rupture.
- (B)** Repeat cleft carotid angiogram (image 2) following 8 mg of intra-arterial nicardipine which shows improvement in the caliber and flow through the left ACA and MCA.

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