

Flow diversion stents provide treatment option for unruptured cerebral aneurysms



About 35,000 Americans suffer potentially life-threatening cerebral aneurysm ruptures each year. A much larger number of people develop unruptured aneurysms — areas of weakness within a major blood vessel in the brain that bulge and are at risk of rupture and hemorrhage. Unruptured aneurysms can remain asymptomatic and undiagnosed. In some cases, the problem is discovered incidentally, when a patient undergoes imaging for generalized neurological complaints, such as headache or dizziness.

Treatment decisions surrounding unruptured intracranial aneurysms can be confounding. The decision to treat the aneurysm depends on several factors, including the size, shape and location of the lesion and the patient's family history and personal health, including a history of hypertension, smoking or other conditions.

Given the consequences of rupture, however, surgical or endovascular treatment is often recommended. UCLA physicians in the Department of Neurosurgery and the Division of Neuro-interventional Radiology offer comprehensive assessment of unruptured cerebral aneurysms and a customized treatment plan that may include the latest repair technique known as flow diversion.

Solution for complex brain aneurysms

Flow diversion represents a significant advance in the treatment of unruptured brain aneurysms, says Geoffrey P. Colby, MD, PhD, associate professor of neurosurgery and radiology at UCLA.

“Instead of just blocking blood flow into an aneurysm, it also accomplishes a rebuilding of the blood vessel wall,” Dr. Colby says. “It’s the only technique that truly addresses the root cause of the aneurysm — which is the weakness of the blood vessel wall.”

UCLA has participated in post-approval studies of flow diversion and has gained valuable experience in using the device, says Gary Duckwiler, MD, chief of diagnostic and interventional radiology.

“As our comfort level has gotten higher with the device, we’ve extended the use of this into other subtypes of aneurysms,” Dr. Duckwiler says. “It’s been a tremendous boon to difficult aneurysms for which we previously didn’t have any good solutions.”

Blocking blood flow to aneurysm

Unruptured brain aneurysms sometimes are treated with craniotomy and microsurgical clipping. Endovascular techniques have been highly successful in closing aneurysms by packing them with wire coils to reduce blood flow into the balloon-like protrusion. Endovascular coiling induces thrombosis (clotting) within the aneurysm.

Flow diversion is a newer endovascular approach that has emerged as a valuable treatment for wide-necked brain aneurysm as well as other aneurysm subtypes. A microcatheter is used to reach the parent blood vessel. However, instead of placing coils into the aneurysm sac, a metallic mesh tube — or stent — is placed across the neck of the aneurysm to divert blood away from the sac. The lining of the blood vessel (endothelium) then grows onto the stent, sealing off the opening of the aneurysm and healing the blood vessel wall.

Treatment for wide-necked aneurysm

Each case should be evaluated to determine the best treatment approach. However, flow diversion is increasingly valued for the treatment of wide-necked aneurysms because the stent acts as a scaffold, allowing for complete endoluminal reconstruction. A flow diverter first received Food and Drug Administration approval in 2011 for large or giant wide-necked brain aneurysms, 10 millimeters or larger, along the proximal carotid artery that pose a high risk of rupture and cannot be safely treated with surgical clipping. Since then, flow diversion has been shown to be beneficial for a broader range of cerebral aneurysms, including smaller aneurysms and aneurysms in other locations. A common side effect of the procedure is a temporary headache. Rare but serious risks include transient ischemic attack, stroke and hemorrhage.

Antiplatelet therapy

Patients undergoing flow diversion typically remain in the hospital for one night. To reduce the risk of blood clots, patients are typically prescribed dual antiplatelet medications for three to six months, followed by aspirin monotherapy. Patients are monitored with imaging tests and an angiogram in the year following the procedure.

Selecting the most appropriate treatment

Patients diagnosed with an unruptured cerebral aneurysm should seek prompt treatment evaluation at a high-volume center with expertise in a variety of treatment methods. A minimally invasive surgical approach often is possible. UCLA utilizes a multidisciplinary team approach to evaluate patients and arrive at personalized treatment recommendations. UCLA's neurosurgical and endovascular teams have experience in treating the most complex aneurysm cases, with excellent results.

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