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New Route to Recovery: Treating Brain Aneurysms from the Inside Gives Better Results with Reduced Risk and Lower Costs

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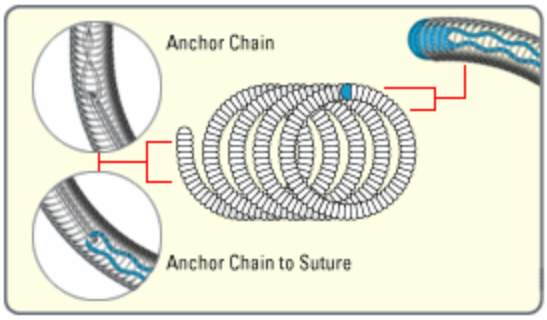
Tracy Bailey-Gates had suffered from headaches—including migraines—from the time she was 12 years old. But the headache that sent her to the emergency room in 1996 was different. It caused her to vomit and sent shooting pains down her neck. Though the emergency room treated it like another migraine, Bailey-Gates, then 34, knew this was different, so she found a neurologist who investigated further.

Her neurologist ordered tests, including magnetic resonance imaging (MRI), a test that uses a magnetic field and pulses of radio wave energy to show pictures of organs and structures inside the body. Though the first MRI showed nothing, the neurologist suspected a possible bruise on her brain, so he requested another. After the second MRI, the doctor called Bailey-Gates at work and asked her to come into his office. He would not explain why over the phone.

This can't be right



Bailey-Gates called her husband, who met her at the neurologist's office. "He sat me down and told me I had an aneurysm at the intersection of my ophthalmic artery and one of my carotid arteries," says Bailey-Gates, who immediately knew how serious her condition was because she teaches physiology at Smithfield Junior Senior High in Harrisville, Rhode Island.

Still, despite—or perhaps because of—her understanding of what this meant clinically, Bailey-Gates was in denial. "At first I was just thinking, 'This can't be right – I have to coach my six year old's soccer game tomorrow.'" She and her husband have two other sons, who were 5 and 3 at the time.

An aneurysm is a weakness in the wall of an artery that causes it to bulge—either in all directions or on one side. If an aneurysm ruptures, it can lead to bleeding into the space surrounding the brain, which might lead to brain damage, paralysis, coma or death.

The aneurysm doctors found in Bailey-Gates's brain was not ruptured, but there was another complication. The location of the aneurysm was at the junction of the vessel that delivers blood to the part of her brain that controls sight, and one of the main vessels that carries blood to the brain. The

critical placement made treatment extremely challenging.

Immediately, Bailey-Gates was admitted to the hospital and given a number of tests. “They did CT scans, ultrasounds, an angiogram—every test you can possibly imagine to try to figure out exactly how to treat it since it was in such a tricky spot,” she says.

After the tests were done, doctors opted to use a conventional treatment that involved reaching the aneurysm from the outside. “They decided to treat it with a traditional craniotomy where they would take a piece out of my skull, lift up my brain a little bit and put a metal clip—kind of a high-tech barrette—onto the neck of the aneurysm,” Bailey-Gates says.

She was all set for the craniotomy and had even begun taking anti-seizure medication. Mentally, Bailey-Gates was preparing for the risky, highly-invasive surgery as well. “My biggest concern was that I would have permanent damage. I’m looking through microscopes all day and teaching kids. I thought I could be paralyzed on one side or blind in one eye. Not to mention quality of life—I had three little kids and a husband,” she says.

Change of plans

Just before the surgery, the neurosurgeon suggested trying something different. “It was a fairly new procedure called endovascular coiling, and he thought I was a perfect candidate for it.”

Endovascular coiling allows physicians to access an aneurysm with a tiny catheter that is guided to the affected blood vessel through an incision in the patient’s leg. The physician sends a guide wire through the catheter to deliver minute platinum coils into the aneurysm. In Bailey-Gates’s case, the physician deployed several sets of coils into the aneurysm. “These coils mesh together and the blood clots around them and creates a seal,” she explains. “That beat opening my head up.”

After the two-hour procedure, Bailey-Gates was placed in an intensive care unit for about 24 hours. She left the hospital **four** days later, and was able to return to work part-time just three weeks after the procedure.

Bailey-Gates considers herself extremely fortunate to have had access to the coiling procedure, which had only been approved for marketing by the Food and Drug Administration just one year before her aneurysm was discovered. “I was very lucky that at Rhode Island Hospital in Providence they have on staff an interventional radiologist—Dr. Richard Haas. He was one of the very few physicians at the time who was certified to perform endovascular coiling,” she says.

Had she been treated with surgical clipping, Bailey-Gates is certain she would have suffered some permanent disability because of the location of the aneurysm in her brain.

Treatment of choice

It is estimated that up to 18 million people harbor unruptured aneurysms and every year more than 30,000 Americans suffer from ruptured brain aneurysms.[1] Though it is a relatively new method of treating these patients, endovascular coiling is quickly becoming the treatment of choice for those suitable for either coiling or surgical clipping.

There's not much mystery why. Coiling offers these tens of thousands of patients the same advantages Bailey-Gates found: less invasive, less risky surgery with a high rate of success and a quicker recovery time—and it costs less.

A study of more than 2,500 unruptured aneurysms at 60 large university hospitals found that surgical clipping had five times the rate of in-hospital deaths and an 80 percent greater rate of adverse events than endovascular coiling.[2] Treatment using coiling also resulted in a shorter length of hospital stay—4.6 days vs. 9.6 days—and generated lower charges, $30,000 vs. $43,000.1

Recovery time with coiling is dramatically lower. A study of over 120 unruptured aneurysm patients involving patient follow-up found that surgical cases on average required one year of recovery time compared to 27 days for patients treated endovascularly.[3] Given the population most likely to suffer brain aneurysms—those between 35 and 60—quick recovery is particularly important.[4]

In October, 2002, a study published in the medical journal *Lancet* found that in patients with ruptured brain aneurysms who are considered equally suitable for surgical clipping or endovascular coiling, coiling generates superior results. At one year, the relative risk of death or significant disability for patients treated with coils was 22.6 percent lower than those treated with surgical clipping.[5]

The initial results from the trial were so convincing that the leaders of the trial stopped recruiting patients after 2,145 of the planned 2,500 patients were enrolled because it was considered unethical to continue treating patients with surgical clipping.[6]

In recent years, technological advances have enhanced the ease with which physicians can perform endovascular coiling. Physicians now have the advantage of using real-time X-ray to help visualize the patient's vessel more clearly as they guide the catheter and coils into the aneurysm.

The fact that more and more physicians are able to perform coiling, and more and more patients are opting for this treatment route is good news for hospitals, payers and physicians. But it's most profound effect is on patients—and often those around them—as in Bailey-Gates's case.

Since her speedy recovery after the 1996 coiling procedure, Bailey-Gates has returned to teaching full-time and received three statewide awards for her efforts in the classroom, including the Outstanding Biology Teacher for State of Rhode Island Award in 2001.

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1 Johnston, SC, Surgical and endovascular treatment of unruptured cerebral aneurysms at university hospitals. *Neurology* 1999; 52: 1799-1805

[1] Stroke and aneurysm fact sheet, Boston Scientific
[2] Johnston, SC, Surgical and endovascular treatment of unruptured cerebral aneurysms at university hospitals. Neurology 1999; 52: 1799-1805 (from BSCI Target background sheet)

[3] Johnston, SC, et. al., Endovascular and surgical treatment of unruptured aneurysms: Comparison of risks. Annals of Neurology, 2000; 48: 11-19
[4] Johnston, SC, Surgical and endovascular treatment of unruptured cerebral aneurysms at university hospitals. *Neurology* 1999; 52: 1799-1805.
[5] The Lancet, October 26, 2002, Vol. 360, No. 9342, p. 1271
[6] The Lancet, October 26, 2002, Vol. 360, No. 9342, p. 1270