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## Fixing Aneurysms Without Surgery

By DONALD G. McNEIL Jr.

In treating hemorrhaging cerebral aneurysms — burst blood vessels in the brain — there are two camps: the clippers and the coilers.

A recent study in *The Lancet*, a London-based medical publication, has come out strongly in favor of coiling, a nonsurgical method far more popular in Europe than it is in the United States.

A medical trial was stopped on ethical grounds when it became clear that a year after treatment 31 percent of the surgical patients were disabled or dead compared with 24 percent of the “coiled” patients.

Since aneurysms often kill and disable young or middle-aged people, neurosurgeons want longer studies to see if coiling lasts as long as clipping does. But these preliminary results, brain specialists say, could still lead to a revolution in the way aneurysms are treated here.

The study’s most important conclusion, doctors agreed, is that all American aneurysm patients should have what 75 percent of them now do not: the choice.

The *Lancet* study “will open the market for coiling,” said Dr. J. P. Mohr, a professor of neurology at Columbia University and director of the Tananbaum Stroke Center there, who was not involved in the research.

It “doesn’t answer every question” but puts coiling “very much on the map,” agreed Dr. John R. Marler, associate director for clinical trials at the National Institute of Neurological Disorders and Stroke.

The technique was invented in the United States but did not prosper as it did in Europe because of concerns over long-term outcomes, but also, some doctors say, because of tradition and rivalries over fees.

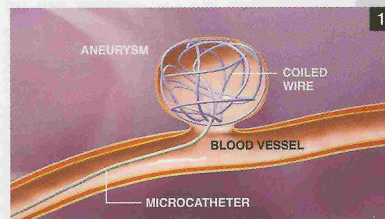
Cerebral aneurysms do not kill as many people as strokes or heart attacks do, but they are spectacularly fatal: 15 percent of all victims die in minutes, and half are dead in a month.

“It’s a very, very bad thing to have happen to you,” Dr. Kieran Murphy of Johns Hopkins

### Threading Wire Into Fragile Arteries

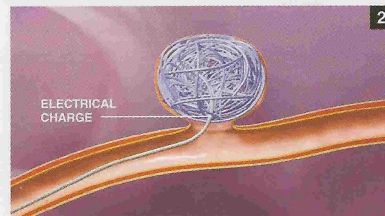
A new study has endorsed a method of filling aneurysms with tiny coiled wire, causing blood to clot before the vessel ruptures.

The technique only works on aneurysms with narrow necks where the coils can collect in a basketlike mass.



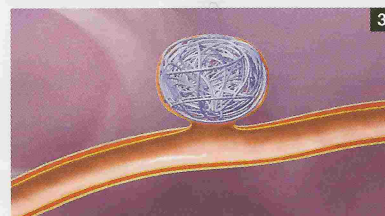
1 A small flexible tube called a microcatheter is threaded through the body from an opening in the groin (right). Guided by X-ray imaging, it arrives at the brain aneurysm.

Small platinum coils are pushed into the aneurysm through the microcatheter.



2 Passing the wire structure into the aneurysm continues until it is fully packed with coils, obstructing the flow of blood.

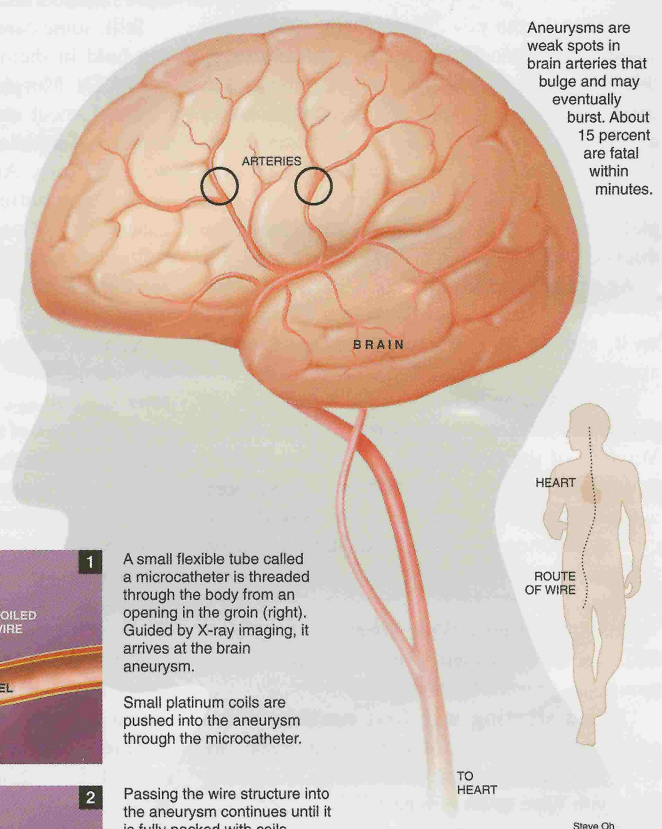
An electrical charge at the coiled wire's end detaches it; the microcatheter is withdrawn.



3 Blood clots around the coils, stopping the aneurysm from bursting.

The coiled wire resembles a tightly packed Slinky in miniature, about double the width of a human hair. The coils form omega-shaped loops.

Source: Boston Scientific Corp.



Aneurysms are weak spots in brain arteries that bulge and may eventually burst. About 15 percent are fatal within minutes.

Steve Oh

Medical Institutions, one of the participants in the Lancet study, said with gentle understatement.

Of the survivors, half are neurologically devastated. Some cannot feed themselves, some suffer seizures, slurred speech or personality changes. The luckiest return to normal with only a few missing memories. All live in dread of a "rebleed."

Brain aneurysms are more common than many realize. About 1 American in every 15, it is estimated, is living with one right now. About 30,000 of them will burst this year.

For 30 years, clipping has been the standard treatment: a neurosurgeon saws off a segment of skull, pushes gently through the brain to the bleeding site and places a clamp — "like a tie clip," Dr. Murphy said — on the section of arterial wall that has weakened and ballooned out.

Coiling is the newcomer. Using computer-aided X-ray scanners, a radiologist threads a very thin catheter up from the patient's groin through the neck and along the narrowing, fragile alleys of the brain until it reaches the aneurysm. Twisting it carefully, he pokes its snout into the aneurysm itself and then slips down it fine platinum coils, like tiny Slinkies about twice the thickness of a human hair.

As smaller and smaller coils are fed in, they form a mesh rather like a Brillo pad. Blood clots on it, and the mass blocks off the neck of the aneurysm.

Recovery time is faster, with less chance of dangerous infections or seizures, doctors agree. Versions of the coiling idea, including rubbery pellets and wire "Christmas trees," have been around for over 20 years, Dr. Mohr said. But the crucial advance was a coil that detached from the catheter when a small current was sent down the wire.

Dr. Mohr compared the dispute over coils to that over the use of wire mesh stents in clogged arteries to prevent heart attacks.

"When stenting was first considered for coronaries, everybody thought it was crazy," he said. "Now there are two alternatives. If stenting fails, you have to do a bypass."

The new coil was invented in 1990 by Dr. Guido Guglielmi, a neurosurgeon, neuroradiologist and electronics expert then working at the University of California at Los Angeles. It is produced by the Boston Scientific Corporation of Natick, Mass., which says it paid nothing toward the Lancet study. The Medical Research Council, the British equivalent of the Food and Drug Administration, financed the study.

Coiling is used on 75 percent of aneurysms in Europe, Dr. Murphy said, compared with about 25 percent in the United States.

Brain specialists and Boston Scientific executives interviewed cited several reasons.

In Europe, most aneurysm patients are taken to large regional hospitals where specialists in both procedures work in teams. By contrast, about 75 percent of all Americans with the crisis symptoms that turn out to be burst aneurysms go to local hospitals.

Most of America's 3,000 hospitals have only one or two neurosurgeons on staff, who also handle brain tumors, gunshots and car accidents. Unless patients are referred to larger hospitals, numbering about 300, where coiling is offered, they will not be seen by doctors who know the procedure.

That does not bode well for patients, all the doctors interviewed agreed. Studies show that aneurysm patients fare much better in hospitals that treat more than 20 aneurysms a year and have "neurocritical care" nurses.

Still, some cannot be coiled. The springs will not hold in them if the aneurysms have wide necks, Dr. Murphy said.

The Lancet study involved 43 hospitals in Europe, Australia and Canada; Johns Hopkins was the only American one. Of the 9,559 aneurysm patients assessed, 7,416 were candidates for only clipping or only coiling or refused to participate; with the rest, a computer randomly assigned 1,073 to coiling and 1,070 to clipping.

Karen Cook, a former virology researcher in Aldbourne, England, became part of the study after she collapsed in an antique store in 1999. Her memories of the next few days are hazy, but she remembers the trial being explained "in one of my lucid moments."

She agreed, was assigned to coiling and was relieved. "I didn't fancy the can-opener job on my head," she said. "The idea of somebody digging around in my brain didn't fill me with joy."

Her only side effects were "a spectacular 2-foot by 2-foot bruise" where the catheter went in and a month of headaches.

Three years later, "I'm doing very well," she said. "I don't think anybody else would notice anything different. There are some holes in my short-term memory. I can't do mental arithmetic as I once could, and I can't get through the day without a sleep. But I get no headaches at all now. I'm back at work, though not as many hours as I used to. And I drive a car."

When she goes back for annual angiograms, she can see the coils. "You know the little springs you get out of clothes pegs? Like that," she explained.

Some American neurosurgeons are unhappy with aspects of the study.

Dr. Robert E. Harbaugh, director of cerebrovascular surgery at the Dartmouth-

Hitchcock Medical Center in New Hampshire, agreed that the seven percentage point difference in good outcomes after one year was significant, but he said he wanted to see longer studies to prove that coiling would prevent rebleeding over the long run.

"You need to use what's safer over a lifetime, not safer over one year," he said, while agreeing that the study was "a historical piece of work" and that "both options should be available" to all patients.

Dr. Richard Kerr, a neurosurgeon at the Radcliffe Infirmary of Oxford University and one of the leaders of the Lancet study, agreed that follow-up was needed. But he said that "tens of thousands of patients have been treated with this around the world, and the rebleed rate is not that great."

"I'm a surgeon," he added, "but I'm very conscious that the results of surgery are not as good as they ought to be. That's why I've embraced this. Maybe there is a better way."

Dr. Harbaugh also said he was worried that some doctors in the Lancet study had more experience than others, a fact that could skew results.

American surgeons, Dr. Kerr said, want a trial that will compare America's best brain surgeons to its best endovascular radiologists.

"But there's no point," he said. "That's not what's available to Joe Public."

Dr. Mohr did complain that the Lancet trial had a "striking omission" in that it did not say how many procedures themselves caused ruptures.

Dr. Guglielmi, reached in Rome, said there were two reasons his coil met more resistance in the United States than in Europe. First, the best-trained American neurosurgeons have relatively high success rates and so have great confidence in their skills.

And second, he said: "In Europe, a doctor has a monthly salary regardless of the procedures he does. But in America, if the neurosurgeon doesn't clip an aneurysm, he doesn't get the money. Economics could be a factor."

Dr. Marc Mayberg, chairman of neurosurgery at the Cleveland Clinic, agreed that rivalries over fees between surgeons and radiologists hurt patients.

"The kind of departmental structure set up 50-plus years ago needs to change," he said. "The bottom line is that a patient needs to be evaluated in an unbiased manner by a team."

The Lancet study "opens the door to both technologies," Dr. Mayberg said.

The wave of the future may be neurosurgeons who can also coil; Dr. Mayberg has two such surgeons on his team, and he estimated that another 15 to 20 American surgeons learned coiling each year.