Brain Aneurysm (Using Polymers)

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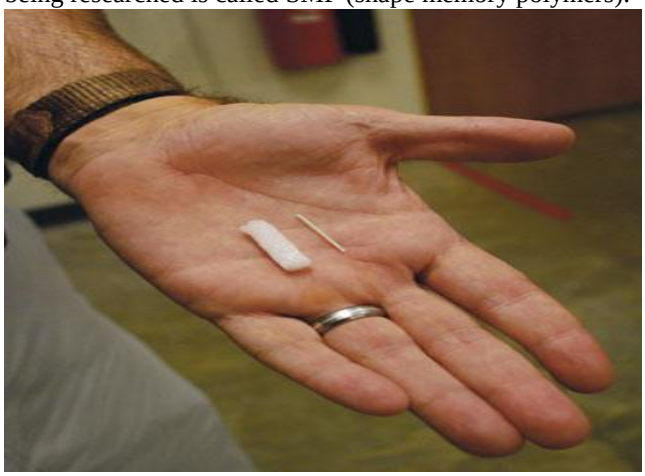
I. Introduction

AN Aneurysm occurs when a weak area of an artery supplying the brain with blood expands or bulges, it is called an intracranial or brain aneurysm. When an aneurysms burst, and blood from the leaking artery seeps into the brain in more than 30,000 people every year. 1 person out of 15 in the United States will develop a brain or cerebral aneurysm during their lifetime. Between 10 and 15 percent of them die before they get to a hospital, and more than half of the rest die within a month of the rupture. Half the survivors are paralyzed or suffer other neurological damage.

II. Methods

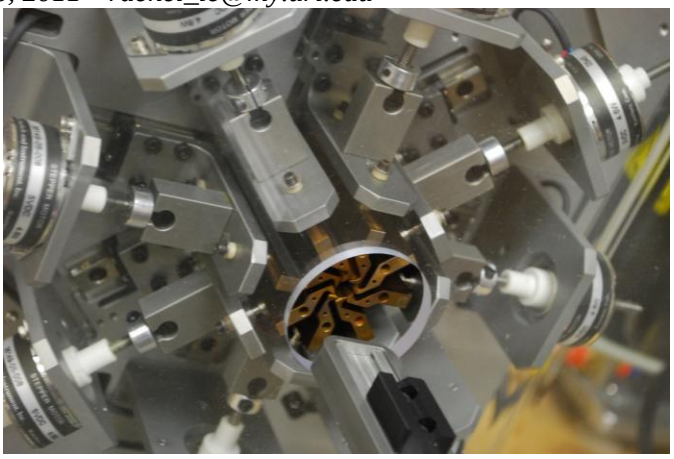
Most common methods are surgically and non surgically. When chosen to do surgery, it is to usually expose the Aneurysm, and close off with a clip and removed. If chosen nonsurgical, it is by inserting tiny spring-like platinum coilds (dozen or more) into the Aneurysm. Another method just is being researched is called SMP (shape memory polymers).



The ball is inserted thought a narrow cylinder that can pass through a catheter that is threaded through arteries to the site of the aneurysm. The compressed SMP ball can be steered into the aneurysm, where a beam of laser light shone through an optical fiber in the catheter hits the SMP cylinder and causes it to return to its original ball shape filling the aneurysm.

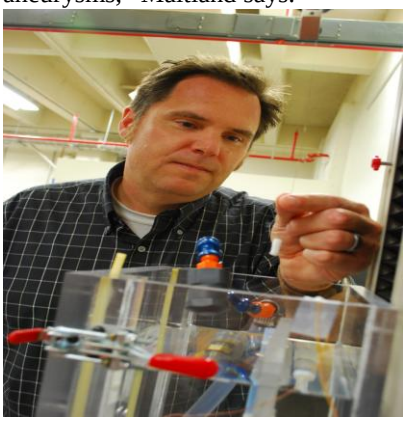
III. Results

Filling the aneurysm with an SMP ball largely avoids potential problems from using coils or clips. First, the size of the ball can be calibrated to the size of the aneurysm, so that it exerts virtually no pressure on the aneurysm walls and the risk of bursting is greatly reduced. Second, the ball has no parts to shift back into the artery to cause unwanted blood clots there.



IV. Discussion

Engineers seldom do brain surgery, but some engineers are getting ready to give brain surgeons new toolds to help treat potentially deadly defects in blood vessels deep inside the brain. The unlikely tools are pea-sized foam balls formed from special plastics called SMPs. Inserted into aneurysms, the SMP balls offer an effective way to treat potentially dangerous aneurysms with less risk than surgery or existing nonsurgical approaches. “Shape memory devices reduce the risk or trauma involved in current therapies for these aneurysms,” Maitland says.



References

[1] "Plugging Aneurysms with Polymers." *Engineering TexasA&M University*. N.p., n.d. Web. 28 Nov 2011. <http://engineering.tamu.edu/magazine/2010/plugging-aneurysms-with-polymers/>.

[2] "Accelerated Cerebral Aneurysm." *Coulter Translational research*. N.p., n.d. Web. 28 Nov 2011. <http://medicaldevice.wisc.edu/documents/MastersAneurysm.pdf>.

[3] . "Brain Aneurysm Risk." *deCODEme*. N.p., n.d. Web. 28 Nov 2011. <http://www.decodeme.com/brain-aneurysm>.

[4] . "Treatment of Brain Aneurysm." *Brain Aneurysmresources*. N.p., n.d. Web. 28 Nov 2011. <http://www.brainaneurysm.com/aneurysm-treatment.html>.