A Flow Control Device for the Treatment of Intracranial Aneurysms

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Technology description

Cerebral aneurysms develop when the wall of a cerebral artery becomes weakened and the blood vessel balloons. Intracranial aneurysms are estimated to affect between three and six percent of the adult population in the United States. Each year 30,000 to 50,000 aneurysms rupture in the United States, killing 50 percent of the individuals who experience these ruptures and leaving another 25 percent with severe neurological injury.

Treatment procedures are aimed at occluding an aneurysm from blood flow to prevent subsequent growth and rupture. Traditional surgical techniques involve placing a clip across the base of the aneurysm to isolate it from blood flow. In many instances the preferred treatment method is an endovascular technique that uses a catheter to deploy a series of coils that fill the aneurysm cavity and block blood flow.

Both treatments involve significant risks. While the endovascular treatment technique has advantages over the open surgical technique, several significant issues limit its broad application. The most significant may be aneurysm reoccurrence, which occurs 30 to 40 percent of the time when the neck of the aneurysm is more than 10 mm wide, even when the initial treatment appears satisfactory. Also, neither technique addresses a major cause of aneurysm formation, the disturbed blood flow that occurs in some intracranial arteries. UW-Madison researchers have developed a flow control apparatus and method that relieves abnormal hemodynamic forces known to cause aneurysm formation, growth and rupture. The device can be delivered in a compact form endovascularly using standard microcatheters and guidewires. Once it’ s delivered to the aneurysm site, the device expands into its final configuration. It is positioned upstream from the aneurysm to effectively divert blood flow and prevent rupture.

A stent-like anchoring element, consisting of a biologically inert material, such as nitinol or stainless steel, stabilizes the device. It is coated with polyurethane or silicon to prevent blood coagulation. To avoid volume flow complications, the device occludes no more than 25 percent of the implant site and comes in a variety of sizes to accommodate the shape and size of an aneurysm.

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a device for improved treatment of intracranial aneurysms.

Application area

Treatment of intracranial aneurysms

Advantages

Prevents aneurysm rupture
Controls hemodynamic forces
Reduces risk of aneurysm recurrence
Uses standard surgical methods
Reduces dangers associated with other techniques

Institution

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