

Researchers devise new technology to monitor brain aneurysms

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University of British Columbia researchers have developed new technology for monitoring brain aneurysms – an approach that is potentially less invasive and more accurate than current methods, and one that is simple enough for patients to use at home for frequent monitoring.

Brain aneurysms occur when the weak wall of an artery carrying blood to the brain begins to bulge and balloon out. If the artery ruptures, the hemorrhage can lead to stroke, brain damage or death. To create a plug that will prevent blood flow to the weak area of the artery, surgeons typically insert an "embolization" implant made of microscopic coils of platinum.

UBC researchers have now devised a monitoring technique that is compatible with existing coil-implantation tools and procedures. In the first study of its kind, the team proved that it is possible to use the platinum implant as an "antenna" to wirelessly detect blood levels and indicate implant failure. Their results will appear in a forthcoming issue of the Elsevier journal *Biosensors and Bioelectronics*.

"This is a completely brand new approach to monitoring cerebral embolization and our tests in the lab have been quite successful," says lead author Kenichi Takahata, an assistant professor in the Dept. of Electrical and Computer Engineering and Canada Research Chair whose research areas include micro sensors, smart implants, nanotechnology and wireless microdevices.

"As an early detection method, what we're proposing could be carried out by patients at home on a continual basis," says Takahata, who led the study with UBC postdoctoral fellow Abdolreza Rashidi Mohammadi. "We anticipate having a prototype within two to three years."

Currently, the only way to check whether an embolization is still working is to expose patients to high-dose X-rays for a CT scan or angiography – an invasive procedure that involves catheters and injecting dyes to highlight brain arteries. Both methods preclude frequent patient checkups.

Aneurysms can occur in any blood vessel in the body and usually cannot be detected unless there is a rupture or leakage. Aneurysms in the brain are one of the common types, affecting up to six per cent of the population. About 33,000 North Americans suffer a rupture every year, leading to stroke with up to a 60 per cent fatality rate and permanent disability in about 50 per cent of the survivors.

Provided by University of British Columbia

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