

New screening tool identifies people at risk of aneurysms

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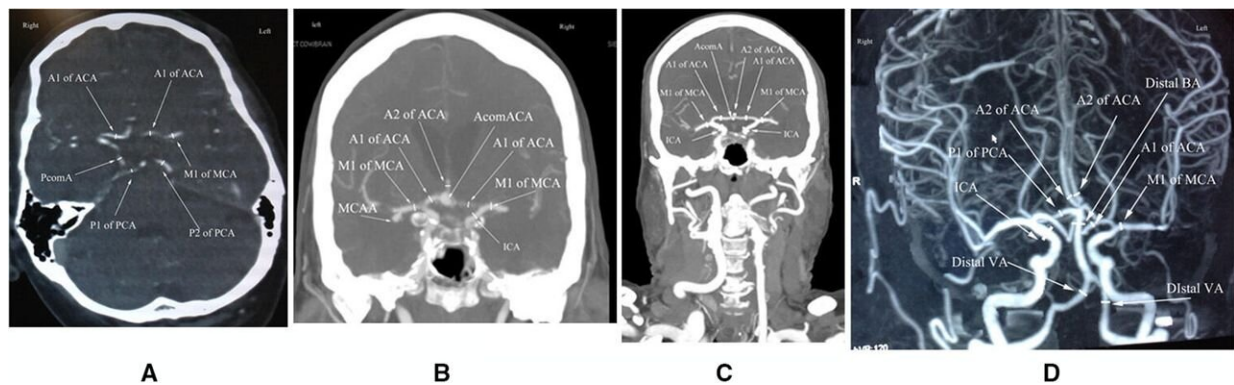


Figure 1. Sites of arterial diameter measurement in cerebral angiography images. White lines perpendicular to the long axes of vessels show the measurement sites and white arrows depict the components of cerebral basal arterial network (CBAN). (A) Axial image showing the sites of measurement; (B) coronal image showing the sites of measurement and location of aneurysms; (C) coronal angiography showing the sites of vessel measurement; (D) digital subtraction angiography showing the sites of vessel measurement. ACA, anterior cerebral artery; A1 of ACA, the first segment of ACA; A2 of ACA, the segment of ACA; AcomA, anterior communicating artery; AcomACA, AcomA complex aneurysm; BA, basilar artery; ICA, cranial component of internal carotid artery; MCA, middle cerebral artery; MCAA, MCA aneurysm; M1 of MCA, the first segment of middle cerebral artery; P1 of PCA, first segment of PCA; P2 of PCA, second segment of PCA; PCA, posterior cerebral artery; PcomA, posterior communicating artery; VA, vertebral artery. Credit: DOI: 10.1136/bmjopen-2021-051028

It's called a silent killer. Warnings are rare, but of the million people who suffer a ruptured brain aneurysm each year, almost half will die and only a third will recover without disabilities.

A new study published in *BMJ Open* has measured for the first time a link between variations in size of the brain's arteries and the likelihood of a cerebral aneurysm, providing scientists with a new screening tool to monitor people at risk.

Lead researcher, University of South Australia neuroanatomist, Dr. Arjun Burlakoti, says imaging tests of 145 patients showed that people with asymmetric brain arteries have a significantly higher chance of developing an aneurysm, a ballooned vessel in the brain, that can rupture and cause a haemorrhagic stroke.

"A subarachnoid hemorrhage is the most dangerous type of stroke and occurs when a brain aneurysm leaks or ruptures, causing bleeding into the brain, killing more than 50 percent of affected people," Dr. Burlakoti says.

"A lot of small, unruptured aneurysms go undetected in commonly used imaging techniques. They may not be diagnosed until they grow sufficiently to cause symptoms or rupture, often when it is too late.

"We looked at brain images of people with aneurysms and found that the four arteries entering the brain box, dividing into multiple segments and supplying blood to the brain, were not in proportion to each other, thus increasing peaks in [blood pressure](#) and predisposing them to ballooned blood vessels."

Where the front part of the brain arterial network (the anterior cerebral artery, or A1) differs in left and right diameter ratio by up to 1.4, people have an 80 percent risk of developing aneurysms in that region, the most

common location of ruptured aneurysms. Those with symmetrical ratios below 1.4 have a 7.8 percent equivalent risk.

Cerebral aneurysms cause almost 500,000 deaths worldwide each year, half of them occurring in people under the age of 50, with women at greater risk.

The main symptom of a burst [aneurysm](#) is a sudden, severe headache, often accompanied by [double vision](#), nausea and vomiting, a stiff neck, muscle weakness, confusion, seizures and cardiac arrest.

If detected early, aneurysms can be monitored and slowed by controlling blood pressure with medication and diet and lifestyle changes. They can also be surgically clipped or removed but this also carries risks of brain damage or stroke and is only recommended if there is a high risk of rupture.

"Based on our findings, MRI and CT angiograms will determine whether people have asymmetrical [brain arteries](#) and if so, they should be screened regularly for cerebral aneurysms," Dr. Burlakoti says.

More information: Arjun Burlakoti et al, Relationship between cerebral aneurysms and variations in cerebral basal arterial network: a morphometric cross-sectional study in Computed Tomography Angiograms from a neurointerventional unit, *BMJ Open* (2021). [DOI: 10.1136/bmjopen-2021-051028](https://doi.org/10.1136/bmjopen-2021-051028)

Provided by University of South Australia

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