Structural variations of brain arteries lead to Migraines

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A migraine is a severe, painful headache that is often preceded or accompanied by sensory warning signs such as flashes of light, blind spots, tingling in the arms and legs, nausea, vomiting, and increased sensitivity to light and sound. The excruciating pain that migraines bring can last for hours or even days. Migraine headaches result from a combination of blood vessel enlargement and the release of chemicals from nerve fibers that coil around these blood vessels. During the headache, an artery enlarges that is located on the outside of the skull just under the skin of the temporal artery. This causes a release of chemicals that cause inflammation, pain, and further enlargement of the artery. Variations in arterial anatomy lead to asymmetries in cerebral blood flow that might contribute to the process triggering migraines. It was once believed that migraines were caused by dilation of blood vessels in the brain, while more recently it has been attributed to abnormal brain signal activity. According to the University of Pennsylvania researcher, an incomplete network of arteries may increase a person's susceptibility to changes in brain blood flow, contributing to the abnormal brain signal activity that triggers migraines. The arterial supply of blood to the brain is protected by a series of connections between the major arteries, termed the "circle of Willis." People with migraine, particularly migraine with aura, are more likely to be missing components of the circle of Willis. In a study of 170 people from three groups -- a control group with no headaches, those who had migraine with aura, and those who had migraine without aura -- the team found that an incomplete circle of Willis was more common in people with migraine with aura (73 percent) and migraine without aura (67 percent), compared to a headache-free control group (51 percent). The team used magnetic resonance angiography to examine blood vessel structure and a noninvasive magnetic resonance imaging method pioneered at the University of Pennsylvania, called Arterial spin labeling (ASL), to measure changes in cerebral blood flow. Abnormalities in both the circle of Willis and blood flow were most prominent in the back of the brain, where the visual cortex is located. This may help to explain the most common migraine auras consist of visual symptoms such as seeing distortions, spots, or wavy lines. The researchers suggest that at some point diagnostic tests of circle of Willis integrity and function could help pinpoint this contributing factor in an individual patient.

REFERENCE


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