

45. Aneurysm, stroke, sinus vein thrombosis - definitions

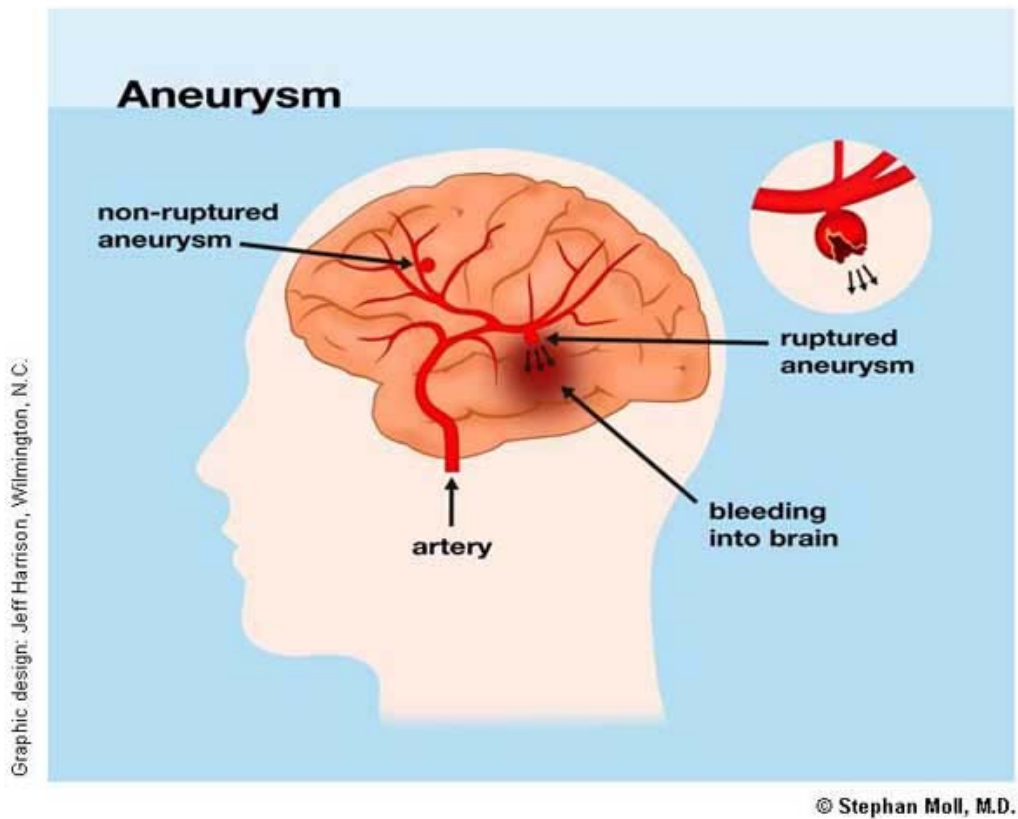
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Q: "A friend of mine had a brain aneurysm two weeks ago followed by a stroke one week ago. She was told that she had protein S deficiency. She was also told that being on the pill might have caused the aneurysm or at least exacerbated the situation."

A: Taking contraceptives may lower protein S levels and the patient may therefore not have a true protein S deficiency (see [Q/A 50](#) "Protein S deficiency" on this webpage). However, low protein S levels do not cause aneurysms or make symptoms of a bleeding aneurysm worse. Contraceptive pills likely do not cause aneurysms or increase the risk of bleeding from an aneurysm.

"Stroke" is defined as a neurologic deficit of sudden onset lasting longer than 24 hours, and is caused by obstruction of blood flow (= ischemic stroke) or bleeding (= hemorrhagic stroke). 80 percent of strokes are ischemic strokes, 20 percent hemorrhagic. Ischemic strokes are caused by blood clots in the brain arteries (= cerebral arteries). If blood clots form in the veins of the brain (= sinus vein thrombosis), then blood is still pumped into the brain but can not flow out; increased pressure in the vessels in the brain results, which may lead to bleeding into the brain tissue and hemorrhagic stroke. Sinus vein thromboses are uncommon. Most of the thrombophilias (factor V Leiden, prothrombin 20210 mutation, etc.) are risk factors for sinus vein thrombosis, but not for the usual arterial strokes. A TIA (=transient ischemic attack) is also called ministroke. It is due to a temporary occlusion of an artery in the brain. It is defined as a neurologic deficit lasting less than 24 hours, with full recovery.

An aneurysm is a well circumscribed pathologic bulging of the wall of an artery (see figure). It can rupture and lead to bleeding. If this happens within the brain a hemorrhagic stroke may result. Sometimes the rupture of an aneurysm also leads to spasm of surrounding blood vessels, leading to an additional ischemic stroke. People can be born with aneurysms or can acquire them during their life. Sometimes aneurysms run in families. They typically occur in people older than 40 years, but may also occur in younger persons. They can be associated with arteriosclerosis (= hardening of the arteries), hypertension, or connective tissue disorders (such as Ehlers-Danlos syndrome) with weakened blood vessel walls.



Factor V Leiden, protein S deficiency and other thrombophilias have nothing to do with aneurysms. Thrombophilias do not cause aneurysms and do not worsen symptoms in case of bleeding. Heterozygous factor V Leiden is not a risk factor for arterial blood clots and therefore not a risk factor for ischemic strokes (except in the young woman who smokes). It is not known whether homozygous factor V Leiden is a risk factor for arterial clots. Heterozygous prothrombin 20210 mutation is also not a risk factor for arterial clots. Antiphospholipid antibodies and elevated homocysteine levels are risk factors for arterial clots and therefore for ischemic stroke. Deficiency of protein C, protein S, and antithrombin III cause mainly venous clots, but sometimes also arterial clots. Since all the above mentioned thrombophilias are risk factors for sinus vein thrombosis, they may cause hemorrhagic stroke.