Expert Opinion

Should You Screen for an Aneurysm in a Migraineur Whose Mother Died From a Ruptured Intracranial Saccular Aneurysm?

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Abbreviations: SAH subarachnoid hemorrhage

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Many patients with typical migraine and a negative family history unnecessarily fear an unruptured aneurysm as the cause. This case centers around whether the fear is justified when the family history is positive.

CLINICAL HISTORY

A 32-year-old woman with migraine without aura, occurring on average two times per month since she was a teenager, was concerned about her risk of an aneurysm and requested evaluation. Her mother died at aged 58 years from a ruptured intracranial saccular aneurysm; there was no other relevant family history. I ordered an MRI scan of the brain with intracranial magnetic resonance angiography (MRA), but the HMO medical director would not authorize the study because he believed it was not indicated, citing a recent study published in the *New England Journal of Medicine.*[1]

Question.—When asymptomatic patients have a family history of intracranial saccular aneurysm, what are the indications for screening?

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EXPERT COMMENTARY

Aneurysmal subarachnoid hemorrhage (SAH) is a devastating illness. Mortality may be as high as 50%, and only about 25% of those affected are left with a good outcome.[2,3] Aneurysmal SAH may occur more frequently in women and disproportionately at earlier ages than other types of stroke.[4,5] It is estimated that 5% of the population harbors an intracranial aneurysm. However, as many as 7% to 20% of patients with an aneurysmal SAH have a first- or second-degree relative with a confirmed intracranial aneurysm, and there is a four-fold risk of aneurysmal rupture among first-degree relatives.[6] Of the relatives, siblings may be more prone to rupture and rupture may be more frequent when there are multiple affected relatives. Overall, most studies suggest that familial predisposition is associated with a higher prevalence of aneurysm and, therefore, a higher risk of SAH.

The circumstances that predispose to aneurysmal rupture may be complex and, as of yet, not fully defined. Aneurysmal size has received considerable attention. Conventional wisdom has held that larger aneurysms are more likely to rupture. Conversely, neurosurgeons observe that smaller aneurysms may rupture. This may be especially true in those with a history of SAH. A 10-mm aneurysm is frequently quoted as the cutpoint for rupture.[2,7] In an international study, there was about a 20-fold difference in the annual

rate of rupture for aneurysms 10 mm or larger versus less than 10 mm (almost 1% versus .05%) in persons without a history of SAH.[2] Basilar tip, vertebrobasilar, and posterior cerebral aneurysms may have the highest relative risk of rupture. Therefore, by extrapolation one might predict that the combination of familial predisposition to aneurysm and aneurysm measuring 10 mm or larger could be a deadly pairing.

Given these perspectives, how might we reduce the risk of aneurysmal SAH in those at high risk? The obvious response, in the absence of relatively simple life-style change or medical therapy, is screening to detect aneurysm(s) followed by aneurysmal ablation. The latter strategy calls for a safe and effective screening technique and a safe and effective ablation modality. In a recent study, 626 first-degree relatives of 160 patients with sporadic SAH were screened with MRA.[1] Aneurysms were identified in 25 relatives of which 88% were siblings. Twenty-three of the 25 had conventional cerebral angiography with 18 undergoing elective surgery. Aneurysms measured 5 to 11 mm in 5, less than 5 mm in 11, and 2 had both small and medium aneurysms. One patient suffered a major complication of cerebral angiography. After 6 months, the Rankin score increased in 61% of the relatives with identified aneurysms. An estimated 0.9 months of increase in life expectancy per person screened was offset by 19 years of functional loss per person. Furthermore, an estimated 149 relatives would need to be screened to prevent one SAH and 298 to prevent one fatal SAH.

The patient referred to in the above clinical vignette may harbor an intracranial aneurysm and its risks, or may be living in fear that she may die of aneurysmal SAH as did her mother. For an individual with this type of familial history, headache, and concern, it is reasonable to screen for a large (10 mm or larger) aneurysm by MRA. If a large aneurysm is found, conventional cerebral angiography followed by surgical ablation should be considered. If a small aneurysm is identified, the patient may elect to undergo surgery, endovascular techniques, or observation with periodic imaging studies. Surgical expertise is critical to the success of the procedure, as surgical morbidity was a rate-limiting factor in the aforementioned series.[1] In the future, development of noninvasive imaging technology for accurate detection and size determination of an aneurysm and endovascular ablation procedures could provide safe and minimally invasive means by which to prevent aneurysmal SAH in those at high risk.[8] Further studies are required to better educate those patients at higher risk for aneurysmal rupture (eg, aneurysm geometry, tobacco and alcohol abuse, hypertension).

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