

# Should people with a first-degree relative who died from subarachnoid hemorrhage be screened for aneurysms?

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### EVIDENCE-BASED ANSWER

Patients whose family history includes 1 first-degree relative with subarachnoid hemorrhage caused by intracranial aneurysm (ICA) need not be screened for ICAs (strength of recommendation [SOR]: **B**, based on a single case series). Hypertension, hyperlipidemia, ethanol use, and tobacco use do not increase the risk of ICA for patients whose primary family member had an ICA (SOR: **B**, based on case series). Screening for

intracranial aneurysms is not cost-effective (SOR: **C**, mathematical modeling/expert opinion).

In studies using mathematic modeling, harms associated with screening (functional impairment, severe morbidity, or death) would outweigh benefits of screening, even for individuals having 2 or more relatives with ICA (SOR: **C**). Patients experience varying levels of psychological distress when offered screening for ICA (SOR: **B**).

### CLINICAL COMMENTARY

**Although the risk of screening may outweigh the benefit, it may be worth it for a worried patient**

The answer to the question, "Is screening for ICA appropriate?" depends on who asked it. If you asked it, prompted by the family history, then the evidence-based answer may be the most appropriate one. However, if the patient poses the question unsolicited—and is worried sick that they too will succumb to this abrupt, unpredictable end, leaving their family behind—then applying the

"common-sense" answer may be most appropriate. The MRI/MRA, in this case, is being used more to treat the anxiety than to screen for the disease. Although the risk of screening may outweigh the harm from ICA in the general population, the benefit may be worth it for the patient who is losing sleep and has somatic symptoms as a result of the worry.

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### ■ Evidence summary

In a systematic review of 23 studies involving 56,304 patients, the prevalence of ICA varied by the number of family members affected; 2.3% in general population, 4% for 1 primary family member affected, and 8% for 2 or more primary family members affected.<sup>1</sup> The annual rate of rupture in a retrospective study of 1449 patients was

0.5%.<sup>2</sup> Rate of rupture varied based on size of aneurysm, location, and gender. In a more recent case series of relatives of people who suffered an subarachnoid hemorrhage, the absolute lifetime risk of subarachnoid hemorrhage was 4.7% (95% confidence interval [CI], 3.1–6.3%).<sup>2</sup>

In a case series of 626 patients having 1 primary relative with ICA, screening

## FAST TRACK

**A study among relatives of patients with hemorrhage showed that offering screening did not provoke anxiety or depression**

with magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA) backup resulted in 0.9 months increased life expectancy per person screened, at the cost of 19 years of decreased function.<sup>3</sup> A mathematical model applied to this study showed that surgery improved life expectancy by an average of 2.5 years; a 6-month postoperative functional assessment found functional impairment in 11 of 18 surgical patients (number needed to harm [NNH]=1.6). In a separate study using data from the same population, being a sibling of an ICA sufferer increased risk of ICA (relative risk=3.8, though with a wide 95% CI of 1.1–29.3).<sup>4</sup> Neither hypertension nor hypercholesterolemia conferred increased risk of ICA, and the risk conferred by smoking and use of alcohol was statistically insignificant.<sup>4</sup>

In a study of MRA with digital subtraction angiography backup, conducted using theoretical models, screening individuals having 2 or more first-degree relatives with aneurysm would result in severe morbidity or death in 26 individuals per 1000 patients screened, vs 15 per 1000 unscreened individuals over a 30-year period.<sup>5</sup> These results were achieved assuming an ICA prevalence estimate of 9.8%, as determined from an earlier population study of individuals with at least 2 first-degree relatives with ICA. The lower ICA prevalence rate of 4% for patients with only 1 primary affected relative would yield an even more favorable result for not screening.

A mathematical model for evaluating cost effectiveness of screening for asymptomatic intracranial aneurysms in the general population determined there is a quality-adjusted life-year reduction for presumed ICA prevalence rates as high as 10%, given an annual rate of rupture of 0.05%.<sup>6</sup> The average cost was \$1121 for those who underwent screening vs \$147 for those who did not. The presumed variables of prevalence, annual rates of ICA rupture, and surgical mortality and morbidity greatly influenced cost-effectiveness.

Screening could be reasonable in populations with higher rupture rates, and if surgical morbidity and mortality decline.

Recently, the psychosocial aspects of screening for ICA have been studied. In 1 case series of 105 patients, 35 screen-positive patients scored lower for quality of life than 70 screen-negative patients. However, only 3 patients regretted participating in screening.<sup>7</sup> An observational study of 980 first-degree relatives of patients with subarachnoid hemorrhage determined that offering screening for ICA did not provoke anxiety or depression.<sup>8</sup> Providing thorough counseling before screening can help to alleviate the patient's anxiety.

### Recommendations from others

In 2000, the Stroke Council of the American Heart Association concluded that screening is not efficacious in populations having a single first-degree relative with aneurysmal subarachnoid hemorrhage or intracranial aneurysm.<sup>9</sup>

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