Current evidence does not support aneurysm screening in first-degree relatives of patients with subarachnoid hemorrhage.

Clinical Problem: A 40 year old man suffers an aneurysmal subarachnoid hemorrhage. His 50 year old asymptomatic brother wants to know whether he should be screened for an intracranial aneurysm.

Clinical Question: In first-degree relatives of patients with sporadic SAH, what are the expected risks and benefits of screening for, and surgically treating, asymptomatic aneurysms?

Search Strategy:
SUMSearch: “Intracranial aneurysms” OR “subarachnoid hemorrhage” AND “family” OR “relative”, using the Screening/Prevention filter. No relevant practice guidelines, meta-analyses or Cochrane reviews were found. 17 PubMed documents were found, of which 4 were pertinent to screening family members of patients with aneurysms. 2 of these articles were editorials. One article used estimates of aneurysm prevalence in first-degree relatives of patients with SAH to model approaches to screening. The authors of the second article, rather than estimating, undertook a large trial to obtain such data directly. The second article was therefore chosen for review.

Clinical Bottom Lines:
1. First-degree relatives of patients with sporadic subarachnoid hemorrhage had a 4.0% (25/626) chance of harbouring an asymptomatic intracranial aneurysm.
2. Using a decision model, a strategy of screening for such aneurysms and then operatively repairing them would result in an overall increase of 2.5 years of life expectancy.
3. In the subjects screened, angiography and surgery resulted in impaired function in 11 of 18 subjects. The model would predict that screening and subsequent treatment would result in 19 years of decreased function, as compared to only 2.1 years of decreased function without screening.
4. From the decision model, 894 first-degree relatives would need to be screened to prevent one SAH in five years, and 149 would need to be screened to prevent one SAH in the course of a lifetime.

The Evidence:
The Magnetic Resonance Angiography in Relatives of Patients with Subarachnoid Hemorrhage Study Group reports the results of both a prospective observational study and a subsequent decision analysis aimed at determining the risks and benefits of a screening program for first-degree relatives of patients with aneurysmal SAH.

193 consecutive patients with SAH, proven to be secondary to aneurysm rupture, were identified, and 626 of their first-degree relatives underwent initial MRA screening for asymptomatic familial aneurysms. 25 of the 626 patients were ultimately found to have an aneurysm. Of the 18 relatives who went on to have operative treatment of their aneurysms, 11 had postoperative sequelaes, defined as a Modified Rankin Score (MRS) greater than zero at six months. None of the operative patients died or developed a MRS greater than three.

The authors use this prospective observational data of prevalence, size, and operative risk of aneurysms in first-degree relatives, as well as actuarial data and natural history data from systematic reviews of the literature, to create a decision-analysis model to estimate the effectiveness of screening. Endpoints identified by the authors were: years of life expectancy gained by screening; years of life with decreased function gained by screening.

Data:
**Differences in Average Life Expectancy (in years)**

<table>
<thead>
<tr>
<th>Modified Rankin Scale</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without Screening</td>
<td>30.4</td>
<td>0.5</td>
<td>0.6</td>
<td>0.4</td>
<td>0.4</td>
<td>0.2</td>
<td>32.5</td>
</tr>
<tr>
<td>With Screening</td>
<td>13.7</td>
<td>16.3</td>
<td>3.8</td>
<td>1.2</td>
<td>0</td>
<td>0</td>
<td>35.0</td>
</tr>
</tbody>
</table>

From the above table:
- Total years of life expectancy gained by screening: 2.5*
- Increase in number of years of life with functional disability (MRS>0) by screening: 19*
- Increase in number of years of life with functional disability without screening: 2.1*

* = Authors’ conclusions

Data for the authors’ calculations of number-needed-to-screen to prevent one SAH within five years (NNS = 894) and over the course of a lifetime (NNS = 149) are based on Dutch life-expectancy tables are not provided in the article.

**Comments:**
1. The only intervention considered in this 1999 study was operative clipping of aneurysms. Endovascular interventions were not considered.
2. The authors do not undertake any sensitivity analysis to test the robustness of their conclusions.
3. The post-operative sequelae were very mild in this study: of 18 patients, only one had a MRS of 3, two had a MRS of 2, and 15 had a MRS of 1 or 0. No death or severe disability was seen peri- or post-operatively. Only one patient was not fully independent (MRS=2) six months post-surgery.
4. The authors make no comment on the economic implications of large-scale screening of first-degree relatives of patients with SAH.

**References:**

**Key Words:** Aneurysm, subarachnoid hemorrhage, SAH, screening, relatives

**Appraiser:** Alex Fraser and the UWO Evidence Based Neurology Group

**Date Appraised:** May 2005