Changing Size of an Aneurysm

Report of a Case

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Follow-up arteriography without intervening surgery usually demonstrates no change or occasionally an increase in the size of an intracranial aneurysm.5,14 Only a few cases have been recorded in which the aneurysm did not fill after repeat angiography.2,9,10,17 These "spontaneous cures" are presumably the result of intra-aneurysmal thrombosis or an actual decrease in the size of the sac.

Marguth and Schiefer17 described a case in which the second angiogram, carried out 15 years later, failed to visualize the aneurysm. Höök and Norlén10 reported a patient in whom follow-up angiography 6 weeks later did not demonstrate the aneurysm. The patient was operated upon and a totally thrombosed aneurysm removed. Hemmer and Umbach8 reported 2 cases in which the aneurysm did not fill after repeat arteriography 7 weeks and 5 months later. Björksten and Troupp's patient2 underwent a craniotomy at which time an attempt was made to clip the aneurysm. A postoperative angiogram showed that the clip was behind the aneurysm. Five years later, follow-up arteriography showed no filling of the aneurysm. The position of the clip was unchanged.

In the present case the size of the aneurysm was different in 3 separate arteriographic examinations. The movement of the applied clips from the fundus of the aneurysm to a position contiguous to the internal carotid artery suggests that the aneurysm not only thrombosed but also decreased in size.

Table 1 summarizes cases in which follow-up arteriograms without intervening surgery demonstrated no filling of the aneurysm.

Case Report

A 36-year-old woman entered Mount Sinai Hospital, City Hospital Center at Elmhurst Division, in 1962, with a 2-week history of sudden onset of headaches and drooping of the left upper eyelid. She had no other complaints. Her past medical history was unremarkable.

Examination. At the time of admission to the hospital the general physical and neurological examinations disclosed only a left 3rd nerve palsy. Routine laboratory studies were normal. The skull x-ray was negative. A lumbar puncture was normal. Carotid arteriography demonstrated an aneurysm of the left internal carotid-posterior communicating artery (Fig. 1).

Operation. A craniotomy was carried out and the aneurysm exposed. An attempt was made to obliterate the aneurysmal sac. During the application of the clips the aneurysm ruptured. The bleeding was eventually controlled with additional clips.

Postoperatively the patient was aphasic and had an almost complete right hemiplegia. One month after surgery a left carotid arteriogram demonstrated a bilobed aneurysm, which was larger than that visualized preoperatively (Fig. 2). The clips were on the fundus of the aneurysm. The patient steadily improved and was discharged from the hospital 6 months later with a mild dysphasial and right hemiparesis.

Two years later she was readmitted for follow-up arteriography. The aneurysm was no longer demonstrable and the clips had moved to a position contiguous to the internal carotid artery (Fig. 3).

Discussion

Although thrombosis of intracranial aneurysms occurs fairly often12,21,22 the frequency of "spontaneous cures" by complete thrombosis and organization of the clot is not really known. Krayenbühl14 found 1 totally fibrosed aneurysm in a series of 7482 autopsies. Schunk28 reported 2 patients with complete thrombosis in a series of 122 intracranial aneurysms. Additional cases have been described in which totally thrombosed aneurysms have been found at autopsy or at surgery.12,16,19 Hamby10 and others5,15 have pointed out that, although the aneurysm may be almost entirely filled with thrombus, the sac may continue to expand and even go on to eventual rupture.

Altered circulatory dynamics with decreased velocity and volume of blood flow tend to facilitate stasis in the sac and to promote thrombosis. Several reports note a decrease in the size of the aneurysm following temporary or permanent carotid occlusion.1,1,16,20

Black and German,2 in an experiment using vein sac grafts, concluded that spontaneous thrombosis occurs if the volume of the aneurysm is large in proportion to the width of the neck or if the neck is very narrow. However, Björksten and Troupp2 point out that the postoperative arteriogram of several of their cases in which the neck of the aneurysm had been constricted during surgery demonstrated good filling of the aneurysm with no decrease in size.

Although Laitinen and Troupp15 concluded that, provided the fundus of the sac is occluded, partial obliteration of the aneurysm resulted in a

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### TABLE 1

*Summary of cases in which follow-up arteriograms demonstrated non-filling of the aneurysm*

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Sex</th>
<th>Author</th>
<th>Location of Aneurysm</th>
<th>Interval Between Arteriograms</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>44</td>
<td>M</td>
<td>Marguth and Schiefer 17</td>
<td>Internal carotid-posterior communicating artery</td>
<td>15 yrs.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>58</td>
<td>F</td>
<td>Höök and Norlén 10</td>
<td>Middle cerebral artery</td>
<td>6 wks.</td>
<td>Totally thrombosed aneurysm removed at surgery.</td>
</tr>
<tr>
<td>3</td>
<td>32</td>
<td>F</td>
<td>Hemmer and Umbach 2</td>
<td>Anterior cerebral artery</td>
<td>7 wks.</td>
<td>Possible mycotic aneurysm.</td>
</tr>
<tr>
<td>4</td>
<td>37</td>
<td>M</td>
<td>Hemmer and Umbach 9</td>
<td>Posterior cerebral artery</td>
<td>5 mos.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>36</td>
<td>M</td>
<td>Björkesten and Troupp 3</td>
<td>Internal carotid artery bifurcation</td>
<td>5 yrs.</td>
<td>Craniotomy with attempt at clipping. Clip position unchanged when aneurysm did not fill with dye.</td>
</tr>
<tr>
<td>6</td>
<td>36</td>
<td>F</td>
<td>Hollin and Gross</td>
<td>Internal carotid-posterior communicating artery</td>
<td>2 yrs.</td>
<td>Increased size after craniotomy. Clips contiguous to internal carotid artery when aneurysm did not fill with contrast medium.</td>
</tr>
</tbody>
</table>

A high degree of protection against further hemorrhage, these authors later described 2 cases in which the aneurysm enlarged after incomplete intracranial ligation. Death from recurrent hemorrhage in patients who showed significant filling of the aneurysm postoperatively occurred in 2 of Allcock and Drake's 13 patients. In a series of aneurysms of the anterior communicating artery reported by Höök and Norlén, the postoperative angiogram demonstrated incomplete obliteration in 4 cases; 2 of these died later with recurrent hemorrhage.

In the present report the apparent enlargement of the aneurysm may have resulted from the...