THE TREATMENT OF INTERNAL CAROTID ARTERY ANEURYSMS BY PROXIMAL ARTERIAL LIGATION
A FOLLOW-UP STUDY*

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ANEURYSMS of the internal carotid artery, both in the cavernous and cerebral portions, have been treated in this clinic by proximal arterial ligation in the neck for the past 16 years. We wish to present a clinical review of this experience and to evaluate some of the hemodynamic factors involved in this particular method of treatment. There are 35 patients in the series and, on the basis of a recently completed follow-up study, the present status of all members is known. To date 8 patients have died of various causes and 27 are living.

TECHNIQUE

The diagnosis of internal carotid artery aneurysm was confirmed by arteriography. The procedure was usually performed within a few days of admission, but if the patient's condition demanded prompter action it was done immediately. Bilateral visualization of the anterior part of the circle of Willis was obtained in most cases. In recent years the percutaneous technique has been used initially.

Pre-operative digital occlusion of the common carotid artery was done in all but the critically ill patients. It was compressed 2 minutes 3 times a day at the start and by small increments, over the course of a week or more, increased to 15 minutes 3 times a day. This routine was modified to meet the individual situation. At operation, usually under local anesthesia, the artery to be ligated was occluded under direct vision for no less than 30 minutes. If there were no signs of vascular deficit, the ligature was secured. In no instance was it necessary to remove a ligature postoperatively.

The usual site of ligation in patients over 40 years of age was the common carotid. In some instances the internal was subsequently ligated. In younger patients the internal was ligated initially unless there was evidence of existing or impending vascular deficit as determined clinically and by intra-arterial pressure determination at the time of ligation.2

To occlude the artery a single ligature of 0 silk was tied over a 1 cm. cuff of deep cervical fascia. Partial ligation was effected by folding the vessel inwards upon itself by means of mattress sutures.3-4 If cerebral vascular insufficiency impeded following the procedure, the patient was placed in a slightly head-down position until the danger was passed. Ordinarily ambulation was begun within 2 weeks.

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RESULTS

Of the 35 patients with internal carotid artery aneurysm, the lesion was located in the cavernous portion in 9 cases and in the cerebral portion in 26 (Table 1).

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<th>Cavernous</th>
<th>Cerebral</th>
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<tbody>
<tr>
<td></td>
<td>9</td>
<td>26</td>
</tr>
<tr>
<td>Dead</td>
<td>1</td>
<td>7</td>
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<tr>
<td>Living</td>
<td>8</td>
<td>19</td>
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<td><strong>Total</strong></td>
<td><strong>35</strong></td>
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A. Cavernous Aneurysms (Table 2). One patient (A.W.) of this group is now dead, succumbing 3 years after ligation to the widespread effects of periarteritis nodosa. Neurologically he improved after ligation. His headaches were relieved, and there was considerable return of function to the extra-ocular muscles. At autopsy, other than findings related to periarteritis nodosa, the left internal carotid artery and the aneurysm thereof were revealed to be small, nonpatent, and filled with scar tissue. The right carotid was about twice normal size; there were no other cerebral vascular lesions.

Eight patients with cavernous aneurysms are living. Only 1 person (N.L.) in this group has hypertension. Both patients (R.S. and F.L.) with arteriovenous aneurysms experienced complete cessation of pulsating exophthalmos and bruit after ligation. One patient (D.Y.), blind in the left eye on admission but with no bruit, now almost 16 years later does have a bruit and is suffering from mild headaches which she considers not severe enough to warrant investigation. She is the only patient in this group to report a head pain. Another patient (S.G.) had diminished vision (20/200) in the right eye which improved after common carotid ligation. Following a prolonged period of physical exertion she lost the sight in that eye completely, and subsequent internal ligation failed to improve the situation. Otherwise she is asymptomatic.

All 9 patients with cavernous aneurysms had derangement of the visual apparatus in some manner on admission. Eight patients, 1 of whom was blind, had weakness of the extra-ocular muscles. The other patient in the group had only diminished vision in the right eye on admission and subsequently lost the sight in that eye. Of the 8 patients with extra-ocular muscle deficit, 4 were completely relieved and the other 4 considerably improved. The 4 patients who had trigeminal nerve involvement all experienced clearance of this after ligation.

B. Aneurysms of the Cerebral Portion of the Internal Carotid Artery (Table