ANEURYSMS OF THE MIDDLE CEREBRAL ARTERY
REPORT OF SEVEN OPERATIVE CASES; REVIEW OF LITERATURE; EVALUATION OF SURGICAL THERAPY

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Intracranial arterial aneurysms are not a homogeneous group, and it has recently become apparent that any report dealing with their treatment must consider them according to their location. Since aneurysms of the middle cerebral artery constitute approximately 30 per cent of all intracranial arterial aneurysms¹⁴ and since they present a particular challenge to the neurosurgeon, we thought it appropriate to present our own experience with these aneurysms and to analyze the material published by others.

It cannot be disputed that intracranial aneurysms are serious lesions. A patient entering the hospital with a subarachnoid hemorrhage has roughly a 50 per cent chance of survival without surgical treatment, and of those discharged, about one fourth die of recurrent hemorrhage and one fourth remain disabled.⁹,¹²,¹⁵

CASE MATERIAL

The case material, which is summarized in Table 1, represents all the patients with aneurysm of the middle cerebral artery admitted to the neurosurgical service of the Hôpital de la Pitié since its foundation. With one exception, Case 1 operated on in 1946, all the patients postdated the reorganization of the neurosurgical service in 1948 by the senior author. Nine patients were operated upon; 7 of these had obliteration of the aneurysmal sac, and the other 2 were subjected to evacuation of the hematoma only. The surgical procedures were carried out by the senior author or one of his assistants (Dr. G. Guiot, Dr. J. Pecker, Dr. Y. LeBesnerais, Dr. J.-C. Clément). One patient was discharged without operation, and 2 others died before surgery.

Obliteration of Aneurysm. Seven patients were treated in this fashion. Time intervals between the most recent subarachnoid hemorrhage and operation were 2 months, 36 days, 12 days, 3 months, 1 day, 22 days, and 2 days. Hypotension in the neighborhood of 60 to 80 systolic by the use of vasodepressor drugs was employed in all but the first case. In 5 instances, the base of the aneurysm was occluded by one, sometimes two, clip(s), and in another

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by a silk suture. One aneurysm was not pedunculated and required a row of clips across the dome. An intracerebral hematoma of sizable proportions was evacuated in 3 instances and a subdural hematoma in 1.

Transient contralateral hemiplegia appeared during the course of the operation in 2 instances. In Case 6 this was presumably caused by spasm because it regressed after vasorelaxation and in Case 4 by impairment of circulation through the parent artery because it immediately disappeared after a higher placement of the clip on an arteriosclerotic aneurysm.

Case 1. (Aneurysm clipped; well 8 years later.)

H.C., 21-year-old female, was admitted to the Hôpital de la Pitié May 28, 1946 with severe generalized headache for 1 month, and diplopia and ptosis of the right eyelid for 3 weeks.

Examination revealed only a complete right oculomotor nerve paralysis. Spinal fluid was yellow. Arteriogram revealed a small aneurysm near the bifurcation of the right internal carotid artery.

At craniotomy (Dr. G. Guiot) 2 months after hemorrhage the aneurysm was seen to arise from the middle cerebral artery, and a single clip was placed on its base. Arterial bleeding began immediately and was controlled by packing the operative field with gelfoam.

The postoperative course was uneventful, the 3rd nerve lesion regressing completely. The patient was in perfect health 8 years after the operation and had married and given birth to three children.

Case 2. (Aneurysm clipped; postoperative extradural hematoma; death 64 days after operation.)

M.D., 28-year-old female, had sudden severe headache for one hour on Nov. 19, 1952 and similar sudden severe headache 6 days later associated with coma for 6 hours, generalized convulsions, projectile vomiting, meningeal signs, and bloody CSF. Improvement followed, but another attack of headache, coma and convulsions occurred December 12.

Arteriogram at the Pitié revealed an 8-mm. aneurysm of the left middle cerebral artery 2 cm. from its origin.

At operation (Dr. Petit-Dutailllis) 36 days after the second subarachnoid hemorrhage, a liquefied subdural hematoma was evacuated and the aneurysm was clipped with a single silver clip at the base, with the B.P. reduced to 90 systolic by gangloplegics.

Immediately after the procedure the patient was completely lucid and talking

### TABLE 1

Authors' 13 cases of aneurysm of the middle cerebral artery

<table>
<thead>
<tr>
<th>Method of Treatment</th>
<th>No. of Cases</th>
<th>Well</th>
<th>Improved</th>
<th>Dead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occlusion of aneurysm</td>
<td>7</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Evacuation of hematoma only</td>
<td>2</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Operation declined</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Died before surgery</td>
<td>2</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Totals</td>
<td>12</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>
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rationally. Several hours later, a state of decerebrate rigidity developed rapidly, and at reintervention 45 minutes afterward a large extradural hematoma was evacuated. The decerebrate state disappeared the next day, but returned 2 days later after an anoxic episode caused by a suppurative pulmonary complication. It continued to be elicitable by painful stimuli until March 10, after which time the patient was flaccid and totally unresponsive until death in hyperthermia on March 22, 1953, 64 days postoperatively.

Autopsy revealed the aneurysm satisfactorily clipped, the middle cerebral artery distal to the clip patent, and the entire cerebrum and brain stem riddled by petechial hemorrhages.

Case 3. (Aneurysm clipped and large hematoma evacuated; mild aphasia and hemianopsia 1 year later.)

F.D., 46-year-old male, was admitted to the Pitié on June 11, 1953, 1 week after an episode characterized by coma of 2 hours’ duration and complete right hemiplegia. Bloody CSF, stiff neck, aphasia, and right hypesthesia were noted; the hemiplegia improved. Arteriography revealed a lobulated 6×13 mm. aneurysm of the left middle cerebral artery 2 cm. from its origin and, in addition, spasm of the intracranial portion of the left internal carotid artery and its branches.

At operation (Dr. Petit-Dutaillis) 12 days after the subarachnoid hemorrhage, the narrow neck of the aneurysm was occluded by a single silver clip with the B.P. reduced to 70/50 by ganglioplegics. Atheromatous plaques were seen on the internal carotid artery and on the aneurysm. A large hematoma was evacuated.

The postoperative course was complicated by a Staphylococcus wound infection and bilateral pulmonary tuberculosis, but neurological recovery was progressive so
that 1 year postoperatively, there persisted only mild aphasia and a right homonymous hemianopsia. Arteriogram 2½ months following operation (Fig. 1) shows absence of the aneurysm and patency of the middle cerebral arterial system.

Case 4. (Aneurysm clipped; well 10 months later.)
A.L., a 46-year-old male, was admitted to the Pitie on Sept. 15, 1953, with a history of sudden intense headache two months previously immediately following a spell of coughing. Stiff neck and bloody spinal fluid were associated, and right temporal headache persisted. Frequent headaches and vertigo had been present for 3 years. Past history included a similar attack of right-sided headache with loss of consciousness in 1944.

Examination revealed only left facial weakness. Arteriogram disclosed a bilobate 8×12 mm. aneurysm of the right middle cerebral artery 3½ cm. from its origin.

Operation (Dr. Petit-Dutailllis) was performed 3 months after subarachnoid hemorrhage with B.P. reduced to 100/80 by ganglioplegics. Two clips were required to obliterate the wide base of the aneurysm, which contained a small atheromatous plaque near its dome. The use of local anesthesia permitted the early detection of a contralateral Babinski sign and of a supervening complete hemiplegia about 15 minutes after application of the clips. The lowermost clip, flush with the parent artery, was removed and replaced slightly higher; the hemiplegia began to regress immediately and was completely gone before closure of the scalp.

Postoperative course was smooth, and the patient resumed his occupation as a butcher, working 16 hours a day. He has continued well for 10 months except for
two grand mal seizures and a feeling of not being entirely up to par. Arteriogram 2 months after operation (Fig. 2) shows nonfilling of aneurysmal pouch.

**Case 5.** (Aneurysm clipped day following second subarachnoid hemorrhage; hematoma and cerebral softening found at operation; minimal aphasia and slight hemiparesis 4½ months later.)

L.P., 29-year-old female, experienced a sudden coma on Oct. 21, 1953, preceded by moderately severe occipital and nuchal headache for several days and by milder headaches for several years. At another hospital, lumbar puncture yielded bloody CSF, and neurological examination showed nuchal rigidity and coma which improved to a state of confusion with pronounced aphasia.

On admission to the Pitié, on Nov. 2, 1953, only motor aphasia and indifference were found on examination. On the evening of November 4, the patient had two episodes of decerebrate rigidity, each lasting 10 minutes and followed by profound coma and right hemiplegia, both of which symptoms improved rapidly. Arteriography the next day showed a 6X8 mm. aneurysm on the left middle cerebral artery 1½ cm. from its origin. Other arteriographic findings were spasm of the left internal carotid and a hematoma.

At operation (Dr. Petit-Dutaillis) immediately afterward, the aneurysm was actively bleeding from several points and required 4 or 5 clips across its dome because its neck was too broad for clipping. Intracerebral hematoma and frontal lobe softening were also found. The aneurysm was approached with the systolic pressure at 60 by means of ganglioplegics.

The patient made rapid progress postoperatively, and 4½ months later she showed only minimal motor aphasia and slight weakness on the right.

**Case 6.** (Aneurysm ligated; well 1 month later.)

J.M., 48-year-old male, previously healthy, suddenly fell to the floor unconscious for 1–2 minutes; severe headache appeared but diminished in intensity during the 3 weeks prior to admission to the Pitié.

Examination revealed mild meningeal signs and slight left facial weakness. Arteriogram disclosed a 7 mm. aneurysm on the right middle cerebral artery 2½ cm. from its origin.

On May 14, 1954, 22 days after subarachnoid hemorrhage, under local anesthesia and with the B.P. lowered slightly with ganglioplegics, the base of the aneurysm was ligated with a silk suture (Dr. Petit-Dutaillis). About 10–15 minutes later, the sensorium became obtunded and a left hemiplegia developed. The theory that these symptoms were caused by arterial spasm seemed borne out by their complete disappearance in 12 hours after treatment with papaverine intramuscularly and continuous slow drip of procaine intravenously.

The postoperative course was uncomplicated, and the patient was discharged in perfect health 3 weeks after operation.

**Case 7.** (Arterial hypertension; aneurysm clipped 2 days following hemorrhage; enormous intracerebral hematoma; death 4 days postoperatively.)

R.G., 61-year-old hypertensive (200 to 240 for 8 years) female, presented mild clouding of the sensorium and mild meningeal signs immediately after a fall from a bicycle. Twenty-four hours later, left hemiplegia and left hemianopsia had developed, and the following day, May 29, 1954, the patient was admitted to the Pitié.
Examination revealed a B.P. of 160/90 and hypertensive fundi in addition to the signs mentioned. Arteriography (Fig. 3) showed a 5 mm. aneurysm on a major branch of the right middle cerebral artery and spasm of the 3 cm. segment proximal to the aneurysm.

Operation was performed as an emergency procedure (Dr. LeBesnerais) on the day of admission under local anesthesia with the B.P. lowered to about 100/50 with ganglioplegics. The base of the aneurysm was clipped and the pouch was coagulated. An enormous hematoma extending to the occipital lobe was evacuated.

Postoperatively the patient responded slightly but remained obtunded and hemiplegic. She gradually lost consciousness and died on the 4th postoperative day. Autopsy revealed the aneurysm properly clipped, and no cause of death was discernible.

Of 7 patients operated upon, 3 are well, 2 are improved in comparison with their preoperative state, and 2 died postoperatively. One postoperative death was the result of an extradural hematoma; the other occurred in a hypertensive female with an enormous intracerebral hematoma. Autopsy in both instances showed the aneurysm properly clipped and the middle cerebral artery patent distal to the aneurysm. The 2 patients who are improved but not in perfect health are disturbed principally by mild aphasia caused by intracerebral hematoma. Postoperative arteriograms in Cases 3 and 4 showed absence of the aneurysm and patency of the entire middle cerebral arterial system. Follow-up periods are 8 years, 1 year, 10 months, 4½ months, and 1 month.

Evacuation of Hematoma. Two patients, aged 45 and 64, one severely hypertensive, had temporal trephination and evacuation of an intracerebral hematoma 2 and 13 days after hemorrhage. One patient had more complete evacuation of the hematoma through a bone flap 5 days after trephination.
Both patients were hemiparetic, aphasic, and mentally obtunded, and both had been demonstrated to have intracerebral hematomas by arteriography. Both patients died soon after operation, one on the operative day, the other on the 6th postoperative day. Autopsy in both instances revealed aneurysm of the middle cerebral artery in the sylvian fissure and recurrence of a large intracerebral hematoma.

CASES IN LITERATURE OF SURGICALLY TREATED MIDDLE CEREBRAL ARTERY ANEURYSMS

In the literature we have been able to find 76 cases of aneurysm of the middle cerebral artery subjected to surgery. An additional case reported by de Sèze, Feld, and Guiot¹⁹ is included in this report as Case 1.

Table 2 shows that of the 76 patients, 50 (66 per cent) were successfully treated, 19 (25 per cent) died, and 7 (9 per cent) survived with disability. The surgical procedures employed were occlusion of the neck of the aneurysm in 29 cases, wrapping of the aneurysm with muscle in 12 cases, occlusion of the parent artery in 6 cases, and ligation of the carotid artery in the neck in 18 cases. Nine patients had only evacuation of the intracerebral hematoma, and 2 were explored but not treated. Practically all patients had had recent subarachnoid hemorrhage, but the interval of time between subarachnoid hemorrhage and operation was not stated in a sufficient number of cases to permit statistical evaluation.

Occlusion of Neck of Aneurysm. The largest number of patients were treated by occlusion of the neck of the aneurysm either by silver clips or nonabsorbable ligature. Most authors preferred silver clips because the possibility of tearing the neck of the sac is apparently less. Two aneurysms tore on application of clip and were treated by packing with muscle. It has been remarked that placing the clip exactly flush with the parent artery is not necessary. In a few cases, the aneurysm was excised, but this is generally not recommended because it loosens the clip. In 1 case the aneurysm was simply coagulated, and in 2 others, coagulation of the aneurysm was used to supplement clipping of the neck.¹¹ Matas endaneurysmmorrhaphy was employed in 1 case when the aneurysm ruptured during the operation.⁶

Of 29 patients who were treated by ligation of the neck of the aneurysm, 24 (83 per cent) are well or improved, 3 (10 per cent) are dead, and 2 (7 per cent) are disabled.

Ligation of Parent Artery. Of 6 patients in whom the feeding artery was ligated and the aneurysm thus excluded from the cerebral circulation, 4 survived, 1 died, and 1 remained hemiparetic. This technique should be limited to lesions located elsewhere than the main trunk of the artery and, insofar as possible, to branches that are relatively unimportant as nourishing arteries of the motor area or language center. Aneurysms of mycotic etiology usually occur distally and therefore are amenable to treatment by ligation of the feeding artery.

Wrapping of the Aneurysm. In 12 cases the aneurysm was wrapped with
TABLE 2
Cases of aneurysm of the middle cerebral artery reported in the literature, showing method of treatment and results

<table>
<thead>
<tr>
<th>Author</th>
<th>No. of Operative Cases</th>
<th>Neat of Aneurysm Occluded</th>
<th>Aneurysm Wrapped With Muscle</th>
<th>Parent Artery Occluded</th>
<th>Cervical Carotid Ligation Only</th>
<th>Evacuation of Hematoma Only</th>
<th>Intracranial Exploration Only</th>
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<tr>
<td>Norlin &amp; Olivecrona</td>
<td>17</td>
<td>13</td>
<td>12</td>
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<td>Falconer</td>
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<td>Laine, Soots &amp; Delandsher</td>
<td>7</td>
<td>1</td>
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<td>3</td>
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<td>Steelman, Hayes &amp; Rizzioli</td>
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<td>Basset, List &amp; Lemmen</td>
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<td>Campbell &amp; Burkland</td>
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<td>5</td>
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<td>Wechsler, Gross &amp; Cohen</td>
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<td>Black &amp; German</td>
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<td>Hermann, Obrador &amp; Dott</td>
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<td>Thevenard &amp; Guilot</td>
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<tr>
<td><strong>Totals</strong></td>
<td><strong>76</strong></td>
<td><strong>29</strong></td>
<td><strong>24</strong></td>
<td><strong>11</strong></td>
<td><strong>18</strong></td>
<td><strong>11</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>

Summary of all cases:
- Well or improved: 50
- Hemiplegic, hemiparetic, or aphasic: 7
- Dead: 19
hammered muscle. Of these patients, 1 died, 1 was rendered hemiplegic, and 10 successfully withstood the procedure and remained well during the generally short observation periods. The permanence of the cure remains to be determined by longer follow-up, but it appears probable that enveloping the aneurysm in muscle affords additional support for the weakened wall.

Evacuation of Hematoma Only. Of the 9 cases in which the hematoma was evacuated but the aneurysm not treated, death occurred in 8 and 1 patient remained well 9 years later. At least 3 patients died of recurrent hemorrhage from the aneurysm after evacuation of the clot, presumably because of removal of support from around the weakened wall of the sac. It therefore seems inadvisable to evacuate a hematoma without attempting a direct attack on the aneurysm. In many instances, surgical exposure of the aneurysm is greatly facilitated by removal of an intracerebral hematoma, and evacuation of such clots should never be omitted during the course of a definitive attack on the lesion.

Intracranial Exploration Only. Of 2 patients explored intracranially but not treated, both died. The aneurysm was not found in one case and was associated with cerebral softening in the other.

Cervical Carotid Ligation. There were 18 patients treated by carotid ligation in the neck. One of these had ligation of the carotid artery intracranially also, as treatment for an associated internal carotid aneurysm. Six patients, not included among these 18, had ligation of the carotid artery in the neck in addition to intracranial attack on the aneurysm. The ligation in most cases was of the common carotid and in practically all cases was complete. In 3 cases, the artery was divided after ligation. Efficiency of collateral cerebral circulation was determined in all cases before ligation, and complications were generally those that appeared after an interval of a day or several days, and are therefore presumed to have been caused by thrombosis or embolism rather than by the immediate decrease in cerebral circulation. Four of these 18 patients died, and 3 were rendered hemiparetic; thus a total of 7, or 39 per cent, suffered death or serious complications. The remaining 11 are well or improved. The shorter the interval between subarachnoid hemorrhage and carotid ligation, the greater was the incidence of complications.

DISCUSSION

Intracranial Operation. The use of vasodepressor drugs to lower arterial pressure for intracranial procedures, as one of us has shown since 1951 with Guiot and Damoiseau, is a very important adjunct to the surgical management of arterial aneurysms because it permits exposure of the sac with less danger of rupture. Severe hemorrhage consequent to rupture may be safeguarded against by occlusion intracranially of the middle cerebral artery proximal to the aneurysm by use of removable clips introduced by Olivecrona or by a noose of silk as recommended by Campbell and Burklund. Caution must be used with these techniques to avoid occlusion of the main trunk of the middle cerebral artery longer than several minutes, or ischemic brain
damage will result. If craniotomy is undertaken in a case in which arteriography has shown that clipping of the base would be doubtful, the carotid artery in the neck may be ligated beforehand, or it may be encircled by a removable noose which can be quickly tightened in case of need. Prevention or alleviation of arterial spasm is important and can best be managed by applying papaverine directly to the arterial wall at operation or later by intracarotid injection of papaverine or by blocking the stellate ganglion.

Selection of the proper time for operation is very important and remains controversial. It is best to wait until the patient’s condition, if not improved, has at least been stabilized, for operative complications are greater in the period immediately following rupture. Unnecessary delay is to be avoided because the incidence of recurrent rupture is particularly high in the first 2 weeks. Recurrence of the hemorrhage or the coexistence of an intracerebral hematoma constitute, according to us, indications for immediate operation.

**Cervical Carotid Ligation.** Most surgeons feel that the common carotid is the safer artery to ligate, whereas others ligate the internal carotid initially. Some ligate first the common carotid artery and later the internal. Sweet, Sarnoff, and Bakay\(^2\) have shown that the internal carotid artery does not always receive collateral circulation from the external after occlusion of the common carotid.

Carotid ligation as a method of treatment cannot be properly evaluated from existing data. Long-term follow-ups are essential. Two very important questions remain to be answered, namely: (1) does cervical ligation give assurance of a permanent cure, and (2) will deprivation of one of the carotid arteries feeding the circle of Willis result in important deficit in nutrition of cerebral tissue as age advances. Answer to the second question can be arrived at by prolonged follow-up with repeated neurological and psychological evaluation. As to the first question, it seems highly probable that cervical ligation affords some protection against subsequent rupture of the aneurysm. The pressure within the middle cerebral artery is known to be reduced by carotid ligation in the neck. Sweet, Sarnoff, and Bakay\(^2\) have shown that in the proximal segment of the internal carotid artery, the systolic pressure drops to 51 per cent shortly after its occlusion. Subsequently, Bakay and Sweet\(^1\) showed that pressures in small intracranial arterial branches do not differ markedly from those in the internal carotid artery and that pressures following carotid ligation are decreased the same percentage in all intracranial arteries down to those 0.4 mm. in diameter. They suggest from these data that carotid ligation should be an equally effective therapeutic measure, regardless of whether the intracranial aneurysm is located proximally on large trunks or distally on ramifications, and that measurements of the pressure in the carotid artery in the neck distal to occlusion may be used to prognosticate the degree of effectiveness. Pressure drops to about half are desirable, and those in the range of 30 per cent of the original level indicate that the collateral circulation is poor and probably will not permit complete ligation of the carotid artery in a single stage.
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That aneurysms can shrink in size after the pressure within them is reduced is indicated by marked improvement of oculomotor nerve symptoms following carotid ligation for aneurysms of the internal carotid artery. Available statistics suggest that aneurysms so reduced in size undergo some sort of healing process and become more resistant to rupture. Testimony that carotid ligation is not always a cure for middle cerebral aneurysms comes from a report by Black and German1 of a 34-year-old patient whose right common carotid artery was ligated for an aneurysm of the supraclinoid portion of the internal carotid artery. Twelve days later, a fatal hemorrhage occurred from an aneurysm of the right middle cerebral artery which was to have been attacked later by direct approach.

Comparison of Intracranial Operation and Cervical Carotid Ligation. The personal experience of the authors and the results obtained from a candid review of the literature lead the authors to the conclusion that intracranial clipping of the aneurysm is the procedure of choice in the treatment of intracranial aneurysms situated on the middle cerebral artery. Whereas aneurysms of the cavernous portion of the internal carotid artery, for example, are inaccessible to direct approach and require the neurosurgeon to be content with carotid ligation, aneurysms of the middle cerebral artery are located particularly conveniently for the neurosurgeon. Because of the ease of surgical exposure of the middle cerebral artery and in view of the low operative mortality, the authors feel that failure to make a direct surgical attack on the aneurysm is not justified. The authors are not content to reduce the pressure within the aneurysm to half its original value by cervical carotid ligation when a definitive cure can be accomplished by obliteration of the neck of the aneurysm. Any neurological disability persisting after clipping of the aneurysm is rarely greater than pre-existing neurological deficit and is usually the result of damage caused by an intracerebral hematoma.

Strengthening the argument in favor of ligating the aneurysm intracranially as opposed to tying the carotid in the neck are the comparative mortalities for the two procedures. Of the 29 patients from the literature treated by obliteration of the aneurysm plus our 7 cases, 5 died, giving a mortality rate of 14 per cent, and 2 were disabled. By comparison, cervical carotid ligation gave a mortality rate of 4 out of 18, or 22 per cent, with an additional 3 patients disabled. If we group the three categories in which a definitive attack was made on the aneurysm intracranially, namely: obliteration of the neck of the aneurysm, wrapping of the aneurysm, and ligation of the parent artery, we arrive at a collective mortality of 13 per cent and a disability of 7 per cent. There has been no report of a recurrence of rupture of an aneurysm treated by one of these three methods; whereas, at least one middle cerebral aneurysm has ruptured subsequent to cervical carotid ligation. Clipping of the aneurysm and ligation of the parent artery are curative procedures; if, however, at intracranial operation, the aneurysm has not permitted either of these procedures and the surgeon has had to be content with simple wrapping of the aneurysm, it is wise also to ligate the carotid artery in the neck.
SUMMARY

The authors present 7 cases of aneurysm of the middle cerebral artery obliterated by silver clips or silk suture with 5 successful results. Two patients with middle cerebral artery aneurysms subjected only to evacuation of an intracerebral hematoma died.

Seventy-six cases of aneurysm of the middle cerebral artery collected from the literature are analyzed. Obliteration of the aneurysm was the procedure that gave the highest percentage of successful results, specifically, 83 per cent. Ligation of the carotid artery in the neck gave a mortality of 22 per cent. The authors conclude that the preferred method of treatment is intracranial attack with obliteration of the aneurysm whenever possible.

REFERENCES