SURGICAL TREATMENT OF SACCULAR INTRACRANIAL ANEURYSMS
A REPORT OF 56 CONSECUTIVELY TREATED PATIENTS
(Received for publication April 23, 1953)

IMPROVEMENT in technical aids available to the neurosurgeon has lowered the operative mortality for surgical treatment of intracranial vascular lesions. However, the operative mortality for intracranial aneurysms reported in the literature has continued to be high, especially for those treated by the intracranial approach. For this reason many surgeons have been content to ligate the carotid artery in the neck rather than assume an operative mortality and morbidity as great or greater than if the aneurysm were not treated at all. The purpose of this paper is to report a large series of surgically treated aneurysms of the circle of Willis. The majority of these lesions have been treated by direct intracranial attack. Only berry or saccular aneurysms are reported. The surgical results of treatment of arteriovenous anomalies and carotid-cavernous sinus fistulae will be reported in a separate article.

TABLE 1

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<td>25</td>
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<td>Bassett et al.†</td>
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</table>

REVIEW OF THE LITERATURE

Only authors who reported more than 30 patients surgically treated are cited. Their results are listed in tabular form in Table 1 together with those of the present authors for comparison.

Dandy’s* original report of 36 patients surgically treated listed an opera-

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* Present address: 550 West Thomas Road, Phoenix, Arizona.
† In active military service.
‡ Present address: 1150 Connecticut Avenue, N.W., Washington 6, D.C.
tive mortality of 25 per cent. One of his patients had only a ligation of the carotid artery in the neck, with resultant death. In 14 patients the aneurysm was trapped between intracranial clips and the carotid was ligated in the neck; there was 1 death (7 per cent) and 1 hemiplegic (7 per cent). In 21 cases various intracranial procedures were performed; there were 7 deaths (33 per cent) and 3 hemiplegics (19 per cent).

Bassett et al. treated 73 patients by surgery with 20 deaths (27 per cent). Of 29 patients with cervical carotid ligations, 1 died (3.4 per cent) and 12 (41 per cent) were rendered hemiplegic. The trapping procedure was used on 18 patients; there were 9 deaths (50 per cent) and 2 hemiplegies (22 per cent). Twenty-five patients had an intracranial clipping of the aneurysm; there were 10 deaths (40 per cent) and 10 hemiplegies (66 per cent). Their operative mortality, therefore, for 43 patients having an intracranial operation was 43 per cent.

Hamby listed an overall mortality of 50 per cent of 32 patients surgically treated. There were 11 cervical carotid ligations with a mortality of 36 per cent. Of 24 patients with intracranial operations 63 per cent died. There were 9 trapping operations, with a mortality of 22 per cent.

Falconer treated 50 patients with aneurysm by surgery with an operative mortality of 18 per cent. Of 13 patients who had cervical carotid ligation only, 27 per cent died and of the 35 treated with an intracranial operation, 11 per cent died.

Poppen has the largest series of aneurysms reported in the literature, and over two-thirds of his patients were treated simply by carotid ligation in the neck. In 101 cervical ligations there were 3 deaths (3 per cent) and 8 hemiplegies (8 per cent). It is of interest that 8 (8 per cent) of these patients have since died, 6 of them because of further rupture of the aneurysm. Of 18 patients subjected to trapping procedure 1 died (6 per cent). Of the 22 others who had intracranial procedures 5 died (23 per cent). Therefore the operative mortality in 40 cases of intracranial operation was 15 per cent.

Murphey has treated aneurysms by cervical carotid ligation. He has ligated the carotid artery in the neck for aneurysms of different locations in 42 patients with a mortality of 11.8 per cent and 19 per cent hemiplegic morbidity.

**MATERIAL**

This series of operations for aneurysms was originally begun by one of us (H.V.R.) at Walter Reed Army Hospital in 1946 and continued there by the other authors (G.J.H. and H.F.S.). The operations at the other hospitals (George Washington University Hospital, Mt. Alto Veterans Hospital and Emergency Hospital, all at Washington, D. C.) were done by H.V.R. Although these aneurysms were treated at different hospitals by three different surgeons, the approach to the problem has been similar enough to make the series homogeneous. All patients treated surgically during the years 1946-52 are included.

The 2 postoperative deaths occurred within 72 hours of surgery. None