Ruptured Anterior Communicating Aneurysm*  
A Comparison of Medical and Specific Surgical Treatment  

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In 1931, N. Dott performed the first successful intracranial operation for a ruptured saccular aneurysm. The aneurysm was situated on the bifurcation of the left internal carotid artery. In 1936, Tönnis had the first operative success in the case of a ruptured anterior communicating aneurysm. At first, individual series were small but as larger series began to appear, it became generally accepted that operative treatment was superior to conservative management. On the other hand, Magladery in 1955, Benson in 1958, and McKissock, et al., as recently as 1965, challenged this view; they reported that they found no significant difference in the results of medical and surgical treatment of ruptured anterior communicating aneurysms in their series of patients. These workers were the first to point out that an assessment of the value of surgery must depend on a comparison of identical series of patients, one treated surgically and the other medically. This essential point is so difficult to achieve that it remains still largely ignored. The patient's age, sex, blood pressure, level of consciousness, major neurological signs, and the interval that has elapsed since the haemorrhage all affect the prognosis.

The first purpose of this paper is to show how profoundly these factors influence the results of treatment, whether this be surgical or medical.

Our second aim is to present the results of treatment of anterior communicating aneurysms by one specific operation and to compare these results with those obtained from conservative management. Thus, we hope to establish the real value of this particular surgical technique; this technique involves proximal occlusion, by clipping, of that anterior cerebral artery which has been shown by angiography to provide the main inflow of blood into the aneurysm. One surgeon was in charge of all the patients; it was also he who performed about 80% of the operations. This is mentioned as one further factor conducive to greater uniformity of results.

Material and Methods

Between January, 1954, and the end of May, 1964, 133 patients with anterior communicating aneurysms were admitted to this Neurosurgical Centre. Of these, 67 patients were treated conservatively, while 55 other patients were treated by one surgical procedure, namely, proximal occlusion of the "dominant" anterior cerebral artery. These 122 patients, each of whom had a single ruptured aneurysm, form the basis for our study. The remaining 11 patients we are excluding for various reasons: either the aneurysm had not ruptured, multiple aneurysms were present, or an operation other than a proximal occlusion had been performed.

The 122 patients, whether medically or surgically treated, were divided into two groups:

Group 1. Group 1 included patients who were conscious, showed no major neurological signs, were under 60 years of age, and had a diastolic blood pressure of 100 or below mm's. Hg. They were patients with a favourable prognosis.

Group 2. Group 2 included patients who were comatose or barely able to respond to simple commands, showed major neurological signs (hemiplegia, dysphasia), were older than 60 years, and had a diastolic blood pressure consistently above 100 mm's. Hg. All patients who were rapidly deteriorating or had a concomitant major illness, or whose condition was aggravated following angiography, have been included in this group. Thus, all patients in this group had an unfavourable prognosis.
Conservative Treatment. Conservative management was adopted for one or more of the following reasons:

1. Operative treatment refused
2. Angiographic demonstration of an anomaly of the anterior part of the circle of Willis
3. Failure to demonstrate angiographically which anterior cerebral artery was “dominant,” that is, provided the main blood supply to the aneurysm.

Conservative treatment consisted of 6 weeks bed rest with adequate sedation from chlorpromazine and pethidine for as long a time as severe headache and restlessness persisted.

Operative Treatment. All operations were performed under moderate hypothermia (30°C) supplemented in the last 3 years of this study by the technique of controlled respiration. The use of dehydrating agents was not necessary. The lateral ventricle was usually tapped after the fronto-temporal craniotomy had been performed. There was never any need for frontal lobectomy. Dissection of the optic nerve, the internal carotid artery, and the anterior cerebral artery could always be accomplished without undue retraction of the frontal lobe. The anterior cerebral artery was obliterated by the application of a single clip. In most operations the anterior cerebral artery was clipped close to the base of the aneurysm; in a few the artery was occluded near its origin.

Black and German found that the strain upon an aneurysm is equal to the sum of the pertinent stresses, namely, the total hydrostatic pressure, the pulsatile nature of the flow, the turbulence, and the jet action. They concluded that proximal occlusion for an intracranial aneurysm has a sound theoretical basis. Bakay and Sweet observed a 50% drop in blood pressure of the original distal to a clip applied to the anterior cerebral artery.

At first a small Cushing’s silver clip was used to occlude the artery. Later a large Olivecrona type of clip was used, after one postoperative recurrence of haemorrhage when at postmortem it was found that the clip was loose and did not obliterate the lumen of the artery. Great care has always been taken to avoid any damage to the perforating vessels.

Analysis of Conservative and Surgical Treatments in Groups 1 and 2

Mortality. A comparison of the mortality figures of the two groups is shown in Table 1. In the prognostically unfavourable Group 2, 66% died whether treated surgically (2 deaths out of 3) or medically (27 deaths out of 41). On the other hand in the prognostically favourable Group 1, among those treated conservatively mortality was 30% (8 deaths out of 26 patients) while those treated surgically had a mortality of 15.4% (8 deaths out of 52 patients). Thus, in our hands, the operation of proximal occlusion of the “dominant” anterior cerebral artery has been more successful than conservative “medical” treatment, when applied to the same type of patient with a favourable prognosis.

Clinical Characteristics. The clinical characteristics of patients in Group 1 are analysed in Table 2. The distribution of sexes and the percentage of patients with angiographic evidence of cerebral vasospasm is almost identical in the two groups. The surgical group contains a higher proportion of younger patients (67%) than the medial group (54%). There is a greater proportion of fully conscious and normotensive patients in the operated group. We believe the composite clinical pictures in the two groups are comparable.

The outstanding fact that emerges from the analysis of Table 2 is that patients under 50 years of age fare much better if they have the proximal occlusion operation (mortality 5.7%) than if they have conservative medical treatment (mortality 35%).

Significance of Time. The longer the interval between haemorrhage and operation, the better the prognosis. This is the reason why Norlen and Barmum in 1953 advised delaying operation for 4 weeks or more. Unfortunately, most recurrent haemorrhages occur

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