ANALYSIS OF RESULTS OF COMPLETE AND PARTIAL REMOVAL OF ACOUSTIC NEUROMAS*

BY

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Out of a total of 3,265 brain tumours verified in Professor Olivecrona's clinic up to December 31, 1946, there were 305 unilateral acoustic neuromas, (9.3%). In addition six bilateral acoustic neuromas and four neuromas of the trigeminal nerve were verified.

Looking back over 24 years, Professor Olivecrona remarked on the improvements in technique which lightened the surgeon's burden. The realization that few patients with acoustic tumours survive more than three or four years if some considerable portion of the tumour has been left behind, led to the adoption of total extirpation as the method of choice, though it carries considerably more risk than more conservative measures.

It had to be noted that the early diagnosis of these tumours had not improved much as time passed, for most of the Stockholm patients came to operation in a late stage of development, and not a few were blind, or nearly so. Only once was a very early tumour found at operation in a patient with unilateral deafness, an enlarged porus, and symptoms suggestive of Ménière's disease.

Of the 305 cases, two cases were not operated upon (one a child 15 months old), and three had decompressions only.

In previous communications, Olivecrona had divided the incomplete removals into two groups: (1) Intracapsular; (2) subtotal. But there was found to be no essential difference in the follow-up histories, and further, since the border-line between the two is narrow, Olivecrona decided to abandon this classification, and to reduce the operation to fate of the patient depended less on the exact quantity of tumour tissue left behind than on the nature of the tumour and its rate of growth.

The unfavourable showing of the incomplete removals was due to the relative inexperience of the operator in the earlier years, and to the fact that it included the failed complete removals. It is, therefore, weighted with unfavourable cases. If conservative methods were rigorously adhered to there was no doubt that the mortality of conservative treatment could be reduced to insignificant proportions. The very favourable showing in the series of total extirpation with preservation of the facial nerve was obviously because it contained the more favourable cases.

Professor Olivecrona thought that the operation was infinitely more difficult to do if the facial nerve was to be preserved, and should only be persisted in when the anatomical configuration in the operation field was favourable.

The causes of death in the cases of complete removal were pulmonary complications (5), lesion of the basilar artery, subdural haematoma, injury to the vagus, shock and haemorrhage (1 each). In all the remaining 34 cases death was caused by postoperative clot in the tumour bed or haemorrhagic softening of the pons. In about half the cases the clot was held to be the dominant factor: in half, the brain stem injury. In the angle even a small clot is very dangerous. Haemorrhagic softening of the pons might, in Professor Olivecrona's opinion, be due to interruption by clips or electrocoagulation of the petrous and other veins on the lateral surface of the pons because it could be seen in cases where it was known that injury to the brain stem had been minimal at operation.

**Late Results**

**Incomplete Removal.**—Within three to four years 60% of those treated thus are dead, either from the immediate effects of the operation, or from recurrence. Of 59 survivors, 20 are known to be dead with an average survival of a little more than three years; nine cases were operated upon again later, with complete removal of the neuroma, but four of these died. None of these 29 ever regained full working capacity, a number living as invalids until their deaths.

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*An abstract of Prof. Olivecrona's paper.*
SYMPOSIUM: SURGICAL TREATMENT OF ACOUSTIC NEURINOMA

On the other hand, of the 25 patients who were still alive, the average survival has been 13 years, and 12 consider themselves to be completely well with full earning capacity. Only four are complete invalids. Amongst this group were five patients with cystic tumours, where only the cysts were evacuated and the interior fixed with Zenker’s fluid. They have lived from five to 20 years, whilst four patients with solid tumours have been followed up for an average of 19½ years. The conclusion that some acoustic tumours grow imperceptibly or cease to grow after incomplete removal is inescapable.

Complete Extirpation.—Of the 166 patients, 10 have not been heard from. Nine patients were dead from intercurrent disease. There remained 139 cases, 63, or nearly 50%, were well, with full working capacity; 54 had good but somewhat reduced capacity; 22 were invalids. The causes of invalidism were: Blindness 7, and cerebellar incoordination 15.

Of the 62 survivors in the group where the facial nerve was preserved, the face recovered in about two-thirds of the cases. Working capacity in this group has been the best of all; only four patients were complete invalids (two blind). The length of time required for rehabilitation was much shorter in this group.

To sum up, 29% of patients with incomplete removals died at once; 24% were dead in three to four years, and only 25% are reasonably well at the end of 13 years, whereas, of the total removals, 23-5% died at once, and 55% were well and working after seven years.

RESULTS IN 130 CASES OF ACOUSTIC NEURINOMA

BY

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We have recently made a survey of the 130 cases of acoustic neurinoma which have passed through our hands during the past 20 years at the London Hospital and in the Nuffield Department of Surgery in Oxford. Our interest has been chiefly in the functional results of the different operative procedures commonly practised, as we consider that the clinical picture of a cerebello-pontine angle tumour is sufficiently familiar to most neurological surgeons to indicate the site of an exploration. The variations in operative procedure according to the type of tumour (acoustic tumour, meningioma, cholesteatoma, etc.) can be decided when the tumour is exposed at operation.

Migration of the population during the war, difficulties in travelling, and the general preoccupation with more urgent matters interrupted our routine follow-up investigations in many cases, and our present information is by no means complete. In 17 cases we have as yet no useful follow-up studies and in another 15 the information is not up-to-date. This is accordingly an interim report, but it is unlikely that subsequent information will alter our conclusions significantly.

Our cases fall into four groups depending on the method of treatment undertaken (Table I). First there was a group of 10 patients who had no operative treatment. The second group of 12 patients had only a decompression, usually suboccipital. The third group was the most numerous, comprising 102 patients in whom an incomplete removal of the tumour was done. In the fourth group of 25 patients the tumour was completely removed.

It will be seen that the total is greater than our total number of cases owing to the fact that some of the patients treated by decompression subsequently had incomplete or complete removal of their tumour, while some of those treated by incomplete removals subsequently had the tumour completely removed.

• Group I: No Operative Treatment

This group (10 cases) is largely unverified as some of the patients are still alive and others died in circumstances not permitting a necropsy, but the clinical features left little doubt about the diagnosis.

Inoperable.—Six patients were considered to be “inoperable”, or too ill to stand operation. When first seen most of them were blind and had gross ataxy, as well as dysarthria, dysphagia, and the like. In this connexion we believe that if a patient is already irreparably blind from an acoustic tumour the prospects are unfavourable. After operation for an acoustic tumour it is usually necessary to learn to walk again, and the combination of blindness with ataxia makes such a difficult task that in practice it is rarely done. We have found that the patient who is both totally blind and ataxic is usually consigned to an inactive existence because no one has time to look after him. However, it is sometimes necessary to operate on unfavourable or