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

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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.

* An abstract of Prof. Olivecrona's paper.
The third treatment. Operative only had our up-to-date. This cholesteatoma, etc.) our follow-up routine in.

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 1). 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 removal subsequently had the tumour completely removed.

Group 1: 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 ataxia, 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 this 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