Hearing Preservation in Acoustic Tumour Surgery

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With 7 Figures

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Summary

900 acoustic neurinomas were removed by the suboccipital approach at Nordstadt Neurosurgical Department from 1978 to 1992 by the same surgeon (M. S.). While 247 patients were deaf on the involved side before surgery, there were 653 patients ears with some preoperative hearing. Preservation of
the cochlear nerve was always attempted, and the overall-rate of hearing preservation was 38% (249 of 653), regardless of pre- and postoperative quality of hearing or of tumour sizes. In small tumour sizes below 3 cm of diameter preservation rate was 51%, in large tumours above 3 cm of diameter it was 22%. A classification system of hearing quality was made up considering pure tone audiometric hearing losses (PTA HL) at 1 to 3 kHz, and individual maximum speech discrimination scores. The usefulness of the preserved hearing is further evaluated considering the quality of hearing in the contralateral ear, and by application of other classification schemes. Presentation of the surgical strategies and their refinements by personal experience provide the base for discussion questioning whether and how further progress may still be anticipated.

**Keywords:** Acoustic neuroma; audiometry; brainstem evoked response audiometry; BERA monitoring; (speech) discrimination score; hearing preservation; suboccipital approach.

**Introduction**

Acoustic neurinomas have remained a challenge to neurosurgeons throughout all decades of this century; and though they are more and more reliably handled with regard to diagnosis as well as to treatment, they are still not mastered.

The least understood phenomenon is the lack of correlation of tumour characteristics and hearing quality, i.e. the presence of nearly normal hearing in some large tumours (Figs. 6 and 7) and the presence of deafness or very poor hearing in even tiny intrameatal processes (Fig. 1)\(^5\). With the introduction of microsurgical techniques complete tumour removal with integrity of the brainstem and with precise anatomical nerve preservation has become possible in an increasing percentage of cases. Though this was a breakthrough for reduction of mortality and morbidity\(^57, 80\), the cochlear nerve remained a problem\(^26, 39\), and in many cases showed no postoperative function despite presumed anatomical integrity\(^83\).

As soon as mortality rates were reduced to a minimum and functional facial nerve preservation overtook the 50% margin, the battle, however, drifted over to another topic, the surgical approaches.

Discussions on opportunities of hearing preservation were either neglected or cut off by certain beliefs such as “hearing preservation is not necessary in case of a contralateral functioning ear”\(^85\), “hearing preservation is not worthwhile because the possibly preservable hearing is so bad that it is not useful”, “only in a very few cases is an attempt of hearing preservation possible and worthwhile, but for these few cases the costs for equipment and personal are by far too high for the society”, statistics are presented that make the argument of “hearing preservation” by suboccipital surgery academic\(^38\).