Extended Middle Fossa Approach in Treatment of Acoustic Tumors: Preservation of Neurological Functions

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ABSTRACT

Hearing preservation and postoperative facial palsy and hearing loss are two of the serious problems in acoustic neuroma surgery and its prognostic factors have been variously reported in literature. According to our data, tumor morphology has statistically significant influence on neurological function preservation. Only Wiet et al. [1] reported that tumor adhesion to vessels and cochlear nerve is connected with worse hearing results. Other authors [2] took this problem under consideration in cases of reoperation or operation after earlier radiotherapy.

In our opinion facial nerve and hearing monitoring play an important role in vestibular schwannoma surgery. In our study group 43.3% of patients were under hearing monitoring and 71.6% under facial nerve monitoring during operation. In monitoring group, good hearing preserved 53% of patients and normal facial function 76.7% of patients. Similar hearing results reported: Coletti et Fiorino [3] – 52%, Steackler et al. [4] - 61.5%.

From our data, location of tumor play the role for hearing results. Jacob et al. [5] reported better results for superior vestibular nerve (75%) than inferior vestibular nerve (28%).

Same authors concluded that tumor size is an important prognostic factor [6]. Also in our study, low stadium of sickness correlated with better neurological results.

Normal facial function play very important role for quality of life after surgery. Deafness had smaller influence for quality of life. Also Ryzenman et al. [7] reported, that for majority of patients facial asymmetry and problems with eyes were most important.

INTRODUCTION

Between six and ten percent of brain tumors are located in the cerebello-pontine angle. Most of them are vestibular schwannomas (80% - 90%). Most common symptoms are: unilateral hearing loss, sudden hearing loss, tinnitus, disequilibrium, vertigo, facial nerve or trigeminal nerve dysfunction and headache. According to the NIH Consensus Development Conference gadolinium MRI is a "gold standard" during diagnostic process and surgery is the best treatment option. There are three possible approaches: middle fossa approach, retrosigmoid approach and translabyrinth approach. The aim of tumor treatment is defined as not only its total removal but also as a good preservation of patient’s neurological functions after surgery, hence the importance of extended middle fossa approach (EMFA), which provides the best possibility of preserving hearing and facial nerve functions in comparison to two others. MRI offers possibility of detection of small tumors. There are also alternative treatments to microsurgery: "wait and scan policy" and radiotherapy. Therefore, preservation of neurological function and good postoperative quality of life is very important. Despite routine monitoring of facial and cochlear nerves, in some cases preservation of their function is impossible. The aim of the study was analysis of factors connected with hearing and facial nerve function and on factors regarding the quality of live after surgery.

METHODS AND MATERIALS

The study group consisted of 59 patients (60 cases of tumor), operated via EMFA in ENT Department of Warsaw Medical University in years 1998-2008. There were 40 women and 19 men. Two patients suffered from neurofibromatosis type 2. The patients’ average age was 46.1 (16 to 67 year).

According to Koos–Perneczky Classification there were 27 tumors in T1 stadium (intracanalicular tumors), 30 tumors in T2 stadium (< 2cm) and 3 tumors in T3 stadium (2-3 cm). In 30 cases there were tumors on the right side and in 30 cases on the left.

For facial nerve evaluation House-Brackmann Scale was applied. For audiological examination AAO-HNS Classifications were applied. For quality of life WHQOL-BREF Test was applied.

For statistical analysis there were used the following tests: Chi2 Fisher; Chi2 Pearson.

RESULTS

Hearing preservation occurred 67.4% patients in T1 and 37.5% patients in T2 stadium. There was statistically significant correlation observed between better treatment results and absence of tumor adhesion to the surrounding tissue (p=0.001). We observed tendency to gain better postoperative results when patients were under intraoperative hearing monitoring (p=0.08) and when primary location of tumor was facial nerve or superior vestibular nerve (Table 1).

Preservation of facial nerve function among patients in T1 and T2 stadium was 81.4% and 66.66% respectively (p=0.20). There was apparent correlation between better treatment results and absence of tumor adhesion to the surrounding tissue (p=0.72), using of intraoperative monitoring (p=0.55) and younger age of patients (p=0.22) (Table 2).

Only 64% of patients agreed to meeting with psychologist and answered for questions about their quality of life. Persons with facial nerve function preserved have better quality of life in physical and social sphere dimension while patients with hearing preserved enjoy higher psychological quality of life (chart 1 and 2).

DISCUSSION

Postoperative facial palsy and hearing loss are two of the serious problems in acoustic neuroma surgery and its prognostic factors have been variously reported in literature. According to our data, tumor morphology has statistically significant influence on neurological function preservation. Only Wiet et al. [1] reported that tumor adhesion to vessels and cochlear nerve is connected with worse hearing results. Other authors [2] took this problem under consideration in cases of reoperation or operation after earlier radiotherapy.

In our opinion facial nerve and hearing monitoring play an important role in vestibular schwannoma surgery. In our study group 43.3% of patients were under hearing monitoring and 71.6% under facial nerve monitoring during operation. In monitoring group, good hearing preserved 53% of patients and normal facial function 76.7% of patients. Similar hearing results reported: Coletti et Fiorino [3] – 52%, Steackler et al. [4] - 61.5%.

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CONCLUSIONS

Tumor morphology has statistically significant influence on hearing preservation and facial nerve function preservation. Other factors are: intraoperative facial nerve, low stadium of sickness (T1), age (under 31 year for VII nerve function) and location of tumor (facial nerve or superior vestibular nerve in case of hearing function).

In patients’ eyes the facial nerve dysfunction has, however, more influence on quality of life than deafness, though this does not correlate with degree of facial nerve dysfunction in House-Brackmann scale.

REFERENCES