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The Prognosis of Acoustic Neuroma Surgery

Yuan Lie*

Department of Medical Genetics, Istanbul University Cerrahpasa Medical School, Istanbul, Turkey

Introduction

A benign tumour that develops on the balancing (vestibular) and hearing (cochlear) nerves flowing from the inner ear to the brain is known as an acoustic neuroma (vestibular schwannoma). Hearing loss and imbalance may occur because of the tumour's pressure on the nerve. Any collection of tumours whose localization, type, approximate size, and enucleability could be determined prior to surgery would be particularly favoured for surgical intervention. The class of tumours under examination, known as auditory neuromas, falls into this category, and hence has surgical implications and potential.

A vestibular schwannoma grows slowly or not at all in most cases. It may, however, grow rapidly and become large enough to press against the brain, interfering with crucial functions in a few cases. Hearing loss, ringing in the ears, and unsteadiness can all be caused by the tumor's pressure. It's possible that the tumour will only need to be monitored. Radiation or surgical removal may be required if treatment is required. The tumour is removed through the inner ear or a window in your skull during acoustic neuroma surgery, which is done under general anaesthesia. If the hearing, balance, or face nerves are inflamed or damaged during the procedure, it is possible that the symptoms will increase [1-3].

Diagnosis

Tumor size and growth measurement: Tumors can be quantified by their distance medial to the internal auditory canal, or the internal auditory canal component of the tumour can be included in the overall tumour size. Because the internal auditory canal is around 1 cm long, it can considerably increase the size of a tumour. Most authors believe that a tumour measuring 1 cm that is contained within the internal auditory canal is smaller than a tumour measuring 1 cm that is not contained within the internal auditory canal. Furthermore, some acoustic neuromas have little or no internal auditory canal component, further complicating issues. The best way to measure a tumour is by its volume. All three dimensions of size and growth might be accounted for using a volume measurement [2,3].

Analysis of growth rates: The equivalent diameter of the measured tumour area accounts for any anomalies in the tumor's form, including the amount that extends into the internal auditory canal. Microsoft Excel spreadsheet software was used to store all of the data. A statistical software package was used to conduct the analysis. Unless otherwise stated, the majority of the group analyses were conducted using a two-way ANOVA. For numerous comparisons, the Newman-Keuls approach was utilised. The greatest analogous cross-sections in both the axial and coronal planes were used to compute growth rates in millimetres per year. The growth rates in the axial and coronal planes were compared to the growth rates using the radiologist's maximum diameter on each imaging scan utilising this procedure. By photographing a series of circles with known diameters, the correctness of this procedure was checked.

Treatment

The surgery's goal is to remove the tumour while preserving the facial nerve to avoid facial paralysis. In other circumstances, removing the entire tumour may not be possible [4,5].

Radiation therapy

There are several types of radiation therapy used to treat acoustic neuroma

Stereotactic radiosurgery: If your tumour is small (less than 2.5 cm in diameter), you are an older adult, or you cannot endure surgery for health reasons, it is commonly employed. Many tiny gamma rays are used in stereotactic radiosurgery, such as Gamma Knife radiosurgery, to deliver a carefully targeted dosage of radiation to a tumour without injuring surrounding tissue or making an incision. The purpose of stereotactic radiosurgery is to halt tumour growth, retain the function of the facial nerve, and potentially preserve hearing. The effects of radiosurgery may take weeks, months, or even years to manifest. Follow-up imaging studies and hearing tests will be used by your doctor to track your progress.

Stereotactic radiotherapy: Over numerous sessions, fractionated stereotactic radiotherapy (SRT) delivers a tiny amount of radiation to the tumour. SRT is used to slow the tumor's growth without causing damage to the surrounding brain tissue.

Proton beam therapy: This type of radiation therapy employs high-energy protons, which are positively charged particles. To treat tumours and reduce radiation exposure to the surrounding area, protons are administered in tailored doses to the afflicted area.

Retrolabyrinthine approach: The endolymphatic sac is conserved by base the flat anteriorly, and the posterior fossa dura extending between the posterior semicircular canal and the sigmoid sinus is pushed forward in a straightforward mastoidectomy method. The goal of this treatment is to gain access to the cerebellopontine angle, which is located anterior to the sigmoid sinus. As a result, the suboccipital method does not require the cerebellar retraction that is required with the suboccipital technique. It was created to treat trigeniinal neuralgia by partially sectioning the sensory root of the fifth cranial nerve. However, it has been employed to gain access to tiny acoustic tumours in circumstances where hearing preservation was desired.

Translabyinihinu approach: Because the translabyrinthine method allows for a more direct, anterelateral approach to the cerebello pontine angle than the suboccipital approach, less cerebellar retraction is required. The angle is shown mostly by bone removal rather than brain retraction. Its main downside, according to some surgeons, is that it provides insufficient exposure, especially when dealing with big tumours. Other surgeons dispute this "inadequate exposure" and believe the translabyrinthine method is best for removing big tumours. Because the labyrinth was destroyed as part of the approach, it is evident that hearing preservation is impossible [1,2].

Conclusion

Hearing preservation surgeries that are tailored to the clinical and tumour features of each patient result in a high incidence of effective hearing preservation, excellent facial nerve results, and minimal overall morbidity. The smaller lesions treated with this method compared to lesions treated

***Address for Correspondence:** Yuan Lie, Department of Medical Genetics, Istanbul University Cerrahpasa Medical School, Istanbul, Turkey; E-mail: lie.yuan@ac.za*

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with retrosigmoid surgery are attributable to the trend of greater hearing preservation rates in middle fossa surgeries.

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Conflict of Interest

The authors reported no potential conflict of interest.

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