

Unchanged unilateral hearing loss and ipsilateral growth of an acoustic neuroma from 1 to 4 cm

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Abstract

Progressive sensorineural hearing loss is the most important early symptom of a cerebellopontine angle process. A case report is presented of a 42-year-old woman who was referred to our department in 1979. Oil cisternography showed non filling of the left internal acoustic canal. Audiometry was planned as the method of control, but she did not return until nine-years later. In 1988, an acoustic neurionoma of 4 cm diameter was found in the left CPA. Pure tone audiometry and speech audiometry showed that during the nine-year interval, her 60 dB flat sensorineural hearing loss and speech perception thresholds had remained almost unchanged. A follow-up with only tone and speech audiometry can lead to a false negative diagnosis in some of these cases. Calculation of the growth in tumour volume over nine years in this patient showed a tumour volume doubling time of about 15 months.

Key words: Neuroma, acoustic; Hearing loss, sensorineural

Case report

In 1979, a 42-year-old woman was seen at the Nijmegen Institute of ORL. She had a three-year history of unilateral progressive sensorineural hearing loss and tinnitus, without vertigo. She had been suffering from headaches diagnosed as migraine. Her otoscopy results were normal. Pure tone audiometry showed a 60 dB unilateral sensorineural hearing loss and her speech perception was 45 per cent at 100 dB (Fig. 1). Stapedial reflexes elicited contralaterally in the left ear, showed a pathological decay at 0.5 and 1.0 kHz and were absent at 2 and 4 kHz. Electrocochleography combined with brainstem evoked response audiometry showed a pathological interwave delay for J1-J5. Electro-nystagmography showed non-pathological position nystagmus. Caloric results were normal on both sides. Oil cisternography showed no filling of the left internal acoustic canal (Fig. 2). A small intracanalicular tumour or an artefact was suspected. It was therefore decided to perform tone and speech audiometric control investigations at six-monthly intervals and to repeat the oil cisternography after six months, making use of the original oil in the thecal sac.

A six-month follow-up appointment was planned at the ENT Department, but the patient did not return. After a delay of nine years, the by then 51-year-old woman was seen at the Department of Neurology with additional complaints of intense and progressive headaches with nausea and vomiting and increasing vertigo. A cranial CT scan with intravenous contrast showed a space occupying lesion in the left CPA with a diameter of 4 cm (Fig. 3). The results of repeated pure tone and speech audiometry were very similar to the original results (Fig. 4). Brainstem evoked response audiometry of the left ear did not yield a discernible pattern, therefore this was indicative of serious disturbance. Electronystagmography now revealed a lack of caloric response in the left ear, whereas fundoscopy of the eyes was normal.

Neurological examination of the cranial nerves showed a loss of skin innervation in the region of the left platysma, while the

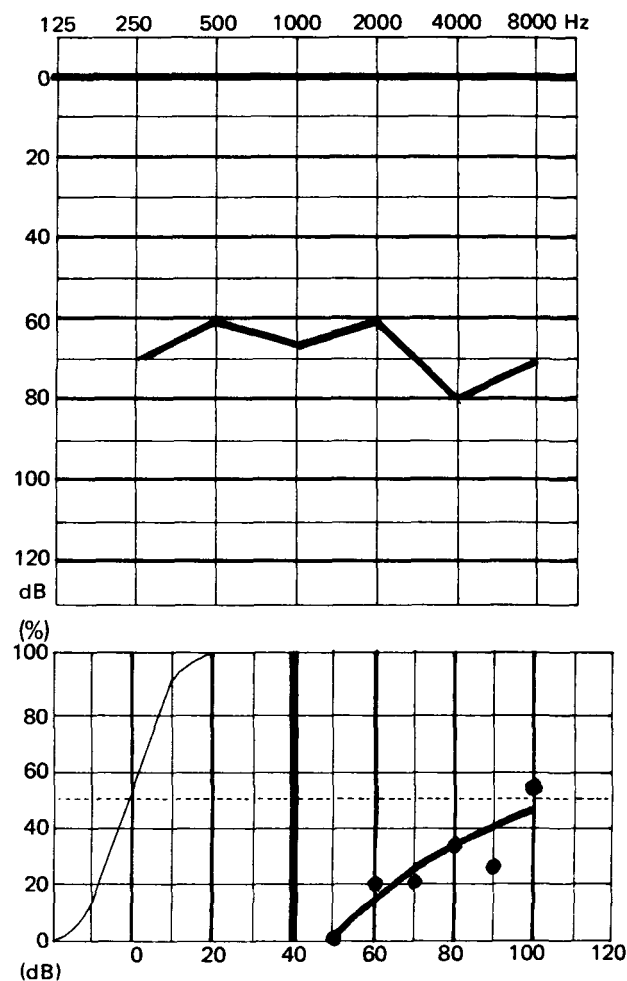


FIG. 1
Tone and speech audiogram at the age of 42 years.

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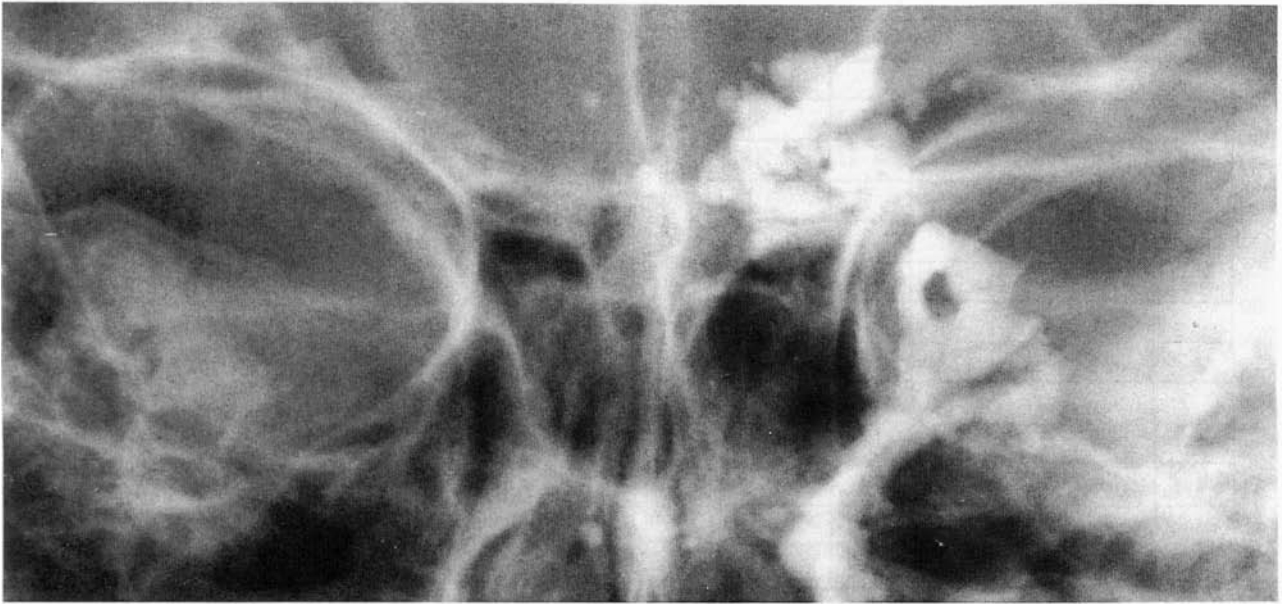


FIG. 2

Oil cisternography (duroliopaque) of the left CPA at the age of 42 years showing non-filling of the left CPA.



FIG. 3A



FIG. 3B

Axial (A) and coronal (B) CT slice with IV contrast of the left CPA showing an acoustic neuroma with a diameter of 4 cm.

facial nerve functions were normal. She was unable to walk in a straight line.

The tumour was only partially removed using the suboccipital approach. Histological examination demonstrated an acoustic schwannoma. She made a good post-operative recovery, her facial function was normal, the vertigo had disappeared, but complaints of migrainous headaches remained. Post-operative CT scans of the left CPA region showed a residual tumour with a diameter of 2.5 cm. A CT scan performed three years later showed no growth.

An estimation can be made of the tumour volume growth rate in this documented case. During nine years of growth, an intrameatal process resulted in a 4 cm diameter tumour. The radius increased from 0.5 to 2.0 cm. In case of volume calculation the neuroradiologist should describe the shape of the tumour with the several diameters. This shape was somewhere between a cylinder and a sphere. This resulted in a 1979 diameter of 0.4 and 0.5 cm (exp. 3) and a 1988 diameter of 25 and 33 cm (exp. 3).

The doubling time was calculated as being about 15 months (Fig. 5). If the tumour growth were linear, the length would increase by about 0.33 cm/year. This growth rate lies between the slow (0.2 cm/year) and fast (1.0 cm/year) growth rates of tumours according to Silverstein *et al.* (1985). The dormant situation of the remaining tumour after surgery has also been reported in one of the cases studied by Wazen *et al.* (1985).

Discussion

In the past, we had proposed performing audiological screening at six-monthly intervals over a period of three years for patients whose examination results (extensive otoneurological examination, brainstem audiometry and air CT cisternography) were not conclusive of a very small acoustic neurinoma or other space occupying lesion in the internal auditory canal (Musiek *et al.*, 1983; Cremers, 1984). Additional neuroradiological examination could also be performed if the sensorineural hear-

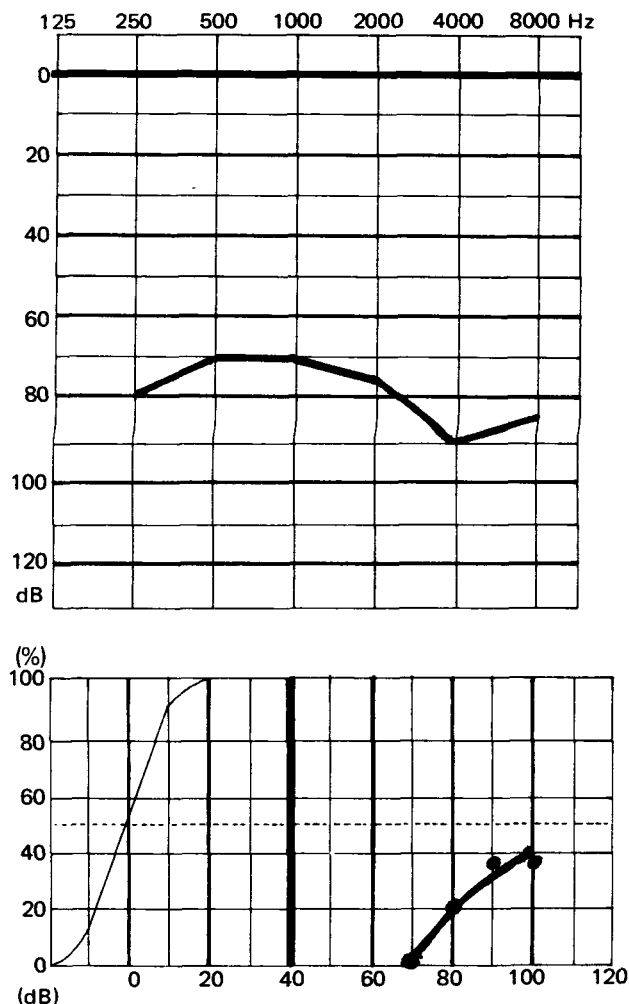


FIG. 4

Tone and speech audiogram pre-operatively at the age of 51 years.

ing loss increased or other symptoms arose. This was our policy for more than ten years and was based on the limited availability of neuroradiological facilities and considerations regarding cost and efficacy.

This case report illustrates that audiological screening with tone and speech audiometry does not always provide a sufficient means to detect a growing tumour. Recently, MRI facilities have become available and a patient who shows no filling of the left internal acoustic canal during oil cisternography, would be a good candidate for MRI of the left CPA. Although audiometric follow-up does not usually present any difficulties and is not time-consuming or expensive, it now appears necessary to carry out MRI in addition.

The growth rate of acoustic neuromas is not well-documented. Reports in the literature are sparse and they mostly deal with experimental situations (Nedzelski *et al.*, 1986) or CPA processes in elderly people (Wazen *et al.*, 1985; Thomsen and Tos, 1990). Tumours are measured radiologically or per-operatively and there is no standardization of the measurement

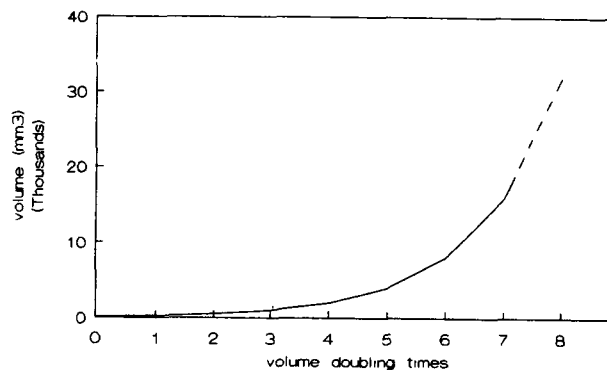


FIG. 5

The tumour volume in the case of a cylinder is $\pi r^2 L$ and of a sphere $\frac{4}{3} \pi r^3$. The 1979 diameter was 10 mm and the 1988 diameter was 40 mm. The calculated volume in 1979 was about 0.4–0.5 cm³ and in 1988 about 25–33 cm³. Assuming linear growth, the tumour doubled at least seven times every 15 months.

methods. Documented cases can contribute to a more detailed knowledge of tumour growth rates. Standardization of the methods for measuring tumours, as for example has been suggested by Nedzelski *et al.* (1986) is necessary and calculation of the volume may be preferred in all cases.

More detailed knowledge on tumour growth rates can possibly support and account for a period of careful observation and waiting in elderly people with tumours (Thomsen and Tos, 1990).

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