Introduction. Vestibular schwannomas are relatively rare tumors whose symptoms are based on their location and as the tumor grows, the symptoms usually advance. Case Report. An 18-year old patient was examined by an otolaryngologist due to buzzing in her right ear that had lasted for about 1 month. Her pure-tone audiometry findings showed slight asymmetry; a slight ascendant type sensorineural hearing loss was found in the right ear (25 dB HL at 125 Hz, 20 dB HL at 250 Hz, and 10 dB HL at other frequencies), while the threshold in the left ear was 15 dBHL at 125 Hz and 10 dB HL at other frequencies. Electronystagmography, otoacoustic emissions and auditory brain-stem responses suggested retrocochlear etiology of tinnitus. Magnetic resonance imaging examination revealed a large right cerebellopontine angle tumor, measuring 5 x 3 x 3 cm, which had shifted the brain stem laterally. Conclusion. Every case of unilateral tinnitus, asymmetric type sensorineural hearing loss, or hypotonia of labyrinth not strictly accompanied by vertigo, needs to be further evaluated using a battery of audiologic tests whose findings may be normal. Audiologic tests should be repeated in cases of persistent symptoms and accompanied by cranial magnetic resonance imaging, which is today considered the gold standard for diagnosis of vestibular schwannoma.

Key words: Tinnitus; Neuraoma, Acoustic; Hearing; Adolescent; Diagnosis; Magnetic Resonance Imaging; Audiology; Hearing Loss, Sensorineural

Case Report

An 18-year old nursing school student was seen by the practicing otolaryngologist due to buzzing in her right ear lasting for about 1 month. The tinnitus had been continuous, of low intensity, and was not seen subjectively as a serious problem. The patient never experienced discharge or pain, nor did she suffer from hearing loss or vertigo. On the clinical ear, nose and throat examination, all findings were within normal limits. Pure-tone audiometry findings showed slight asymmetry; in the right ear, a slight ascendant type sensorineural hearing loss was found [25 decibels hearing level (dBHL) at 125 Hz, 20 dBHL at 250 Hz, and 10 dBHL at other frequencies], while the threshold in the left ear was 15 dBHL.
at 125 Hz and 10 dBHL at other frequencies (Figure 1).

The otoneurologic evaluation resulted in the following findings: spontaneous nystagmus was absent, Romberg test was negative, Unterberger test showed lateralization to the right. Vestibular impairment of the right labyrinth was suspected, accompanied by discreet sensorineural hearing loss at one frequency and tinnitus in the right ear, suggestive of the right retrocochlear hearing loss. Therefore, otoacoustic emissions, electronystagmography, and auditory brain-stem response (ABR) tests were performed.

Evoked otoacoustic emissions were normal on the left ear and completely missing on the right one. Electronystagmographic findings showed the absence of spontaneous nystagmus, and the findings during the rotatory test were normal. The caloric stimulation suggested vestibular impairment of the right labyrinth, while the function of the left labyrinth was normal (CP=61%). Fixation suppression was bilaterally present. The findings suggested partial impairment of the right labyrinth function with the central vestibular compensation.

ABR examination yielded only the wave I in the right side, whereas the findings were normal during the stimulation of the left side.

The patient was then referred to magnetic resonance imaging (MRI), which showed right cerebellopontine angle tumor, surprisingly measuring 5 x 3 x 3 cm, which had shifted the brainstem laterally in a grotesque way, displacing it altogether to the left of the midline (Figure 2).

The patient underwent surgery by a neurosurgeon, who performed retrosigmoid approach. The surgery was followed by transient facial nerve palsy. The follow-up audiologic and vestibular evaluation showed the loss of cochleovestibular function on the right side. The follow-up MRI examination showed a small (remaining part) of tumor which was thereafter observed by a neurosurgeon.

Three years later, the patient came back with a sudden hearing loss in her functional left ear. Pure-tone audiometry showed a linear type of sudden sensorineural hearing loss with a threshold at an average of 60 dBHL. Intravenous corticosteroid injections and vasoactive drugs were administered immediately. During the next follow-up, 4 days later, normal hearing was recorded in the left ear.

Discussion

Asymmetric sensorineural hearing loss and unilateral tinnitus inevitably raise suspicion of retrocochlear pathology [2–4]. It is therefore mandatory to discriminate cochlear from retrocochlear hearing loss [5]. As a rule, a battery of audiologic tests is necessary to establish the type of hearing loss in patients with asymmetric pure tone thresholds. However, some patients may have normal hearing, defined as a pure-tone average <20 dBHL, speech discrimination score >90%, and interaural differences ≤10 dB [6, 7]. Numerous studies suggest that vestibular schwannoma may also be present in patients with the normal threshold. This fact is frequently overlooked during routine practice. Furthermore, it is generally considered that patients with normal or almost normal hearing have small schwannoma [8]. In our case report, the tumor of a young patient was large and accompanied by very few symptoms. Similar cases were reported by Magdziarz DD et al. [7].

The purpose of this case report is to draw attention to the fact that every case of asymmetric sensorineural hearing loss, unilateral tinnitus, or unilateral vestibular loss not strictly accompanied...
by vertigo needs to be further evaluated using a battery of audiologic tests whose findings may be normal [9, 10].

Audiologic tests should be repeated in case of persistent symptoms and accompanied by cranial MRI, which is today the gold standard for establishing diagnosis in all cases of cerebellopontine angle tumors.

Although the contralateral hearing loss after surgery of vestibular schwannoma was seen in 1.3% of patients because of brainstem shift, brainstem edema, labyrinthine fluid imbalance due to cerebrospinal fluid (CSF) release and contralateral sympathetic labyrinthitis due to injury of the ipsilateral labyrinth after translabyrinthine resection of tumors [11], the onset of contralateral hearing loss in our patient (3 years after surgery) suggested sudden hearing loss which was completely recovered on prescribed therapy.

**Conclusion**

Every case of unilateral tinnitus, asymmetric sensorineural hearing loss, or hypotonia of labyrinth not strictly accompanied by vertigo, needs to be further evaluated using a battery of audiologic tests whose findings may be normal. Audiologic tests should be repeated in cases of persistent symptoms and accompanied by cranial magnetic resonance imaging, which is today considered the gold standard for diagnosis of vestibular schwannoma.

**References**