A Rare Case of an Acoustic Tumor Diagnosed in an Elderly Patient with Atypical Nystagmus

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Abstract We describe a rare case of an acoustic tumor diagnosed in a 69-year-old female who presented with a history of persistent rotatory vertigo on shifting her head position since several weeks, which was accompanied by mixed upper eyelid-oriented counterclockwise rotation on standing. Pure-tone audiometry and auditory brainstem responses were symmetrical, and thermal stimulus test results were normal. These symptoms ruled out Meniere’s disease and acute vestibular neuronitis; therefore, benign paroxysmal positional vertigo (BPPV) of the right posterior canal was considered the most probable cause. However, no improvement was observed with the Epley maneuver. Furthermore, the eye-tracking test indicated ataxia, and optokinetic nystagmus was also abnormal, which warranted further examination using magnetic resonance imaging (MRI). T2-weighted images revealed a 5-mm tumor within the internal acoustic meatus. This case strongly suggests that MRI should be considered for all patients presenting with atypical nystagmus, even when BPPV is the most probable cause.

Keywords acoustic tumor; nystagmus; benign paroxysmal positional vertigo

1. Introduction Vertigo is defined as the sensation of tilting within a stable environment. It accounts for > 50% of all dizziness cases reported in the primary care setting [6]. The most common causes of vertigo are Meniere’s disease, acute vestibular neuronitis, and benign paroxysmal positional vertigo (BPPV), which account for > 90% of all cases [4]. The incidence of acoustic tumors during the course of BPPV is approximately 30% [7]. Moreover, vertigo is reportedly an important symptom of tumor growth when hearing is normal, or when there is no bilateral difference in hearing ability [8]. Therefore, physicians should consider other causes, including stroke, migraine, or acoustic neuroma, when symptoms persist for several hours [5]. We report the relatively rare case of a 69-year-old female who presented with symptoms of an acoustic tumor that manifested as rotatory vertigo and nausea on shifting of her head position, with nystagmus findings similar to those observed in BPPV.

2. Case report 2.1. Clinical history A 69-year-old female with a history of hypertension was receiving treatment at our internal medicine clinic. The patient experienced rotatory vertigo and nausea on awakening on the morning of March 26, 2009. She visited the emergency department and underwent head computed tomography, but no abnormal findings were detected. The symptoms were initially relieved with intravenous treatment. She revisited our clinic on the same day for a more detailed examination. Our initial analysis indicated no abnormal neurological findings or cochlear symptoms other than rotatory vertigo on shifting of the head position.

During our initial evaluation, we considered the three most common causes of vertigo: Meniere’s disease, acute vestibular neuronitis, and BPPV. Initially, Meniere’s disease was ruled out because pure-tone audiometry only revealed symptoms at the initial visit, and a > 10-dB difference between the right and left ear was only detected at an 8-kHz frequency (Figure 1). The symptom of rotatory vertigo on shifting of the head position was consistent with acute vestibular neuronitis and BPPV, which can be differentiated on the basis of vertigo type. Acute vestibular neuronitis is generally characterized by nystagmus with central horizontal vertigo [7]; however, our patient exhibited a mixed upper eyelid-oriented component and a counterclockwise rotating component when turning from the sitting position to the suspended head position, as shown in Figure 2. Moreover, counterclockwise rotatory nystagmus was also observed when turning from the suspended head position to the sitting position. Therefore, the rotational and vertical vertigo did not support a diagnosis of acute vestibular neuronitis but indicated right posterior canal-type BPPV. We tested our hypothesis by performing the Epley maneuver [3] thrice, but the nystagmus and rotatory vertigo symptoms persisted.
A difference of > 10 dB between the right (○) and left ear (×) was detected at an 8-kHz frequency at (a) the initial visit (March 26, 2009) (b) but not at a follow-up visit, when the acoustic tumor was no longer visible on MRI (May 12, 2012).

Nystagmus at the initial visit was characterized by a combination of an upper eyelid-oriented component and a counterclockwise rotating component when turning from the sitting position to the suspended head position.

Together, these findings were inconsistent with the three most common causes of vertigo.

On March 28, 2009, other possible causes of vertigo were investigated using several tests to discriminate between central and peripheral disorders. As shown in Figure 3, auditory brainstem response audiometry showed a latency period between waves I-V, with an extension on the left side indicating a normal response. In contrast, the eye-tracking test suggested ataxia (Figure 4), the optokinetic nystagmus test (maximum velocity, 95°/s; acceleration, 4°/s²) showed that nystagmus release varied between the right and left eyes (maximum slow phase velocity for the right and left ears was 40°/s and 76°/s, respectively), and the air caloric test (15°C, 60-s stimulus) showed no obvious difference between the right and left ears (maximum slow phase velocity of the right and left ears being 23°/s and 27°/s, respectively). The visual suppression test results were normal for both ears (65.2% and 59.3% for the right and left ears, respectively). In summary, the presence of severe vertigo, the positive caloric test results, and the negative visual suppression test results indicated that the persistent rotatory vertigo in our patient had a central cause.

The major causes of central vertigo are cerebrovascular disease, multiple sclerosis, and neoplasms [7]; and elderly patients with a clinical history of hypertension are particularly at risk of the cerebrovascular causes of vertigo.
Therefore, we performed plain magnetic resonance imaging (MRI) on March 31, 2009 to detect potential cerebral lesions. As shown in the T2-weighted image in Figure 5, a 5-mm low intensity area was observed within the internal acoustic meatus, indicating a right acoustic tumor. Three months later, MRI revealed no increase in tumor size, and 3 years since then, no increase in size has been observed (Figure 5). The symptoms of nystagmus and rotatory vertigo on shifting of the head position have gradually improved since their onset. Eight months after initial diagnosis, the episodes of vertigo and nystagmus completely resolved, indicating a central compensatory mechanism.

3. Discussion
We reported a relatively rare case of a right acoustic tumor in a 69-year-old female with symptoms and nystagmus findings similar to those observed in right posterior canal-type BPPV. Including suspected BPPV, BPPV are present at a high frequency (approximately 50%) in patients with vertigo [9]. However, it is plausible that the present patient was actually a case of BPPV; furthermore, the acoustic tumor was incidentally found on diagnostic imaging. Nonetheless, the persistent symptoms after several Epley maneuvers as well as the abnormal eye-tracking and optokinetic nystagmus test results suggested that the symptoms of vertigo and nystagmus were due to the acoustic tumor.

First, we examined the cause of nystagmus, which presented symptoms similar to those of BPPV or an acoustic tumor. Although the vestibular-evoked myogenic potential was not examined in this study, the normal caloric test results indicated that the tumor was derived from the inferior vestibular nerve, which communicates with the posterior semicircular canal and saccule. Therefore, we considered that the tumor compressed the inferior vestibular nerve, resulting in nystagmus that appeared as right posterior canal-type BPPV.

Although the tumor in the present case was relatively small (5 mm), the eye-tracking and optokinetic nystagmus test results were abnormal; therefore, we considered that the tumor position in the internal auditory canal may have induced the nystagmus by applying pressure to the vestibulocochlear nerve, thereby indirectly impairing inner ear blood circulation [1]. The eye-tracking test was affected in both directions, which may be explained by the patient’s advanced age. Nonetheless, our results indicated that neuro-otological tests are useful to differentiate central vertigo, including acoustic tumors, and that MRI should be performed if abnormalities are present in these test results.

Dunniway et al. [2] reported five cases (two cerebellopontine angle meningiomas, one acoustic tumor, one cerebellar pontine angle lipoma, and one thalamic glioma) characterized by BPPV-like symptoms and verified them as intracranial tumors after performing various tests. The study concluded that MRI imaging should be executed for cases that do not show improvement after performing the canalith repositioning procedure twice. However, in the present case, although the canalith repositioning procedure was performed thrice, the nystagmus and vertigo symptoms did not improve. The success rate of the Epley maneuver for the treatment of BPPV is approximately 85% [10]. However, even for probable BPPV cases that are refractory to appropriate treatment, neuro-otological tests and MRI should be performed to rule out central lesions, including acoustic tumors.

4. Conclusion
From the results of the caloric test, we suspected that the tumor in the present case was derived from the inferior vestibular nerve, which communicates with the posterior semicircular canal and saccule. The tumor likely applied pressure to this nerve, thereby causing the nystagmus symptom and the manifestation of right posterior canal-type BPPV. Despite the small tumor size, the eye-tracking and optokinetic nystagmus test results were abnormal, indicating that in addition to MRI, neuro-otological tests should be performed to differentiate central causes of vertigo, including acoustic tumors. In cases that demonstrate BPPV-like symptoms and nystagmus findings, MRI imaging should be performed for further diagnosis if the symptoms do not improve after the canalith repositioning procedure is performed twice.

References


