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Case Report Otorhinolaryngology

Post-traumatic refractory multiple canal benign paroxysmal positional vertigo: a case report

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ABSTRACT

Benign paroxysmal positional vertigo (BPPV) is the most prevalent form of peripheral vertigo and is seen in a significant number of patients who present at neurology and ear, nose, and throat clinics. Various maneuvers may be used to determine the affected canal based on observation of specific nystagmus signs, and may also be used for treatment. Multiple canal pathology can make diagnosis and treatment more difficult. Presently described is case of BPPV with multiple canal pathology and traumatic etiology that was resistant to treatment.

Keywords: Head trauma; multiple canal benign paroxysmal positional vertigo; refractory.

Benign paroxysmal positional vertigo (BPPV) is the most frequent cause of recurrent vertigo, and one of the most frequently encountered diseases in otolaryngology and neurology clinics [1, 2]. Though most often the posterior semicircular canals are affected, more rarely, the horizontal and anterior canals may be also involved. Multiple canal etiology is detected in 4.6% to 20% of all cases of BPPV [2]. It may be ipsilateral, or both ears may be affected. Since different canals induce various, distinct nystagmus patterns, BPPV can have very different clinical symptomatologies and examination findings. Accurate diagnosis has crucial importance for proper treatment.

CASE REPORT

A 33-year-old male patient with history of fall from a balcony presented at the clinic with complaint of dizziness persisting for 2 months. He reported that after the traumatic incident, his left ear bled and he had discharge from left ear during subsequent 1½ months. For approximately 20 days prior to presentation, however, he had not had ear discharge. Initially, he had severe headache, but severity gradually decreased. Vertigo was provoked by sudden movements, especially when looking upward and to his left. When walking, his eyes drifted to left. He added that hearing acuity of left ear had decreased.

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Patient also reported that dizziness was triggered by coughing or straining. Otoscopic examination revealed pale, intact, left tympanic membrane. Right tympanic membrane was normal. Spontaneous, low-amplitude nystagmus involving right side was observed. Supine roll test demonstrated bilateral apogeotropic nystagmus that was more severe on left side. Dix-Hallpike maneuver revealed clockwise nystagmus on left side, while on right side, counterclockwise, upbeating rotational nystagmus was observed. Stepping test with closed eyes and Unterberger's test revealed deviation to left side. Fistula test yielded negative results. Laboratory tests disclosed bilateral, symmetrical, high-frequency sensorineural hearing loss (SNHL). Video head impulse test did not yield a valid impulse or significant result. On head thrust test, defective vestibulo-ocular reflex was detected. Caloric reflex test revealed decreased lateral canal response on left side.

In the light of available findings, in addition to labyrinthine concussion of the left ear, BPPV originating from bilateral posterior and right horizontal semicircular canals was suggested Ageotropic nystagmus was observed in supine roll test. Nystagmus worsened with left turn of the head, which was evaluated as right lateral canal cupulolithiasis. For right posterior canal BPPV, Epley maneuver was performed. One day later, barbecue maneuver was performed for treatment of right horizontal canal cupulolithiasis, and Epley maneuver was used for the treatment of the left posterior canal. Complaints of the patient had not regressed at follow-up visit 10 days later, which led to recommendation of Vanucchi's forced prolonged position maneuver to treatment for presence of right lateral canal cupulolithiasis. One week later, regression was still not seen. Habituation exercises, including Brand-Daroff exercises, and rehabilitation were prescribed. Two months later, spontaneous nystagmus had disappeared, and results of Unterberger's and stepping tests were within normal limits. Head thrust test revealed active bilateral vestibulo-ocular reflex. Recovery from paresis of left peripheral vestibular system due to left labyrinthine concussion was observed. However, incidents of positional nystagmus persisted at lower frequency. Clinically, the patient felt better. At follow-up visit 3 months later, disappearance of spontaneous nystagmus was noted, but bilateral apogeotropic nystagmus that was more severe on left was detected in supine roll test. Dix-Hallpike maneuver induced clockwise and counterclockwise upbeating rotational nystagmus on left and right. Semont maneuver was performed for the right ear. Three days later, Dix-Hallpike maneuver revealed disappearance of nystagmus on right side, but it persisted on left side. Semont maneuver was performed for the left ear. At follow-up 1 week later, patient reported considerable regression of his symptoms. On Dix-Hallpike test, no nystagmus or dizziness was observed. However, supine roll test revealed lingering bilateral apogeotropic nystagmus and dizziness. Three months later, the patient returned due to worsening of his complaints. Supine roll test revealed persistence of apogeotropic nystagmus. Furthermore, bilateral rotational nystagmus, which had disappeared following Semont maneuvers, but was observed on Dix-Hallpike test, recurred at the same severity. It was learned that the patient had not performed his habituation exercises regularly. Semont maneuver was performed for the right and then for the left ear at 3-day intervals. Epley maneuver was used with same 3-day protocol, but no recovery was achieved. It was recommended to patient that he continue his habituation exercises. At final follow-up scheduled 17 months later, otologic pathology with bilateral involvement of 3 semicircular canals persisted.

DISCUSSION

BPPV is clinical condition that is result of movements of otoliths in the inner ear triggered by head movements. It usually affects single canal. Symptomatology of BPPV patients consists of rotational, vertigo-like sensation of spinning surroundings, occurring mostly when the patients lie down, turn to one side, or sit up quickly. Sudden head movements can also trigger vertiginous episodes [3]. Rarely, it may affect more than 1 canal and induce complex clinical manifestations [2]. Multi-canal BPPV can involve ipsilateral canals or canals of both ears. In this case, BPPV involved bilateral posterior canals and right horizontal canal. Main etiological factors in cases with multi-canal BPPV are trauma and labyrinthitis [2, 4, 5]. In the present case, clinical manifestations of vertigo began following incident of head trauma 2 months earlier. Odiometric tests disclosed bilateral, symmetric, high-frequency

SNHL which demonstrated sudden drop at 4 KHz. Left shift in Unterberger's test and stepping test with closed eyes and typical nystagmus during supine roll and Dix-Hallpike tests were observed. Intact bone structure, internal ear, and eighth cranial nerve observed on post-traumatic cranial computed tomography and magnetic resonance image ruled out diagnoses of labyrinthitis, vestibular neuritis, and sudden hearing loss. Multiple canal BPPV and labyrinthine concussion of the left ear were suggested.

Duration of nystagmus and vertigo was analyzed, and it was noted that such instances of longer duration are observed in multi-canal etiology [2]. However, nystagmus induced by movements of head can be difficult to interpret.

The most important diagnostic tool for patients with BPPV is specific nystagmus findings obtained with maneuvers directed to specific canal [5, 6, 7]. Combination of these findings along with patient's history increases possibility of making correct diagnosis.

In BPPV series, bilateral posterior canal involvement has been reported in between 6% and 26% of cases [8]. On physical examination, bilateral positive Dix-Hallpike sign is seen. In this case, on right side, counterclockwise, upbeating rotational nystagmus was observed, and clockwise on left side. In Dix-Hallpike test, typically, when patient sits erect from supine position, direction of the rotation is reversed. Nystagmus is more severe on side of the affected ear. In evaluation of treatment success, both decrease in the patient's complaints and negative results in Dix-Hallpike and supine roll tests are important.

It is easier to diagnose canal pathologies with different canal planes whether they involve the same or contralateral side. In mixed-type vertigo, most prevalent combinations seen are posterior and horizontal canal pathologies, as was the case with our patient [1, 2, 4]. In a multicenter study presented by Leopardi et al., in only 4.4% of BPPV cases were multi-canal etiologies observed, and the authors reported combination of posterior and horizontal canal pathologies as most frequently seen type of BPPV [9].

In a series of 345 cases of BPPV reported by Balatsouras et al., only 32 cases had multi-canal etiology, and 11 of those occurred after a traumatic event [1]. They also detected viral etiologies and chronic otitis as underlying factors.

Therapeutic maneuvers have been defined for each type of BPPV. Principal maneuvers are as follows: Epley and Semont maneuvers are used for posterior canal BPPV, Lempert and barbecue maneuvers for horizontal canal BPPV, and Yacovino maneuver for anterior canal BPPV [2]. In multi-canal BPPV, combinations of these maneuvers are applied, and treatment can be challenging. In these cases, treatment should be initiated first for the canal with more numerous symptoms. In our case, since complaints concerning right posterior and right horizontal canal were more intense, we started treatment with Epley maneuver for the right ear, followed by barbecue maneuver the next day. Multiple canal BPPV requires greater number of sessions and it can be more resistant to treatment. In present case, despite various maneuvers applied many times, only patient's complaint of dizziness decreased; complete cure was not achieved.

Conclusion

Though cases of multiple canal BPPV are not exceptional, important difficulties remain in clinical diagnosis and treatment. Most often, there is trauma in multi-canal pathology. Accurate analysis of nystagmus findings obtained with provocative tests is important in the selection of correct therapeutic maneuvers. Potential longevity of treatment should also be kept in mind.

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