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Review Article

Repositioning maneuvers in benign paroxysmal positional vertigo: how do we improve outcomes?

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ABSTRACT

Benign paroxysmal positional vertigo (BPPV) is the most common peripheral vestibular disorder. A series of meetings with clinicians treating BPPV were conducted to seek their views on improving outcomes in patients with BPPV. BPPV is primarily treated by Otolith repositioning maneuvers (ORM) to help to move the otoconia out of the canal and lead it back to the vestibule. Although repositioning maneuvers are effective in BPPV management, some patients experience residual dizziness, postural instability, recurrences, and psycho-emotional consequences after about 1 month after repositioning. An important and useful non-pharmacological intervention for patients with balance disturbances is Vestibular rehabilitation (VR), which includes vestibular adaptation, habituation and substitution, and patient education. Repositioning devices and mastoid vibration could help a subgroup of patients with BPPV who do not respond to conventional management. Betahistine dihydrochloride accelerates the recovery of function of vestibular system by improving blood flow in the inner ear, and normalization of the function of motion sensitive hair cells is faster. Betahistine-treated patients may have faster recovery, lesser recurrence, and longer relief of symptoms. The use of betahistine in combination with maneuvers can help prevent the development of residual dizziness.

Keywords: Vestibular rehabilitation, epositioning devices, Betahistine, Residual dizziness, Otolith

INTRODUCTION

Benign paroxysmal positional vertigo (BPPV) is the most common peripheral vestibular disorder.[1-3] An increasing number of people in the elderly age group with associated age-related comorbidities and the presence of deficits in physiological, cognitive, and social functions contribute to the development of various diseases.

BPPV is the most common type of vestibular vertigo in the elderly population; it has an adverse impact on functioning and quality of life of affected individuals.[4,5] The prevalence of BPPV is about 25% in elderly people over 70 years with complaints of dizziness, and this symptom persists for more than one year.[6,7] The chief complaint of patients with BPPV is vertigo, and it may be associated with hearing loss, tinnitus, poor balance, gait disturbance, and an increase in the risk of falls.[1,9,10] Patients with BPPV restrict their activities in order to avoid crises due to vertiginous symptomatology resulting in a compromised quality of life, functional loss, loss of postural balance and risk of falls, fractures, hospitalizations, depression, and disability.[8-18]

CAUSE OF BPPV

The trigger for vertigo and other associated symptoms is believed to be the displacement of statocone (otoconia) fragments from the utricle macula. The statoconia freely float in the endolymph of one or more semicircular canals that become sensitive to changes in head position.[19] The brief period of vertigo occurs due to abnormal stimulation of the dependent semicircular canal. In most patients,

BPPV is caused by canalolithiasis where free debris float within the long arms of the semicircular canals.[20]

TREATMENT OF BPPV

BPPV is primarily treated by ORM to help to move the otoconia out of the canal and relocate this back to the vestibule.[20]

Current data indicates that the Epley maneuver is effective for the treatment of BPPV of posterior canal. Fife et al classified the Epley maneuver for otolith repositioning as 'recommendation level A'. The Epley maneuver is effective and safe and must be offered to patients with BPPV of the posterior canal of all ages.[21] The Epley maneuver improves patients' Dizziness handicap index (DHI) score and decreases the impact of the vertiginous symptoms.[22] Other positional exercises include the Brandt-Daroff exercises. Brandt-Daroff exercises are often impractical because patients do not tolerate repeated provocation of symptoms. Semont's liberatory maneuver (SLM) is the treatment for cupulolithiasis of anterior and posterior canals.[23,24] The apogeotropic variant of the Horizontal semicircular canal (h-SCC) BPPV is attributed to canalithiasis of the anterior arm or cupulolithiasis. The Gufoni maneuver seems to be effective in all pathophysiologic types of apogeotropic h-SCC BPPV. Barbeque rotation techniques such as Vannucchi-Asprella maneuvers mainly target lithiasis of the anterior ampullary arm.[25] The affected-ear-up 90° maneuver is effective against lateral canalolithiasis.[26]

The number of maneuvers used varies in different studies (usually from 1 to 3 maneuvers). Hence, it is not possible to propose a standard number of maneuvers, or if they should be performed in the same session or in different ones. Patients with BPPV not located in a single posterior semicircular canal are more likely to require multiple visits for canalith repositioning.[27,28]

A series of meetings with clinicians treating BPPV were conducted to seek their views on improving outcomes in patients with BPPV.

RESIDUAL DIZZINESS AND RECURRENCE OF VERTIGO AFTER ORM

Although repositioning maneuvers are effective in BPPV management, some patients experience residual dizziness, postural instability, recurrences, and psycho-emotional consequences for about 1 month after repositioning. Older adults have less improvements in dynamic balance and self-perceived handicap rating in comparison to younger people.[20]

Ganança et al. observed a BPPV recurrence rate of 21.5% in the elderly. Forty four percent of patients treated successfully with the canalith repositioning procedure redevelop BPPV within the first 2 years.[20] Thus, ORM may not be sufficient to completely restore postural stability in elderly subjects with BPPV.[28-30]

VESTIBULAR REHABILITATION

An important and useful non-pharmacological intervention for patients with balance disturbances is vestibular rehabilitation, which includes vestibular adaptation, habituation and substitution exercises, and patient education.[31-33] Ribeiro et al showed the effects of VR in maintaining postural balance in elderly subjects with BPPV.[34] The exercises included oculomotor exercises, habituation exercises (repeated head and trunk movements), standing and dynamic balance training, and lower-limb muscles strengthening. For each exercise prescription, a universal set of 10 modifiers and progression patterns were followed to make the exercises more challenging.[35]

Angeli et al also used VR exercises in elderly people with BPPV. These maneuvers were more effective compared to no treatment, and VR exercises can be added to ORM to improve results in the treatment of BPPV in elderly people.[28] Angeli et al further reported a considerable rate of symptoms recurrence in the elderly who only underwent ORM and suggest that VR exercises could decrease recurrence rate of BPPV. The protective effect was more evident in elderly people.[28]

The updated evidence-based clinical guidelines of the American Academy of Otolaryngology-Head and Neck Surgery Foundation (AAO-HNSF) recommend that clinicians should offer VR as treatment for BPPV. Although movement/habituation based VR should not be the first-line treatment modality for BPPV, it is recommended in patients who experience persistent disability following Canalith repositioning procedure (CRP).[29] VR is particularly indicated in subjects with additional impairments, such as non-specific dizziness and increased risk of falls.

A Cochrane review was conducted to assess the efficacy of VR in patients with symptomatic unilateral peripheral vestibular dysfunction; this included eight studies investigating VR in BPPV specifically. This review supported the contention that the primary intervention for BPPV should be CRP that directly treats the condition, but movement/habituation-based VR may further aid and benefit long-term functional recovery.[36]

REPOSITIONING DEVICES

Repositioning devices were developed to overcome the limitations in conventional repositioning treatment of BPPV. The Thomas Richard Vitton (TRV) reposition chair is a mechanical diagnostic and repositioning device developed for the management of BPPV. The key advantages of the TRV chair include improved analytical feasibility, accurate navigation, and treatment of people unfit for manual treatments. Patients with refractory BPPV

showed significant improvement by reposition chair management. The repositioning device could significantly reduce disease burden in the group of patients with BPPV who did not respond to conventional management.[37]

Persistent recalcitrant positional vertigo (PRPV) after Posterior semicircular canal occlusion (PSCO)

PSCO is a safe and effective option for recalcitrant BPPV. However, 30.8% of patients had recalcitrant positional vertigo postoperatively, ascribed commonly to contralateral BPPV. Patients considering PSCO should be counselled regarding this risk to ensure realistic expectations.[38]

Mastoid vibration

Mastoid vibration may be used to assist in treatment of persistent cases of BPPV, where a simple CRP may fail to improve symptoms. Introducing mastoid oscillation via vibration to the CRP in persistent cases of semi-circular canalithiasis BPPV may produce positive patient outcomes.[39]

Use of betahistine

Betahistine is a widely used drug to ameliorate dizziness.[36] Betahisitine increases labyrinthine microcirculation and suppresses the increased neuronal activity in vestibular receptor cells, afferent neurons.[36] Betahistine dihydrochloride accelerates the recovery of function of vestibular system by improving blood flow in the inner ear, and normalization of the function of motion sensitive hair cells is faster. In more than 40 years of clinical use, betahistine has shown an excellent safety profile with the usual dose range from 8-48 mg daily.

According to clinical studies, betahistine 48 mg daily for 3 months is an effective and safe option for the treatment of peripheral vertigo.[40] The use of betahistine has been demonstrated to resolve Residual dizziness (RD) symptoms. In a placebo-controlled study, patients with RD after Epley's maneuver were treated with either betahistine or placebo. Patients receiving betahistine were 3.18 times more likely to have no residual dizziness than the placebo group. Increasing age was associated with a decreased likelihood of improving residual dizziness.[41] The expert group agreed that betahistine does have a role to play in helping resolve residual symptoms after Epley's maneuver.

Treatment of patients with less than 60-days duration of BPPV with betahistine dihydrochloride after Epley's maneuver was effective, and ten days after treatment postural stability of patients was normalized. Patients had faster recovery, decreased recurrence and longer relief of symptoms. Treatment with Epley's maneuver and betahistine demonstrated better improvement in the mean visual analog score at follow-up at 1 and 4 weeks.[42,43]

CONCLUSION

Dizziness associated with BPPV may respond to repositioning maneuvers but even after successful maneuvers, some patients report residual dizziness.

Appropriate CRPs can provide rapid and long-lasting relief of symptoms in patients with BPPV. The experts concurred with this finding. Early recognition and treatment might decrease the incidence of residual dizziness in patients with BPPV, especially in those patients with psychiatric comorbidities and in the elderly, thereby lowering the risk of falls. Residual dizziness may be resolved by vestibular rehabilitation and repositioning devices.

The use of betahistine in combination with maneuvers can help prevent the development of residual dizziness. Use of betahistine improved vestibular recovery and has been demonstrated to resolve residual dizziness symptoms.

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