Viewpoint

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Vitamin D Deficiency: A Modifiable Risk Factor for Recurrent Benign Paroxysmal Positional Vertigo?

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ABSTRACT

Benign paroxysmal positional vertigo (BPPV) is a common vestibular disorder characterized by recurrent episodes of vertigo, predominantly affecting middle-aged women. While canalith repositioning maneuvers are generally effective, recurrence is frequent and can significantly impact quality of life. An increasing number of studies have reported an association between vitamin D deficiency and BPPV, especially in recurrent cases. Furthermore, recent meta-analyses and randomized controlled trials suggest that vitamin D supplementation can significantly reduce recurrence rates in patients with BPPV. Despite growing awareness, vitamin D deficiency remains prevalent in Korea. Given the high burden of BPPV and the safety and accessibility of vitamin D supplementation, vitamin D screening and supplementation can be a clinically reasonable and potentially beneficial strategy—particularly for middle-aged women, who are most commonly affected by BPPV, and for BPPV patients with recurrent episodes.

Keywords: Vitamin D deficiency, Benign paroxysmal positional vertigo, Vitamin D

Dear Editor,

Benign paroxysmal positional vertigo (BPPV) is characterized by brief episodes of vertigo triggered by changes in head position. While nationwide data on BPPV in South Korea remain limited, evidence suggests that incidence has been steadily rising over time [1]. International studies estimate an annual incidence of about 0.6%, and a lifetime prevalence of around 2.4% [1]. The condition most commonly affects individuals in their 50s to 60s, and is predominant in women, with a female-to-male ratio ranging from 2:1 to 3:1 [1]. Though canalith repositioning maneuvers, such as the Epley maneuver, typically provide effective symptom relief within a few days, recurrence is common [1]. Studies indicate that 20% to 50% of patients may experience recurrence within a few years of the initial episode [1,2]. Vertigo episodes can significantly disrupt daily functioning and increase the risk of injuries from falls. Furthermore, the recurrent and unpredictable nature of these episodes may lead to psychological distress and a reduction in overall quality of life.

The vertigo associated with BPPV is attributed to the displacement of otoconia, also referred to as canaliths, from the utricle into the semicircular canals. This displacement may result from various etiologies, including age-related degenerative changes, head trauma, or inner ear disorders [1]. However, most BPPV cases are classified as idiopathic, with no clearly identifiable underlying cause [1]. Recent research has increasingly focused on vitamin D deficiency as a systemic metabolic factor potentially contributing to BPPV onset and recurrence [1]. Vitamin D plays a key role in calcium regulation and is therefore essential for maintaining the structural integrity of otoconia, which are composed of calcium carbonate crystals [2]. When vitamin

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D levels are low, the biochemical stability of otoconia may be compromised, increasing the likelihood of fragmentation and displacement, which can potentially lead to BPPV [2].

Although findings from individual studies have been somewhat inconsistent, several observational studies have reported a significant association between lower serum vitamin D levels and the occurrence of BPPV, particularly in patients with recurrent episodes [2-4]. A recent systematic review and meta-analysis of 47 observational studies [5] demonstrated that patients with BPPV had lower serum vitamin D levels compared to non-BPPV controls (weighted mean difference: –2.84 ng/mL). Moreover, patients with recurrent episodes had even lower serum vitamin D levels than those without recurrence (weighted mean difference: –5.01 ng/mL), implying a stronger association between lower vitamin D levels and BPPV recurrence. However, these findings are largely based on observational data, which are inherently limited in establishing causality due to the potential influence of confounding factors. For instance, individuals with lower levels of physical or outdoor activity may be predisposed to both lower vitamin D levels and an increased risk of BPPV, independently of any direct causal relationship between the two. A randomized controlled trial conducted in Korea and published in Neurology journal in 2020 found that patients with BPPV and low vitamin D levels (<20 ng/mL) who received daily supplementation of 800 IU of vitamin D had a 24% relative reduction in recurrence rates over 1 year, compared to those who did not receive supplementation [6]. Similarly, a meta-analysis of seven controlled trials indicated that vitamin D supplementation reduced the recurrence rate of BPPV by 59% compared to control groups without supplementation [7]. Nevertheless, the strength of this evidence should be interpreted with caution, as the meta-analysis included only one randomized controlled trial, and the trial itself was not placebo-controlled, which represents a significant methodological limitation. Nevertheless, these findings suggest a possible causal link between lower vitamin D levels and BPPV, and that correcting vitamin D deficiency may help reduce the recurrence of BPPV.

According to results from 119,335 subjects during 2017 to 2022, 7.6% of Korean adults were vitamin D deficient (<10 ng/mL) [8]. Although vitamin D testing and supplementation have become increasingly popular in recent years, a majority of Korean adults are still likely to be vitamin D deficient, because of persistent risk factors such as indoor lifestyles and insufficient sun exposure. Korean medical societies related to menopause and osteoporosis recommend a daily intake of at least 800 IU of vitamin D for postmenopausal women to support bone health and reduce the risk of fractures [9,10].

Although emerging evidence suggests an association between lower vitamin D levels and the occurrence or recurrence of BPPV, the current data are largely derived from observational studies and a limited number of controlled trials with insufficient randomization or blinding. Consequently, the causal relationship between vitamin D deficiency and BPPV remains uncertain. However, taking into account the epidemiological and clinical context of vitamin D as well as the disease burden of BPPV, vitamin D screening and supplementation may be a clinically reasonable and potentially beneficial strategy—particularly for middle-aged women, who are most commonly affected by BPPV, and for BPPV patients with recurrent episodes.

Future research, particularly well-designed, placebo-controlled randomized trials, is needed to clarify whether vitamin D supplementation can reduce BPPV recurrence, to establish appropriate thresholds for vitamin D supplementation, and to determine optimal dosing regimens and target serum levels. Until more robust evidence is available, vitamin D supplementation should be considered cautiously and individualized according to clinical context.

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AUTHOR CONTRIBUTIONS

Dr. Ki Dong KO had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. All authors reviewed this manuscript and agreed to individual contributions.

Conceptualization: KDK. Investigation: KKK and ICH. Writing–original draft: KDK. Writing–review & editing: all authors.

CONFLICTS OF INTEREST

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DATA AVAILABILITY

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