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e Relationship between Vitamin D De ciency and Bppv

BPPV occurrence

VIT D de ciency can change the structure of the otoconia, which are made of calcium carbonate. Such structural changes may induce otoconia to easily detach from the otolith organ, leading to BPPV attacks. A prospective study in Egypt suggested that low VIT D levels were related to BPPV development; the mean VIT D level in the BPPV group (16.04 ng/ml) was signi cantly lower than the healthy control (19.53 ng/ml) [3]. Another prospective study demonstrated a signi cantly lower VIT D level in BPPV patients, including those who experienced their rst episodes and recurrent vertigo patients. is observation suggested that VIT D de ciency might be a risk factor for BPPV [10]. In a Korean study where postmenopausal BPPV female patients were classi ed into three groups (normal, osteopenia and osteoporosis) according to the Bone Mineral Density (BMD), multiple logistic regression analyses showed that VIT D de ciency was positively related to osteoporosis in BPPV. VIT D de ciency and osteoporosis were found to be risk factors for BPPV [11]. In a retrospective study that included 380 BPPV patients and 3125 control subjects, divided into age-and gender-based subgroups, di erences in the serum VIT D existed among di erent age groups and genders. Lower VIT D level was a risk factor in both male and female patients aged less than 40 and females aged 40-69 and 60-69 years. Interestingly, a recent study reported that the mean age years of male BPPV subjects and healthy controls were 62.1 ± 10.6 and 59.4 ± 13.2, with no statistically signi cant di erence in age between the two groups. e mean VIT D level was 20.99 ± 6.76 ng/ml and 23.17 ± 6.49 ng/ml in the BPPV patients and controls, and 25(OH)D was identi ed as a risk factor of BPPV in males [12].

Otolin-1 is an inner ear protein exclusively expressed in otoconia and cells of the vestibule and cochlea. Interestingly, a prospective study found high otolin-1 levels in BPPV patients, suggesting that it may be a potential serum marker for BPPV patients. However, no statistical signi cance in low VIT D levels was found between BPPV patients and controls [4]. Two limitations of that study included the small sample size and the high percentage of post-traumatic BPPV patients (13%).

BPPV recurrence

In the previously mentioned Egyptian prospective study, the BPPV patients were divided into a non-recurrent and recurrent group according to BPPV recurrence at one-year follow-up. VIT D levels in the non-recurrent group (16.04 ng/ml) were signi cantly higher than in the recurrent group (11.93 ng/ml) (P=0.046), which suggested that recurrent attacks of BPPV were associated with lower VIT D levels [3]. Similarly, in another prospective cohort study, a statistically signi cantly greater proportion of VIT D de ciency (serum 25(OH)D ≤ 20 ng/ml) patients was found in the recurrent BPPV group, compared to the non-recurrent BPPV group (68% *vs* 37%), with signi cantly higher mean VIT D levels in the latter group (19.53 ± 15.33 *vs* 25.85 ± 14.10 ng/ml) [13]. Wang et al. reported lower serum 25-(OH)VIT D levels in middle-aged and elderly women with recurrent BPPV (17.15 ± 2.028 ng/ml) compared to an age-matched healthy control group (23.84 ± 3.125 ng/ml) [14]. During the comparison between non-postmenopausal and postmenopausal women within the recurrent BPPV group, decreased serum VIT D levels (16.231 ± 2.102 ng/ml) were found in women over 50, especially postmenopausal ones. In a study by Gu Il Rhim, during a 2-year follow-up period, BPPV recurrence rates were signi cantly di erent at di erent VIT D levels, while two cut-o points for 25-(OH) VIT D were 10 ng/ml and 15 ng/ml. Setting the cut-o point was 15 ng/ml, greater and less than 15 ng/ml the recurrence rates respectively were 60% and 40%, the recurrence was increasing with the declining of serum VIT D level, it indicated that the low serum VIT D levels signi cantly a ected the recurrence of BPPV [15].

On the contrary, no signi cant di erence in 25-(OH) VIT D level was found in patients rst diagnosed with BPPV (21.0 ± 5.9 ng/ml) and recurrent BPPV patients (21.9 ± 4.9 ng/ml) in a prospective study [10]. A meta-analysis that assessed the risk factors for BPPV recurrence concluded that VIT D did not contribute to BPPV recurrence [16].

to BPPV attacks. Most clinical trials found that VIT D de ciency was a risk factor for BPPV occurrence. Although the association between VIT D de ciency and recurrence for BPPV was inde nite, many studies indicated that VIT D supplements were bene cial to BPPV patients with VIT D de ciency. VIT D supplementation not only reduced BPPV recurrence but also helped prevent injury caused by VIT D de ciency to other body organs. Accordingly, we recommend quantifying serum VIT D levels in BPPV patients and dietary or drug supplementation for hypovitaminosis D. Although most trials supported the VIT D supplementation, high-quality clinical trials were sparse. Currently, there is no consensus on VIT D supplementation for VIT D de ciency.

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Con ict of Interest

e authors declare no con icts of interest.

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