



Benign Paroxysmal Positional Vertigo Is More Commonly Associated with Orthostatic Dizziness Than Orthostatic Hypotension

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Abstract

Purpose: Orthostatic dizziness (OD) and positional dizziness (PD) are considerably common conditions in dizziness clinic, whereas those two conditions are not clearly separated. We aimed to evaluate the clinical significance of simple OD and OD combined with PD for the diagnosis of benign paroxysmal positional vertigo (BPPV) and orthostatic intolerance (OI). **Patients & Methods:** Patients presenting with OD (n = 102) were divided into two groups according to their symptoms: group PO, presenting with PD as well as OD; group O, presenting with OD. A thorough medical history, physical examination, and vestibular function tests were performed to identify the etiology of the dizziness. Orthostatic vital sign measurement (OVSM) was used to diagnose OI. **Results:** The majority of patients were in group PO (87.3%). BPPV was the most common cause of OD for entire patients (36.3%) and group PO (37.1%), while OI was most common etiology for group O (38.5%). Total of 17 (16.7%) OI patients were identified by OVSM test. Orthostatic hypotension (n=10) was most frequently found, followed by orthostatic hypertension (n=5), and orthostatic tachycardia (n=2). Group O showed significantly higher percentage (38.5%) of OI than group PO (13.5%) ($P=0.039$). **Conclusion:** Positional tests for BPPV should be considered as an essential diagnostic test for patients with OD, even though their dizziness is not associated with PD. It is suggested that orthostatic testing such as OVSM or head-up tilt table test should be performed as an initial work up for the patients with simple OD.

Introduction

Orthostatic dizziness is found in 2–19% of elderly population and 4.8% of the adult population >20 years of age. It can be caused by orthostatic intolerance (OI), which is a subcategory of dysautonomia. Dizziness in this condition is resulted from abnormal changes in blood pressure, heart rate, and cerebral blood flow in response to upright posture. Orthostatic intolerance was further classified as orthostatic hypotension (OH), orthostatic tachycardia (OT), or orthostatic hypertension (OHT).

The causes of PD vary widely because any disease that affects the vestibular system can cause PD. Among the various etiologies that are associated with positional changes, benign paroxysmal positional vertigo (BPPV) is the characteristic condition associated with typical symptom-provoking positions. The primary symptom of BPPV is rotational vertigo characterized by a sudden attack that is triggered by changes in head position in a specific direction. However, it was reported that a small group of BPPV patients experienced an unspecific sensation of dizziness, such as oscillopsia, imbalance, and nausea. Also, in more than half of patients, symptoms of BPPV can be provoked by rising up from supine position. Reverse nystagmus and otolith organ dysfunction may account for OD in BPPV patients. This may complicate the diagnostic impression because dizziness caused by upright position is usually considered as a typical manifestation of OI.

In this study, we aimed to evaluate (1) the ratio of OI and its subtypes in patients with dizziness which is associated with orthostatic positional change (OD), and (2) the disease entities for the group of simple OD and for the group with combined form dizziness (dizziness is associated with orthostatic position as well as changes in head position).

Patients & Methods

The study included 102 patients whose dizziness was induced or aggravated by orthostatic positional change. All subjects were asked to independently complete a questionnaire. The questionnaire consisted of 13 items regarding the effect of various positional changes on their dizziness (Table 1). Questions 1–11 pertained to specific head position changes that aggravated dizziness, whereas questions 12 and 13 referred to the effect of orthostatic positional changes on dizziness (OD). The subjects were divided into two groups according to their answers to the questionnaire. Patients who answered “yes” to either 12 or 13 and “yes” to any of questions 1–11 were placed in group PO (PD as well as OD). Subjects who answered “yes” to only items 12 and 13 were placed in group O.

All patients underwent orthostatic vital sign measurement (OVSM) test using an automatic sphyngomanometer (Omron 10 Series™, Omron Healthcare, Kyoto, Japan), which is performed by a nurse. After a rest period in a quiet room, blood pressure and heart rate were measured with the patient's arm placed at heart level in a sitting position. The patient was then placed in the supine position on the bed, and blood pressure and heart rate were recorded after a 2-min of rest period. Finally, the patient was instructed to stand up with the forearm placed on a table at the height of the patient's heart level (4th intercostal space). Vital signs were measured 2 and 5 min after assuming the standing position. When the patient is intolerable to the orthostatic challenge, the procedure is immediately discontinued. Criteria for positive orthostatic hypotension were defined as a decrease in systolic or diastolic blood pressure greater than 20 or 10 mmHg, respectively, or both at the standing position. Orthostatic tachycardia was defined as an increase in HR of at least 30 bpm, or a maximum of 120 bpm was obtained in the upright position without profound hypotension; orthostatic hypertension was defined as systolic BP increase ≥ 20 mmHg with orthostatic position. Statistical differences among groups were determined using analysis of variance (ANOVA) and the chi-square test. P-values <0.05 were determined to indicate statistical significance.

Results

The etiology of dizziness for the subjects is shown in Fig. 1. BPPV was most common (n = 37, 36.3%), followed by peripheral vestibular diseases (n = 17), and OI (n = 15). The majority of patients with OD were in group PO (87.3%), followed by group O (12.7%). The characteristics of patients in each group are shown in Table 2. Age and gender differences were not statistically significant between the groups PO and O. Orthostatic intolerance (OI) was identified in 17 patients (16.7%) from the 102 patients with OD. Orthostatic hypotension (n=10) was most frequently found, followed by orthostatic hypertension (n=5), and orthostatic tachycardia (n=2). Group O showed significantly higher percentage (38.5%) of OI than group PO (13.5%) ($P=0.039$) (Fig. 2). OI was more frequently detected when the etiology was not associated with BPPV (20.0% of BPPV(-) patients vs. 10.8% of BPPV(+) patients, in total) (Fig. 3). The percentage of patients with BPPV was similar in group PO (37.1%) and group O (30.8%). Only 4 of the 37 BPPV patients (10.8%) had concomitant BPPV and OI; three were in group PO and one was in group O. This finding suggests that the OD symptom in BPPV is not associated with orthostatic hypotension.

Discussion

Positional dizziness is a frequently encountered symptom in dizziness clinics. It can be caused by a number of conditions, and its wide variety of etiologies makes identification of the cause of PD difficult. Orthostatic dizziness is also common symptom in dizziness clinic, and is usually considered to be related with orthostatic intolerance. The present study included patients whose dizziness was caused or aggravated by orthostatic positional change, and the patients were further divided into two groups. We found that combined form (87.3%) was far more common than simple OD.

A previous study found that OD was prevalent in subjects who were female, had a history of hypertension, and used sedatives/hypnotics. Our findings were similar, showing that female patients were twice as many as male patients in patients with OD. We found that a history of hypertension and antihypertensive use was more frequent in group O, although the difference between the two groups was not statistically significant.

It is noteworthy that the most common etiology of orthostatic dizziness was not OI, but BPPV (36.3%). Peripheral vestibular diseases followed as second most common cause of OD, and OI (14.7%) ranked the third. BPPV was found at similar rate for each of group PO (37.1%) and group O (30.8%). This result implies that positional tests for BPPV should be performed in patients with OD, even though their dizziness is not associated with PD. While the cause of OD in group PO was similar to the distribution of etiologies for the entire OD patients, group O showed unique distribution of causes for OD. OI was most common problem (38.5%) in group O. The ratio of OI was significantly higher in group O patients (38.5%) compared to group PO ($P=0.039$). Considering this result, orthostatic testing such as OVSM or head-up tilt table test (HUTT) should be performed as an initial work up for the patients with simple OD.

In the present study, orthostatic hypotension was identified in 10 patients, with a prevalence of 9.8%, which is comparable to the previous studies. Orthostatic hypotension was most common, followed by OHT, and OT. The ratio of OH and OHT was higher in group O compared with group PO (Fig.2).

Table 2. Patient's characteristics.

	Total	Group PO	Group O	P value
Number (%)	102	89	13	
Age (years)	50.9±16.0	51.1 ± 15.9	49.6 ± 17.1	0.772
M:F	30:72 (1:2.4)	27:62 (1:2.3)	3:10 (1:3.3)	0.751
Hypertension	44 (43.1)	36 (40.4)	8 (61.5)	0.129
Antihypertensive use	39 (38.2)	31 (34.8)	8 (61.5)	0.063
Hypotension	12 (11.8)	12 (13.5)	0 (0)	0.176

Table 1. Patient questionnaire regarding aggravating factors related to positional change.

- Does looking up increase your problem?
- Because of your problem, do you have difficulty getting into or out of bed?
- Do quick movements of your head increase your problem?
- Because of your problem, do you avoid heights?
- Does turning over in bed increase your problem?
- Does bending over increase your problem?
- Does lying down on your back increase your problem?
- Does reaching for something on a shelf increase your problem?
- Does moving your head from side to side increase your problem?
- Does sweeping the floor increase your problem?
- Does picking something up from the floor increase your problem?
- Does standing up from a sitting position increase your problem?
- Does standing up from a supine position increase your problem?

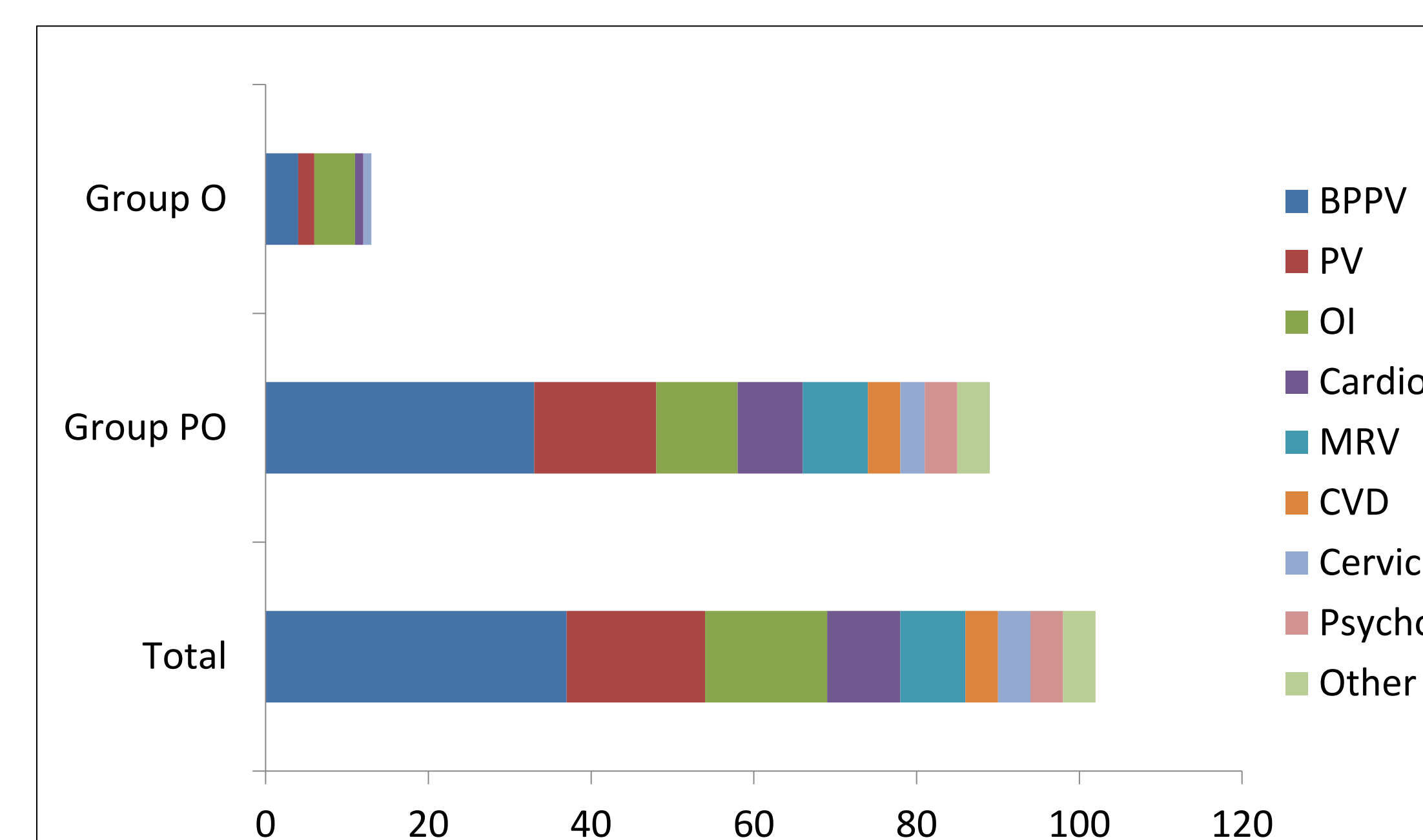


Fig. 1. Diagnosis of orthostatic dizziness according to its association with positional dizziness. Benign paroxysmal positional vertigo (BPPV) was the most common diagnosis, followed by peripheral vestibular diseases (PV), orthostatic hypotension (OH), and other etiologies.

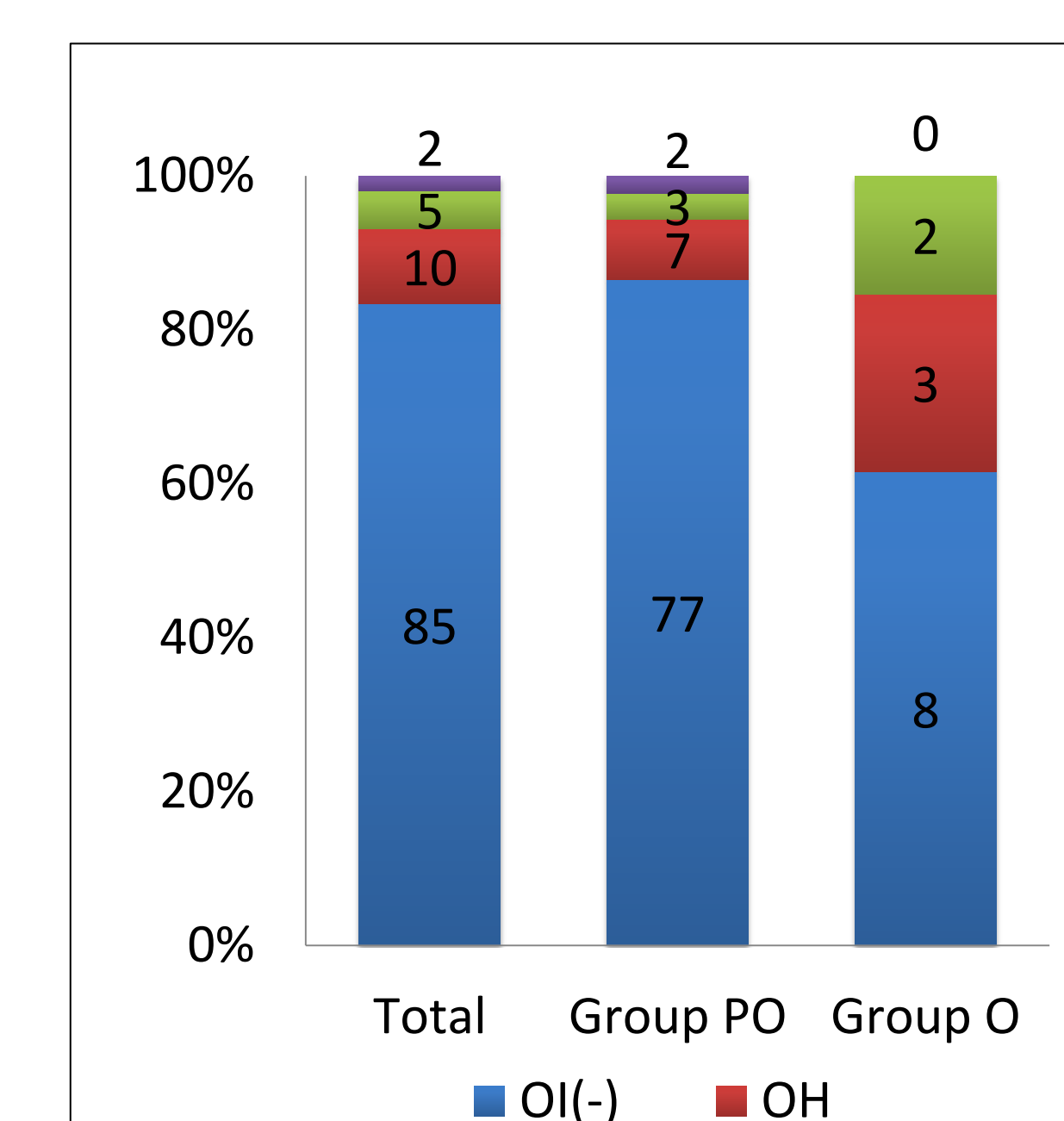


Fig. 2. Orthostatic intolerance (OI) was identified in 17 patients (16.7%) from the patients with orthostatic dizziness. Orthostatic hypotension (OH; n=10) was most frequently found, followed by orthostatic hypertension (OHT; n=5), and orthostatic tachycardia (OT; n=2). Group O showed significantly higher percentage (38.5%) of OI than group PO (13.5%) ($P=0.039$).