

Prevalence of unrecognized benign paroxysmal positional vertigo in older patients

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Abstract Dizziness is a relatively common complaint which occurs more often with increasing age. Benign paroxysmal positional vertigo (BPPV) is an important cause which can easily be treated but is frequently not recognized by professionals. The aim of this study was to assess the prevalence of unrecognized BPPV in older patients. Patients ≥ 70 years of age ($n = 989$) indicated whether they experienced dizziness, and if so whether the symptoms were typical for BPPV. If affirmed, a diagnostic maneuver was performed. Positive patients were treated at once. All suspected patients completed quality of life questionnaires and were followed for 3 and 6 months. Positive BPPV patients were compared with negative (but suspected) patients. Almost one quarter of the patients (226 patients, 23 %) suffered from dizziness, among whom 101 were suspected of BPPV. Less than half ($n = 45$) underwent the diagnostic maneuver, of whom 13 (29 %) were positive for BPPV. At follow-up, one patient developed BPPV, leading to a total of 14 positive patients (overall prevalence 1.4 %). BPPV positive patients did not differ

from BPPV negative patients. Among a large group of older patients, one quarter experiences dizziness, and 1.4 % has definite BPPV.

Keywords Benign paroxysmal positional vertigo · Dizziness · Prevalence

Introduction

Dizziness is a common complaint and its incidence increases with age [1–3]. It is accompanied by an increased risk of falling [4], which can have serious consequences in the frail elderly [5]. An important cause of dizziness is benign paroxysmal positional vertigo (BPPV): 17–42 % of patients with vertigo as a primary complaint ultimately receive this diagnosis [6]. BPPV is characterized by short-standing episodes of vertigo precipitated by a change in head position, the most common provocative movements being looking upward, bending over and rolling over in bed [7]. It is believed that dislodged otoconia (canaliths) inside one of the semicircular canals cause continuing movement of the endolymph, even after head movement has ceased [8]. This results in bending of the cupula, thus, provoking vertigo. In a majority of cases, the posterior semicircular canal is affected.

The term ‘benign’ refers to the lack of an underlying serious central nervous system (CNS) disorder and its generally favorable prognosis, but undetected and untreated BPPV does not necessarily have a benign course with respect to its effect on daily functioning and health-related quality of life [4, 7]. Posterior canal BPPV is easily treated with a so-called Epley maneuver, the success rate being around 90 % [9, 10]. Overall, the incidence of BPPV has been reported to vary across populations from 10.7 to

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64 per 100,000 people per year [2] with a lifetime prevalence of 2.4 % [7]. Studies in geriatric populations assessed the prevalence of suspected unrecognized BPPV and came to prevalences of 9–11 % [3, 11], but neither study confirmed the diagnosis by the gold standard, the Dix Hallpike test.

We aimed to assess the prevalence of BPPV in an older population of patients who visited the outpatient clinic for other reasons than dizziness and had not been diagnosed with or treated for BPPV before. Our second aim was to assess whether treatment of BPPV with the Epley maneuver increased patients' quality of life.

Methods

From January 2011 to August 2012, 989 non-consecutive patients aged 70 and older who visited the outpatient clinics of the departments of ophthalmology ($n = 335$), neurology (260), geriatrics (174), ENT clinic (131) and orthopedics (89 patients) in a medium-large hospital were screened for the presence of dizziness. Exclusion criteria were immobility, dementia and a recent diagnosis or treatment for BPPV. Patients were asked whether they had recently (past 3 months) experienced dizziness, and if so, whether the dizziness occurred at bending over, looking up, lying down or rolling over in bed. If one or more of these four questions were answered affirmatively, the patient was informed about the study and if he wished to participate, he was referred to the dizziness clinic.

If patients gave written informed consent, they were asked to complete the dizziness handicap inventory (DHI) [12] and the SF-36 [13]. The former is a validated questionnaire assessing the effect of dizziness on daily functioning. It comprises 25 items and has a score range of 0–100 points, with higher scores indicating more dizziness-related impairment. The latter is a widely used generic health-related quality of life instrument; it comprises 36 items and also gives a score ranging from 0 to 100 for eight domains (physical functioning, physical role functioning, bodily pain, social role functioning, mental health, emotional role functioning, vitality, general health perceptions). Higher scores on this questionnaire indicate a better quality of life. All dizzy patients were asked to complete the DHI and SF36 at baseline, and during follow-up (3 and 6 months after treatment).

All referred patients underwent the diagnostic Dix Hallpike maneuver or the supine roll test to assess the presence of BPPV: if the results from the Dix Hallpike test were positive (both vertigo and rotatory, up-beat nystagmus), the patient was diagnosed as having typical posterior canal (p-)BPPV; if the supine roll test was positive, the diagnosis horizontal canal (h-)BPPV was confirmed.

Patients with p-BPPV were treated with the Epley maneuver (canalith repositioning maneuver); patients with h-BPPV were treated with the Gufoni maneuver. If symptoms persisted after treatment, the patient was invited to return to the clinic and the therapeutic maneuver was applied again.

The institutional medical ethics committee approved the study.

Statistical analysis

We used descriptive statistics for the prevalence of BPPV, baseline and follow-up DHI scores and SF36 scores. We tested the difference in age between participating patients and non-participating patients with the student's t test. Differences between BPPV positive and negative patients at baseline were tested with Fisher's exact test for nominal variables (sex), and the Mann–Whitney U test for non-parametric continuous variables (DHI and SF36 scores). Changes in questionnaire scores between baseline and follow-up within BPPV patients were tested with the Wilcoxon's signed rank test. To adjust for multiple testing, a p value <0.01 was considered statistically significant. SPSS version 19.0 was used for all analyses.

Results

Mean age of all 989 patients was 79 years (SD: 5 years) and 575 were female (58 %). About one quarter ($n = 226$, 23 %) indicated to suffer from dizziness, among whom 101 were suspected of having BPPV based on the type and occurrence of dizziness, and were invited for the diagnostic workup [mean age 79, SD: 5 years, 71 % female ($n = 72$)] (Table 1).

More than half ($n = 56$) of these patients refused further workup for various reasons (Fig. 1): 27 patients refused because of other medical problems or personal circumstances, 10 were not willing to participate, 4 patients indicated that they no longer suffered from dizziness, and for the 10 remaining patients, the reason for not participating was unknown. Patients who refused were on average just as old as patients who participated (both 79 years old, SD: 5.3 and 4.5 years, respectively, $p = 0.93$).

Forty-five patients wished to be further assessed with the Dix Hallpike maneuver [29 females (64 %)]. Thirty-two had a suspicion of BPPV, based on the typical symptoms, but were negative on the Dix Hallpike maneuver, and 13 were positive for p-BPPV. None were positive for h-BPPV. Four of the 32 negative patients, however, indicated to suffer from persisting symptoms at follow-up and returned to the clinic for a re-evaluation. Of these patients, one had a positive Dix Hallpike at the

Table 1 Baseline characteristics of patients with BPPV and without BPPV

	BPPV positive (n = 14)	BPPV negative (n = 31)	p value
Female (%)	10 (72 %)	19 (61 %)	0.74
Age [mean (SD)]	79.6 (4.2)	78.8 (4.7)	0.59
Baseline DHI (median, range)	40 (4–66)	38 (6–80)	0.85
SF36 domain: general health perception	55 (15–82)	45 (10–87)	0.11
Physical functioning	53 (0–95)	50 (0–85)	0.64
Physical role functioning	0 (0–100)	0 (0–100)	0.71
Bodily pain	51 (21–100)	42 (21–100)	0.54
Social functioning	69 (0–100)	63 (0–100)	0.69
Mental health	70 (16–100)	72 (8–100)	1.0
Emotional role functioning	50 (0–100)	33 (0–100)	0.40
Vitality	50 (5–85)	50 (0–95)	0.90

Medians and ranges are presented

SD standard deviation, BPPV benign paroxysmal positional vertigo, DHI Dizziness Handicap Inventory, SF36 Short Form 36, health-related quality of life questionnaire

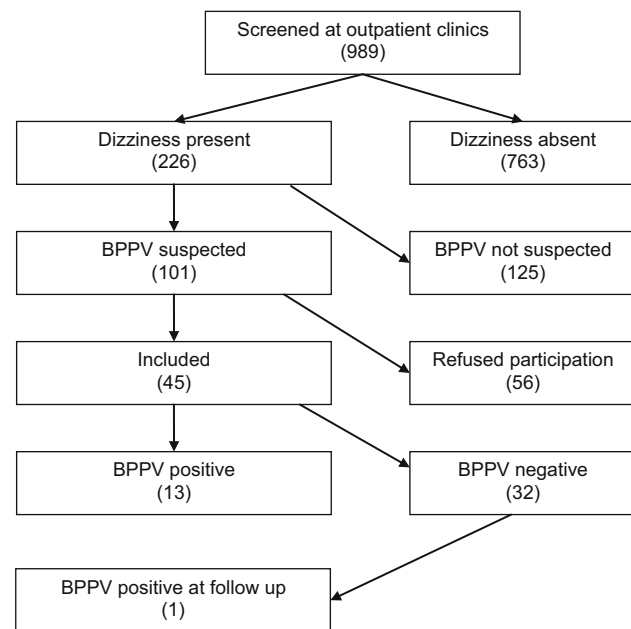


Fig. 1 Flow chart of the study

second evaluation and was subsequently treated. This resulted in a total of 14 positive BPPV patients [mean age 80, SD: 4 years; 10 female (72 %)].

Baseline median DHI of dizzy patients without BPPV was 38 (range 6–80), and the median DHI of BPPV patients was comparable (40, range 4–66, $p = 0.85$). SF36 scores did not differ between the groups (Table 1).

All patients recovered from their symptoms after the Epley maneuver. After 3 months, the DHI of the 14 BPPV patients had decreased from 38 to 6 (range 0–26, $p = 0.001$). The median DHI score of the BPPV positive patients after 6 months follow-up was 13 (range 0–33, $p = 0.002$).

There were no differences between baseline and follow-up SF36 domain scores, neither within nor between BPPV and non-BPPV patients.

Discussion

This study confirms that dizziness is a common complaint in the older population. We found that 23 % of the older patients who had been referred to an outpatient clinic for other primary reasons than dizziness, suffered from dizziness. In 10 % of these older patients, the dizziness occurred with changes in head position (positional vertigo). However, we confirmed the presence of BPPV in only 1.4 %.

The numbers in the literature on the prevalence of dizziness and BPPV in the older patient vary quite a lot. Compared with the studies of Oghalai et al. [4] and Kollen et al. [11], our prevalence of dizzy patients is somewhat lower, but the populations are quite different and the study methods vary as well. Kollen et al. [11] found a nystagmus in only one third of the patients in whom the side-lying test was positive; in our study, all patients with a positive Dix Hallpike maneuver also had a nystagmus. Oghalai et al. [4] studied a poor, inner city minority sample of patients visiting the geriatric outpatient clinic, and found 9 % to suffer from BPPV. Our population was older on average, and consisted of mainly white patients, although we did not assess the ethnicity.

Although in our study, 10 % reported to suffer from the typical complaints that accompany BPPV, we found a prevalence of true BPPV of only 1.4 %, while we had hypothesized this prevalence to be 9–11 %. Several explanations for this lower rate can be considered. Firstly, more than 50 % of patients who had complaints of positional vertigo were not willing to have their dizziness further evaluated, because of existing comorbidity, personal circumstances or lack of seriousness of complaints. Oghalai et al. [4] and Kollen et al. [11] tested all dizzy patients without giving them the option not to participate. It is difficult to hypothesize what the effect of this selection has been on the outcome. A second explanation could be that in patients with a typical 3-month history but negative Dix Hallpike the BPPV had resolved spontaneously within these 3 months or was not active at the time. The two previously mentioned studies asked for current dizziness as

opposed to our 3-month interval. This seems to be the most plausible explanation, since BPPV often manifests itself with symptomatic episodes lasting from days to months, which are interspersed by asymptomatic intervals [14]. Theoretically, the positional vertigo experienced by our patients could also be of central origin ('central positional vertigo'), due to a lesion of vestibular nuclei or caudal cerebellum, which is not detected with the Dix Hallpike maneuver. However, it is unlikely that many of our patients had central pathology, because it is known that this is very rare (accounting for fewer than 5 % of the patients presenting with positional vertigo) [14].

First choice of treatment for BPPV, according to the clinical guideline is the Epley maneuver which was successful in all of our 14 BPPV patients: the DHI improved significantly and the Dix Hallpike maneuver was negative after treatment [10]. However, no effect on the generic HRQoL, measured with the SF-36, was observed. This is a common phenomenon, relating to the generic nature of the questionnaire, which does not pick up small but relevant disease-specific changes [15].

Limitations of our study were that we focussed on dizziness more than balance disturbance in our questionnaire. Therefore, we may have missed patients with BPPV who presented with balance disturbances only. We have limited the test to patients with a suspect history for BPPV, and thereby, we may have missed patients with a more unspecific history. Secondly, the inclusion rate for the diagnostic test was low, which could have introduced a selection bias.

In conclusion, the prevalence of hidden/unrecognized BPPV in our population of older patients is low. Comparisons with other prevalence studies are hampered by the differences in case mix and study methods. The meaning of a typical history but a negative Dix Hallpike test is at present unclear but because dizziness increases the risk of falling and loss of quality of life, this topic deserves more research. In every contact with older patients, complaints of dizziness should be actively asked for and thorough follow-up is indicated to assess a relatively easily treatable condition such as BPPV.

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