

The Characteristic Differences of Benign Paroxysmal Positional Vertigo among the Elderly and the Younger Patients: A 10-Year Retrospective Review

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Objective: To compare the clinical characteristics of benign paroxysmal positional vertigo (BPPV) between the elderly and the younger patients.

Material and Method: The medical records of BPPV patients with positive testing result on the Dix-Hallpike or supine roll test between January 2002 and December 2012 at Songklanagarind hospital, Thailand were retrospectively reviewed.

Results: Of the 951 BPPV patients, 595 patients were in the younger group (age ≤ 60 -year-old, mean age = 46.9 ± 8.9 years) and 356 patients were in the elderly group (age > 60 -year-old, mean age = 69.3 ± 6.7 years). The most common etiology of BPPV was idiopathic. No significant difference was found regarding gender and semicircular canals that were involved in both groups. The most involved semicircular canal was the posterior canal. The most common described symptom of BPPV was vertigo. Patients in the elderly group were less likely to describe vertigo as the presenting symptom of BPPV compared to those in the younger group (OR = 0.22; 95% CI, 0.12-0.41; $p < 0.001$). The elderly group usually complained of imbalance and dizziness (OR = 15.83; 95% CI, 8.7-28.8; $p < 0.001$ and OR = 10.12; 95% CI, 5.23-19.59; $p < 0.001$, respectively). The duration of the symptom before diagnosis was longer in the elderly, when compared to the younger group (30 days, median; IQR = 7, 61 versus 5 days, median; IQR = 2, 7), respectively ($p < 0.001$). The ability to describe the trigger event precisely was less in the elderly group (63.8% versus 82.2%, $p < 0.001$). The elderly group significantly underwent brain imaging studies more than the younger group (8.4% versus 3.5%, $p = 0.02$). Outcome of the treatment after the repositioning procedure was comparable in both groups ($p = 0.58$). Approximately 80% of patients in both groups had complete recovery from BPPV during their last visit.

Conclusion: Dizziness and imbalance were the common presenting symptoms of BPPV in the elderly. The younger patients tended to describe the classic symptom of vertigo that was specific to BPPV more precisely than the elderly. These may contribute to underestimate BPPV, do unnecessary brain imaging study, and take more time to get the correct diagnosis of BPPV among elderly patients.

Keywords: Benign paroxysmal positional vertigo, BPPV, Elderly, Vertigo, Dizziness

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Dizziness is a frequent complaint in the older population and has multifactorial causes. Symptoms of dizziness may reduce quality of life, restrict daily activities, and increase the risk of falls and fractures⁽¹⁾. The one treatable cause and favorable prognosis of dizziness in the elderly is benign paroxysmal positional vertigo (BPPV). It is one of the most frequent causes of the peripheral vestibular disorders and the most common vestibular dizziness among the elderly⁽¹⁾. Symptoms of BPPV include a recurrence and brief duration of rotational vertigo induced by head position

changes. The diagnosis of BPPV is based on clinical presentation and confirmed by the present of nystagmus during the Dix-Hallpike or the supine roll test. Typical nystagmus is characterized by upbeating torsional or downbeating torsional or horizontal nystagmus depending on which semicircular canal was involved. The first-line treatment of BPPV is the repositioning maneuver^(2,3), which is simple and effective in curing BPPV⁽⁴⁾.

Although BPPV is easily treated, it seems to be an underestimated cause of dizziness among elderly patients⁽⁵⁾. Troubles in sorting through causes of dizziness in elderly patients are due to non-specific complaints and presenting history, co-morbid chronic medical illnesses, and increased medication usage⁽⁵⁾. Describing dizziness is usually difficult for patients

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and the cause of dizziness may be secondary to central causes, such as vascular events, tumor, and degenerative disease. Therefore, the physician undertakes an expensive testing regimen such as brain imaging studies and unnecessary vestibular testing rather than paying attention to the patients' complaint to make the correct diagnosis.

The purposes of the present study was to identify and compare the clinical characteristics of BPPV between the patients in the elderly group (age >60-year-old) and the younger group (age ≤60-year-old). Of particular interest, which characteristic are more specific to BPPV in the specific age group.

Material and Method

A retrospective comparative study was carried out at the otolaryngology clinic at Songklanagarind Hospital after approval from the Ethics Committee of Prince of Songkla University. The paper based as well as computer-based medical records were reviewed. For all subjects, the inclusion criteria were the diagnosis of BPPV between January 2002 and December 2012. The diagnosis was based on the history of vertigo, dizziness, or imbalance and was confirmed in all cases by the positive results of the Dix-Hallpike or the supine rolling test. Age, gender, the presenting symptoms such as dizziness, unsteadiness, vertigo, and position-related vertigo, the involved canal, side, etiology, the duration of symptom before the diagnosis, frequency of symptom,

precipitating factors, treatment outcome, recurrence rate, the number of repositioning maneuvers, and history of related neurological imaging were collected. Subjects who had any incomplete medical records were excluded.

Descriptive statistics were used to summarize patient demographics and characteristics. The continuous data was present in means and standard deviations. Categorical variables were analyzed using Pearson's Chi square test. Non-parametric data was analyzed using the Wilcoxon signed rank test. The presenting symptoms in both groups were analyzed for any association using the univariate logistic regression analysis. The analysis was performed with R Statistical Software (ver. 2.15.1; Foundation for Statistical Computing, Vienna, Austria). A *p*-value <0.05 was considered statistically significant.

Results

Of the 951 BPPV patients, 595 and 356 patients were in the younger group (age ≤60-year-old) and the elderly group (age >60-year-old), respectively. The mean age of patients in the younger group was 46.9±8.9 years, and 69.3±6.7 years in the elderly group. BPPV has been found to be more prevalent in females. The most common involved semicircular canal was the posterior canal. Between the groups, no significant differences were found regarding gender distribution, etiology, side, and involved canals. Results were summarized in Table 1.

Table 1. Demographic data of patients and clinical features of BPPV in elderly and younger patients

Characteristic	The younger group (age ≤60)	The elderly group (age >60)	<i>p</i> -value
Number of patient (%)	595	356	
Age, years ± SD (range)	46.9±8.9 (10-60)	69.3±6.7 (61-93)	
Male/female, n (%)	112 (18.8)/483 (81.2)	55 (15.4)/301 (84.6)	0.22 ^a
Etiology of BPPV, n (%)			0.75 ^a
Idiopathic	545 (91.6)	329 (92.4)	
Secondary	50 (8.4)	27 (7.6)	
The involved side(s), n (%)			0.48 ^a
Right	336 (56.5)	205 (57.6)	
Left	225 (37.8)	137 (38.5)	
Both sides	34 (5.7)	14 (3.9)	
The involved semicircular canal(s), n (%)			0.41 ^a
Anterior canal	1 (0.2)	1 (0.3)	
Posterior canal	542 (91.1)	334 (93.8)	
Lateral canal	30 (5.0)	13 (3.7)	
Multiple canals	22 (3.7)	8 (2.2)	

BPPV = benign paroxysmal positional vertigo; SD = standard deviation

^a Pearson Chi-square test

Table 2. The described symptoms at the presentation of BPPV in the elderly group when compared with the younger group

Symptoms	The younger group (age ≤60, n = 595)	The elderly group (age >60, n = 356)	Odds ratio (95% CI)	<i>p</i> -value ^a
Vertigo, n (%)	579 (97.3)	317 (89.0)	0.22 (0.12-0.41)	<0.001
Imbalance, n (%)	13 (2.2)	93 (26.1)	15.83 (8.70-28.80)	<0.001
Dizziness, n (%)	11 (1.8)	57 (16.0)	10.12 (5.23-19.59)	<0.001

BPPV = benign paroxysmal positional vertigo; 95% CI = 95% confidence interval

^a Logistic regression analysis

Table 2 demonstrated the symptoms at the presentation of BPPV in both groups. The most common described symptom of BPPV was vertigo (97.3% of the younger group and 89% of the elderly group). Patients in the elderly group were less likely to describe vertigo as the presenting symptom of BPPV compared with those in the younger group (odds ratio (OR) = 0.22; 95% CI, 0.12-0.41; $p < 0.001$). The elderly group usually complained of imbalance and dizziness more frequent than in the younger group (OR = 15.83; 95% CI, 8.7-28.8; $p < 0.001$ and OR = 10.12; 95% CI, 5.23-19.59; $p < 0.001$, respectively).

The duration of the symptom before having a diagnosis was longer in the elderly when compared to the younger group (30 days, median; interquartile range (IQR) = 7.61 versus 5 days, median; IQR = 2.7), respectively ($p < 0.001$). The proportions of patients that described the specific trigger event were less in the elderly group than the young group (63.8% versus 82.2%, $p < 0.001$). The most common position that induced symptom was rolling over by turning to the right. Regarding the investigation to differential diagnosis of the central nervous system that causes dizziness, we found the elderly group significantly underwent brain imaging studies more than the younger group (8.4% versus 3.5%, $p = 0.02$). At the last follow-up visit, 77.8% and 78.1% of patients in the younger and elderly group had a complete recovery from BPPV ($p = 0.12$). The number and outcome of the repositioning procedure, and the recurrence after the treatment during the last follow-up visit were comparable. The details were shown in Table 3.

Discussion

The prevalence of dizziness in the elderly patient was 36 to 60% in the primary care setting and was attributed to vestibular vertigo about 28%^(6,7). The prevalence of BPPV in the elderly older than 60 years was nearly seven times higher than in the age group of 18 to 39 years-old⁽⁸⁾. The cumulative incidence of

BPPV at the age of 80 years was 9%⁽⁸⁾. A prevalence of unrecognized BPPV in the elderly group was found in nearly 10%⁽⁷⁾. Non-recognition leads to the delay of treatment, and resulted in falls, geriatric depression, impact on psychological and social well-being, and significant medical costs^(7,9).

Although in general, positional vertigo is a term that is often used to describe feeling of BPPV symptoms, the describing symptoms in elderly patients are different. Herdman et al revealed the frequency of complaints in 100 patients with BPPV; 57% complained of poor balance, 53% was vertigo, difficulties with walking, lightheadedness, nausea, senses relating to tilt, spinning inside the head, sweating, sense of floating blurred vision, and jumping vision⁽¹⁰⁾. Previous studied showed that in the elderly patients who had multiple co-morbidities and more than one type of dizziness, were more likely to describe dizziness with postural change than vertigo. They were also having more history of falls⁽¹¹⁾.

In the present study, the authors also found that major complaints in the elderly were dizziness and imbalance. Reasons the BPPV was underestimated as a cause of dizziness and vertigo among the elderly may be due to the less classic description of BPPV symptoms and wide range of diseases that can be the cause of dizziness in the elderly⁽¹¹⁾. It was possible that the trouble in sorting through complaints of multiple symptoms the elderly patients often had, may be the reason the elderly patients had longer duration before diagnosis than the younger. Most of the younger patients in the present study were diagnosed within one week. The elderly, in contrast, took a month on average before having the diagnosis of BPPV.

The consequences of the delayed diagnosis of BPPV, regarding advanced age was the residual dizziness and high anxiety levels, after the repositioning maneuver was done⁽¹²⁾. Stamboliva et al demonstrated having a longer symptom duration before diagnosis could adversely affect the severity of postural instability after the repositioning maneuver examined

Table 3. Clinical characteristics, investigation, and treatment outcomes of patients with BPPV, in both groups

	The younger group (age ≤60, n = 595)	The elderly group (age >60, n = 356)	p-value
The duration of the symptom(s) at presentation, n (%)			<0.001 ^a
1 week or less	449 (75.5)	111 (31.2)	
>1 week to 2 weeks	54 (9.1)	36 (10.1)	
>2 weeks to 4 weeks	13 (2.2)	21 (5.9)	
>4 weeks	79 (13.3)	188 (52.8)	
Median duration of the symptom at presentation, days (IQR)	5 (2, 7)	30 (7, 61)	<0.001 ^a
Presence of trigger of the symptom(s), n (%)			<0.001 ^b
Related with head movement	104 (17.5)	128 (36.0)	
Specific position	489 (82.2)	227 (63.8)	
No trigger	2 (0.3)	1 (0.3)	
Position induced symptoms, n (%)			0.78 ^b
Rolling over (turning to the right)	219 (36.8)	127 (35.7)	0.02 ^b
Rolling over (turning to the left)	166 (27.9)	75 (21.1)	0.93 ^b
Lying down	113 (19.0)	66 (18.5)	0.40 ^b
Getting up	56 (9.6)	27 (7.6)	0.03 ^b
Bending over	37 (6.2)	10 (2.8)	
Brain imaging (CT or MRI), n (%)	21 (3.5)	30 (8.4)	0.02 ^b
Number of repositioning maneuvers, n (%)			0.12 ^b
1	489 (82.2)	279 (78.4)	
2	37 (6.2)	35 (9.8)	
>2	69 (11.6)	42 (11.8)	
Outcome after repositioning maneuver(s), n (%)			0.58 ^b
Non dizziness	523 (87.9)	318 (89.3)	
Residual dizziness	72 (12.1)	38 (10.7)	
Outcome of treatment at the last follow-up, n (%)			0.12 ^b
Complete recovery	463 (77.8)	278 (78.1)	
Recurrence	132 (22.2)	78 (21.9)	

BPPV = benign paroxysmal positional vertigo; IQR = inter quartile range; CT = computed tomography; MRI = magnetic resonance imaging

^a Wilcoxon signed rank test, ^b Pearson Chi-square test

by static posturography. Even though the repositioning maneuver eradicated vertigo and nystagmus, the postural instability did not disappear⁽¹³⁾.

Regarding the investigation, the authors found that the elderly group underwent brain imaging more frequently than the younger group. All imaging were unremarkable and none of these imaging were helpful in making a proper diagnosis. The unnecessary imaging study that usually underwent when the elderly were presented to the emergency unit and misdiagnosed as emergency cerebrovascular events due to advancing age, resulted in costly neurological imaging. Li et al suggested that the diagnosis by the Dix-Hallpike maneuver could help limit the high cost of unnecessary investigation in unrecognized BPPV⁽⁹⁾.

The simple and effective method to treat BPPV is the repositioning maneuver⁽²⁻⁴⁾. The maneuver

reduces postural instability and body oscillation⁽¹⁴⁾. Previous studies found that the impacted on health-related quality of life of BPPV could be significantly improved by the repositioning maneuver⁽¹⁵⁾. The effectiveness of the maneuver among the elderly BPPV patient was similar to the general population^(16,17). The authors had confirmed that after the repositioning maneuver, dizziness was resolved in 87.9% of the younger group and 89.3% of the elderly group. Complete recovery was maintained until the last follow-up visit in 77.8% and 78.1% of the younger and the elderly group, respectively. The number of repositioning maneuvers and recurrent rates between the elderly and the younger patients with BPPV were comparable. It is simple to diagnose BPPV by performing the Dix-Hallpike maneuver and takes little effort to treat it with the appropriate intervention.

Therefore, the authors encourage performing Dix-Hallpike test in all dizzy and unsteadiness elderly patients, to help diagnose and prevent delay of treatment. This will be benefit in the recognition and the management of BPPV in elderly patients, resulting in the improvement of the patients' quality of life.

The particular strength of the present study was large sample size. However, there were certain limitations. It was a retrospective review, the data were derived from a single tertiary referral center, and all patients in the study were Thai. The results might not be applied to other ethnic groups. Nevertheless, the present study provides a decade overview of clinical presentations and the long-term treatment outcomes of BPPV.

Conclusion

The less classical describing characteristics of BPPV in the elderly are dizziness and imbalance. These are different from the younger patients who presented with classical symptoms of BPPV. This could possibly be the cause of the underdiagnosis of BPPV, unnecessary brain imaging and the longer duration before diagnosed BPPV among elderly patients.

What is already known on this topic?

BPPV among elderly patients seems to be underestimated due to nonspecific complaints. Because describing dizziness is usually difficult for patients and the cause of dizziness may be secondary to central causes. This leads to the delay of treatment, and impact on quality of life.

What this study adds?

The authors have found that the elderly usually complained of imbalance and dizziness instead of vertigo. The less classical describing symptom causes an unnecessary imaging study and the delay of treatment of BPPV in the elderly. However, the results of treatment by the repositioning procedure were promising and comparable in the elderly and the younger patients.

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Potential conflicts of interest

None.

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ลักษณะที่แตกต่างของโรคเวียนศีรษะบ้านหมุนจากการเปลี่ยนท่าในผู้ป่วยสูงอายุและผู้ป่วยที่มีอายุน้อยกว่า: การศึกษาย้อนหลัง 10 ปี

ยุตติยา ปลอดภัย, วิราภรณ์ อัจฉริยะเสถียร, วันดี ไช่มุกด์

วัตถุประสงค์: เพื่อเปรียบเทียบลักษณะทางคลินิกของโรคเวียนศีรษะบ้านหมุนจากการเปลี่ยนท่าในผู้ป่วยสูงอายุ และผู้ป่วยที่มีอายุน้อยกว่า

วัสดุและวิธีการ: การศึกษาย้อนหลังทบทวนเวชระเบียน ผู้ป่วยเวียนศีรษะบ้านหมุนจากการเปลี่ยนท่าที่ให้ผลบวกจากการทดสอบ ดิกซ์ฮอลไปด์ หรือ ชูปไฟน์โรล ระหว่างเดือนมกราคม พ.ศ. 2546 ถึง เดือนธันวาคม พ.ศ. 2555 ที่โรงพยาบาลสงขลานครินทร์ ประเทศไทย

ผลการศึกษา: จากผู้ป่วยเวียนศีรษะบ้านหมุนจากการเปลี่ยนท่า 951 ราย มี 595 ราย อยู่ในกลุ่มที่มีอายุน้อยกว่า (อายุน้อยกว่า หรือเท่ากับ 60 ปี อายุเฉลี่ย 46.9±8.9 ปี) และ 356 ราย อยู่ในกลุ่มสูงอายุ (อายุมากกว่า 60 ปี อายุเฉลี่ย 69.3±6.7 ปี) สาเหตุส่วนใหญ่ของโรคเวียนศีรษะจากการเปลี่ยนท่าคือ ไม่ทราบสาเหตุ ไม่พบความแตกต่างอย่างมีนัยสำคัญระหว่างเพศและท้องถิ่นที่เกี่ยวข้อง ในทั้งสองกลุ่ม ท่อเซมิเซอร์คิวลาร์ที่เกี่ยวข้องมากที่สุดคือท่อด้านหลัง การบรรยายอาการของโรคเวียนศีรษะบ้านหมุนจากการเปลี่ยนท่าที่บ่อยที่สุดคือ เวียนศีรษะบ้านหมุน ผู้ป่วยในกลุ่มสูงอายุจะไม่ค่อยบรรยายว่ามีอาการเวียนศีรษะบ้านหมุนเป็นอาการนำของโรค เวียนศีรษะบ้านหมุนจากการเปลี่ยนท่าเมื่อเปรียบเทียบกับผู้ป่วยกลุ่มที่มีอายุน้อยกว่า (OR = 0.22; 95% CI, 0.12-0.41; p<0.001) ผู้สูงอายุมักบ่นถึงอาการเสีสมดุลหรือมีนศีรษะ (OR = 15.83; 95% CI, 8.7-28.8; p<0.001 และ OR = 10.12; 95% CI, 5.23-19.59; p<0.001 ตามลำดับ) ระยะเวลาของอาการก่อนได้รับการวินิจฉัยจะยาวนานกว่าในกลุ่มผู้สูงอายุเมื่อเทียบกับกลุ่มที่มีอายุน้อยกว่า (ค่ากลาง 30 วัน ค่าพิสัยระหว่างควอร์ไทล์ 7, 61 เปรียบเทียบกับ ค่ากลาง 5 วัน ค่าพิสัยระหว่างควอร์ไทล์ 2, 7 ตามลำดับ p<0.001) ความสามารถในการบรรยายเหตุกระตุ้นให้เกิดอาการในผู้สูงอายุน้อยกว่า (ร้อยละ 63.8 เปรียบเทียบกับ ร้อยละ 82.2 p<0.001) กลุ่มผู้สูงอายุถูกส่งถ่ายภาพสมองมากกว่าผู้ป่วยกลุ่มที่มีอายุน้อยกว่าอย่างมีนัยสำคัญ (ร้อยละ 8.4 เปรียบเทียบกับ ร้อยละ 3.5 p = 0.02) ผลการรักษาหลังกระบวนการกลับท่าสามารถเปรียบเทียบกันได้ทั้งสองกลุ่ม (p = 0.58) ประมาณร้อยละ 80 ของผู้ป่วยทั้งสองกลุ่มฟื้นกลับสนิทจากโรคเวียนศีรษะบ้านหมุนจากเปลี่ยนท่าเมื่อเข้ารับการตรวจครั้งสุดท้าย

สรุป: ภาวะมีนศีรษะและเสีสมดุลเป็นอาการแสดงที่พบบ่อยของโรคเวียนศีรษะบ้านหมุนจากการเปลี่ยนท่าในกลุ่มผู้สูงอายุ ผู้ป่วยที่มีอายุน้อยกว่ามีแนวโน้มจะบรรยายรูปแบบของอาการเวียนศีรษะบ้านหมุนซึ่งเป็นลักษณะจำเพาะต่อโรคเวียนศีรษะบ้านหมุนจากการเปลี่ยนท่าได้แม่นยำมากกว่าผู้สูงอายุ ซึ่งอาจมีส่วนให้โรคเวียนศีรษะบ้านหมุนจากการเปลี่ยนท่าในผู้ป่วยสูงอายุ มีการประมาณการที่ต่ำกว่าความเป็นจริง ได้รับการส่งถ่ายภาพสมองที่ไม่จำเป็น และทำให้ใช้เวลานานก่อนได้รับการวินิจฉัยโรคที่ถูกต้อง