Etiology of Vertigo in Thai Patients at Thammasat Hospital

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The purpose of this research is to study the causes of vertigo in the patients at Otoneurology Clinic, Thammasat Hospital. The data of these patients, collected from the medical records between January 2010 and January 2011, were reviewed and analyzed. From one hundred and forty-nine cases, 49 cases (33%) were men and 100 cases (67%) were women, which yielded the male-to-female ratio of 1:2. The average age of patients was 55 year olds. The most common diagnostic category was peripheral vestibular disorders (80.5%). Other causes were central vestibular disorders (4.7%) and non-vestibular related (4%), whereas the remaining (10.1%) was undiagnosed. The causes of vertigo included benign paroxysmal positional vertigo: BPPV (53%), Meniere's disease (10.1%) and recurrent vestibulopathy (8.1%), while the underlying diseases found were diabetes mellitus (11.4%), hypertension (32.2%) and dyslipidemia (34.2%). In Otoneurology Clinic, Thammasat Hospital, the peripheral vestibular disorders was the main etiology of vertigo, while the three most common causes were BPPV, Meniere's disease, and recurrent vestibulopathy respectively.

Keywords: *Vertigo, Vestibular disorder, Otoneurology clinic*

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Dizziness is a very common complaint in clinical practice. In the United Kingdom, 24.3% of the patients in general practice were presented with such a symptom[1]. Neuhauser[2] found that 4.9% of the dizziness in German people was due to vertigo *i.e.* vestibular dizziness. The vertiginous patients may have other associated symptoms such as hearing loss, tinnitus, and aural fullness. The etiology of the vertigo can be categorized into four groups; peripheral vertigo, central vertigo, psychogenic, and undiagnosed causes. Several researches were conducted to analyze the causes of the vertigo; however, only a few studies based on Thai patients were performed[3-7]. Therefore, the objective of this research is to study the causes, associated symptoms, and underlying diseases of the vertiginous patients at Thammasat hospital.

Material and Method

The medical records of vertiginous Thai patients presented at Otoneurology clinic, Thammasat Hospital, between January 2010 and January 2011 were retrospectively reviewed. Also the diagnosis, clinical manifestation, underlying disease, auditory test as well as vestibular test data were collected and studied. The statistical analysis was performed using the SPSS program. The Chi-square and Fisher's exact tests were applied to the outcome variables, while the p-value of < 0.05 was considered to be statistically significant.

The study protocol was approved by the Ethics Committee, Faculty of Medicine, Thammasat University, MTU-EC-OL-1-019/54. Date of approval: 17 March 2011.

Results

A total of one hundred and forty-nine patients were presented at Otoneurology clinic over the study period. Forty-nine cases (33%) were men and one hundred cases (67%) were women, which yielded the male-to-female ratio of 1:2. Patient ages ranged between 24 to 84 years while the average age of the patients was 55 years old. The distributions of age and sex are depicted in Fig. 1.

The majority of vertigo symptom resulted from the disorders of the vestibular system, while the most common diagnostic category was peripheral vestibular disorders (80.5%). Other causes were central vestibular

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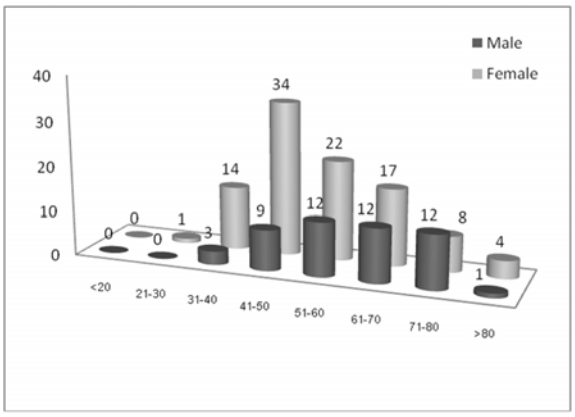

Fig. 1 Age and sex distributions

disorders (4.7%) and non-vestibular related (4%), whereas the remaining (10.1%) was undiagnosed. In the peripheral vestibular disorders case, the notable causes were benign paroxysmal positional vertigo: BPPV (53%), other peripheral vertigo (10.7%), Meniere' s disease (10.1%), recurrent vestibulopathy (8.1%), and sudden idiopathic hearing loss (2.7%) respectively. On the other hand, the central vestibular disorders were due to Migraine (2%) and cervical vertigo was frequently found in the other diagnosis category. The causative diseases of vertigo are shown in Table 1.

The distributions of gender and mean age of the vertiginous patients can be statistically analyzed as shown in Table 2.

The symptom, which 62.4% of the vertiginous patients described, was the dizziness only, while the additional hearing loss was accounted for 11.4% and the additional tinnitus of 2%. Finally, 24.2% of the total cases were presented with all three symptoms as presented in Fig. 2.

Audiometric tests were performed in all vertiginous patients suffering from hearing loss. In pure tone audiometry, the bilateral sensorineural hearing loss was detected in 33 patients (52.4%), whereas 19 patients (30.2%) were presented with unilateral sensorineural hearing loss. Auditory brainstem response (ABR) showed normal in 18 patients (81.8%) and abnormal in 4 patients (18.2%). Finally, Videonystagmo-graphy with caloric test showed normal results in 7 patients (36.8%) and abnormality in 12 patients (63.2%).

The underlying diseases found in the vertiginous patients were diabetes mellitus (11.4%), hypertension (32.2%), dyslipidemia (34.2%), coronary artery disease (2%), gout (2%) and other diseases (8.1%). The distribution of the common underlying

Table 1. The causative diseases of vertigo

Causes	n (%)
Peripheral vertigo	120 (80.5)
BPPV	79 (53.0)
Meniere's disease	15 (10.1)
Recurrent vestibulopathy	12 (8.1)
Sudden idiopathic hearing loss	4 (2.7)
Vestibular neuritis	3 (2.0)
Bilateral vestibular loss	3 (2.0)
Otosyphilis	2 (1.3)
Vestibular schwannoma	1 (0.7)
Congenital inner ear anomaly	1 (0.7)
Central Vertigo	7 (4.7)
Migraine	3 (2.0)
Brain tumor	1 (0.7)
Multiple system atrophy	1 (0.7)
Brain atrophy	1 (0.7)
Cerebellar compression by large vertebral a.	1 (0.7)
Psychogenic	0 (0)
Other diagnosis	6 (4.0)
Cervical vertigo	4 (2.7)
Postural hypotension	1 (0.7)
Dilantin overdose	1 (0.7)
Undiagnosed	16 (10.7)
Other peripheral vertigo	16 (10.7)
Other central vertigo	0 (0)
Total	149 (100)

diseases, for vertigo diagnoses, in the present study is depicted in Table 3.

Discussion

From the collected data, the age of the patients presented with vertigo was in the range of 41 to 50 years old. The vestibular disorders cases in children were considered uncommon, and a few studies[4,7] reported BPPV of childhood between 0.2% and 0.7% of the total cases. The majority of the patient in Otoneurology Clinic had peripheral vestibular disorders in which the causes were identified for 120 cases (80.5%) and 16 cases (10.7%) were undiagnosed. In the identified peripheral vestibular disorders cases, the results of 60-72.8% were concluded in the other studies conducted on Thai patients[4-7]. On the other hand, similar studies performed in other countries showed results variation of 40-88.5%[8-10].

Chronic illnesses, *e.g.* diabetes mellitus (DM), hypertension and dyslipidemia, can influence the vestibular disorders. The relationship between common vertigo diagnoses and the above relevant chronic illnesses did not show statistical significance (p-value

Table 2. Common vertigo diagnoses and the distributions of gender and mean age

No.	Diagnosis	Male, n (%)	Female, n (%)	M:F	Mean age, years
1	BPPV	23 (46.9%)	56 (56.0%)	1:2.4	53.1
2	Other peripheral vertigo	7 (14.3%)	9 (9.0%)	1:1.3	60.0
3	Meniere's disease	3 (6.1%)	12 (12.0%)	1:4	55.3
4	Recurrent vestibulopathy	4 (8.2%)	8 (8.0%)	1:2	57.6
5	Sudden idiopathic hearing loss	2 (4.1%)	2 (2.0%)	1:1	63.2
6	Cervical vertigo	2 (4.1%)	2 (2.0%)	1:1	47.7
7	Vestibular neuritis	-	3 (3.0%)	-	54.8
8	Bilateral vestibular loss	2 (4.1%)	1 (1.0%)	1:0.5	60.4
9	Migraine	-	3 (3.0%)	-	43.0
10	Otosyphilis	2 (4.1%)	-	-	60.2

Table 3. Common vertigo diagnoses and the distribution of underlying diseases

No.	Diagnosis	DM, n (%)	HT, n (%)	DLP, n (%)
1	BPPV	7 (4.7%)	22 (14.8%)	24 (16.1%)
2	Other peripheral vertigo	3 (2.0%)	5 (3.4%)	6 (4.0%)
3	Meniere's disease	-	3 (2.0%)	5 (3.4%)
4	Recurrent vestibulopathy	4 (2.7%)	4 (2.7%)	6 (4.0%)
5	Sudden idiopathic hearing loss	1 (0.7%)	2 (1.3%)	2 (1.3%)
6	Cervical vertigo	-	2 (1.3%)	1 (0.7%)
7	Vestibular neuritis	-	3 (2.0%)	1 (0.7%)
8	Bilateral vestibular loss	-	2 (1.3%)	3 (2.0%)
9	Migraine	-	-	-
10	Otosyphilis	-	1 (0.7%)	-

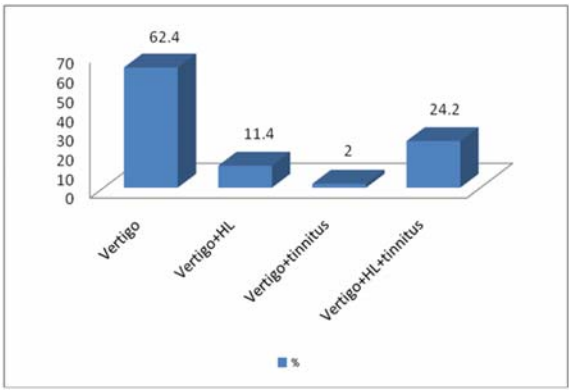

Fig. 2 Symptoms of vertiginous patients

> 0.05), similar to the present study performed in Nigeria[9]. Nonetheless, a few studies emphasized the association between the vestibular dysfunction and the chronic illnesses, such as DM, hypertension, and heart diseases[11-13]. Thai patient data collected by other vertigo researches[3-7] came from ENT clinics in the university hospital and the most common cause of vertigo was peripheral vestibular dysfunction. The etiologies of vertigo in the above researches are concluded as shown in Table 4.

The most common cause of peripheral vertigo was BPPV (53%). Other studies in the university hospitals in Thailand found similar results ranging between 22.1% and 52.5%[4-7] with an exception of Prasansuk (4.7%)[3]. The diagnosis of BPPV is performed by reviewing the patient's history and physical examination especially the positional nystagmus in Dix-Hallpike maneuver or supine roll test[14]. Meniere's disease was the second most common peripheral vestibular dysfunction and accounted 10.1% of the total cases. The similar result was also presented in the previous studies[5-7]. The American Academy of Otolaryngology-Head and Neck Surgery published the diagnostic guidelines for Meniere's disease[15]; however, the vestibular test results were not included in such guidelines and their

Table 4. Etiologies of vertigo in Thai patients

Diagnosis	This study (2011), n (%)	Isaradisaikul (2010)[7], n (%)	Bangpoophamorn (2007)[6], n (%)	Asawavichianginda (2007)[6], n (%)	Navacharoen (1995)[4], n (%)	Prasansuk 1986)[3], n (%)
Peripheral vertigo	120 (80.5)	398 (72.8)	523 (60.8)	465 (63.0)	271 (60.0)	54 (32.0)
BPPV	79 (53.0)	287 (52.5)	255 (29.7)	245 (33.2)	100 (22.1)	8 (4.7)
Meniere's disease	15 (10.1)	80 (14.6)	120 (14.0)	94 (12.7)	87 (19.2)	11 (6.5)
Sudden idiopathic hearing loss	4 (2.7)	16 (2.9)	41 (4.8)	8 (1.1)	44 (9.7)	4 (2.4)
Vestibular neuritis	3 (2.0)	1 (0.2)	14 (1.6)	8 (1.1)	9 (2.0)	-
Labyrinthitis	-	4 (0.7	6 (0.7)	-	4 (0.9)	-
Recurrent vestibulopathy	12 (8.1)	-	10 (1.2)	34 (4.6)	1 (0.2)	-
Bilateral vestibular loss	3 (2.0)	-	-	7 (0.9)	-	-
Otosyphilis	2 (1.3)	1 (0.2)	38 (4.4)	23 (3.1)	19 (4.2)	11 (6.5)
Vestibular schwannoma	1 (0.7)	2 (0.4)	3 (0.3)	14 (1.9)	2 (0.4)	9 (5.3)
Delayed endolymphatic hydrops	-	1 (0.2)	-	20 (2.7)	2 (0.4)	-
Ototoxicity	-	-	13 (1.5)	10 (1.4)	2 (0.4)	5 (3.0)
Positional alcohol vertigo	-	-	5 (0.6)	-	-	-
Temporal bone fracture	-	1 (0.2)	-	-	-	-
Labyrinthine concussion	-	-	7 (0.8)	-	-	6 (3.6)
Perilymph fistula	-	-	3 (0.3)	-	-	-
Otosclerosis	-	-	5 (0.6)	-	-	-
Ramsey Hunt syndrome	-	1 (0.2)	-	-	-	-
Facial nerve tumor	-	-	3 (0.3)	-	-	-
Otolithic dysfunction	-	-	-	2 (0.3)	-	-
Congenital inner ear anomaly	1 (0.7)	-	-	-	-	-
Benign paroxysmal vertigo of childhood	-	4 (0.7)	-	-	1 (0.2)	-
Central Vertigo	7 (4.7)	4 (0.7)	80 (9.3)	18 (2.4)	22 (4.9)	6 (3.6)
Migraine	3 (2.0)	-	15 (1.7)	-	3 (0.7)	-
Brain tumor	1 (0.7)	-	3 (0.3)	-	3 (0.7)	-
Cerebellar compression by large vertebral a.	1 (0.7)	-	-	-	-	-
Post-concussion syndrome	-	1 (0.2)	-	-	3 (0.7)	-
Epilepsy	-	1 (0.2)	3 (0.3)	-	3 (0.7)	-
Stroke	-	1 (0.2)	38 (4.4)	-	4 (0.9)	-
Vertebrobasilar insufficiency	-	-	10 (1.2)	-	1 (0.2)	-
AICA syndrome	-	-	2 (0.2)	-	-	-
PICA syndrome	-	-	2 (0.2)	-	-	-
Wallenberg's syndrome	-	-	1 (0.1)	-	2 (0.4)	-
Multiple sclerosis	-	-	-	-	1 (0.2)	-
Streptpcoccus suis meningitis	-	1 (0.2)	-	-	-	-
Encephalitis	-	-	-	-	1 (0.2)	-
Brain atrophy	1 (0.7)	-	-	-	1 (0.2)	-
Multiple system atrophy	1 (0.7)	-	-	-	-	-
Other brain lesion	-	-	6 (0.7)	-	-	-

Table 4. Cont.

Diagnosis	This study (2011), n (%)	Isaradisaikul (2010)[7], n (%)	Bangpoophamorn (2007)[6], n (%)	Asawavichianginda (2007)[6], n (%)	Navacharoen (1995)[4], n (%)	Prasansuk 1986)[3], n (%)
Psychogenic	-	1 (0.2)	20 (2.3)	19 (2.6)	1 (0.2)	-
Other diagnosis	6 (4.0)	1 (0.2)	33 (3.8)	3 (0.4)	3 (0.7)	26 (15.4)
Cervical vertigo	4 (2.7)	1 (0.2)	23 (2.7)	-	-	7 (4.1)
Postural hypotension	1 (0.7)	-	-	3 (0.4)	-	-
Dilantin overdose	1 (0.7)	-	-	-	-	-
Syncope & presyncope	-	-	5 (0.6)	-	-	-
Motion sickness	-	-	4 (0.5)	-	-	-
Glaucoma	-	-	1 (0.1)	-	-	-
Others	-	-	-	-	3 (0.7)	19 (11.2)
Undiagnosed	16 (10.7)	143 (26.1)	204 (23.7)	233 (31.6)	155 (34.3)	83 (49.1)
Other peripheral vertigo	16 (10.7)	122 (22.3)	160 (18.6)	45 (6.1)	-	-
Other central vertigo	-	1 (0.2)	-	-	-	-
Unclassify	-	20 (3.7)	44 (5.1)	188 (25.5)	155 (34.3)	83 (49.1)
Total	149 (100)	547 (100)	860 (100)	738 (100)	452 (100)	169 (100)

roles remained controversial. The caloric test abnormality was reported in up to 50% to 66% of the patients with the Meniere's disease[16]. In this research, Videonystagmography with the caloric test was also performed on four patients presenting with the above disease. The test results were normal for two patients and the unilateral canal weakness was found in the others. Recurrent vestibulopathy was the third most common cause found in this study (8.1%). The previous studies in Thailand[4-6] reported only 0.2 - 4.6% whereas in Nigeria[9] the same cause was found in 19.6% of the total cases. Leeuwen[17] followed 105 patients presented with the recurrent vestibulopathy for approximately 31 months. And it was found that the diagnosis was subsequently changed to migraine in 2% of the patients and to Meniere's disease in 1%. Therefore, a long-term follow-up of the patients may be required in order to diagnose the cause correctly.

Sudden idiopathic hearing loss was accounted for 2.7% which was similar to two previous studies[3,7]. Patients suffered from this disorder had accompanying vertigo in 30-60%[18,19]. The severity of the associated vertigo in general was rather subtle. At Thammasat hospital, the patient with sudden idiopathic hearing loss would be treated at general ENT clinic. If the clinical symptom was not improved, the patient would be referred to Otoneurology clinic. Two percents of the total diagnoses were vestibular neuritis, resembling other researches on Thai Patients[4-7]. Vestibular neuritis was accounted for 3-10% of the total cases in the specialized dizziness clinics. Due to the acute onset of severe vertigo, this condition was the most common dizziness diagnosis in general practice second to the BPPV[1]. Also according to the data, the all patients with the vestibular neuritis were female with the average age of 54 years old. This number is approximately the same as those in other common vestibular disorders found in the female case. Whereas a few studies showed that the vestibular neuritis was frequently presented in male patients with the age between 30 and 50 years old[20].

In the present study, central vestibular disorders were less common (4.7%) in Thai patients while other researchers reported 0.7-9.3%[3-7]. The patients suffered from the central vertigo were mainly treated in neurological clinic. Therefore, such a condition was frequently documented in the studies from neurological clinic[21] as well as combined otolaryngology and neurology multidisciplinary clinic[22]. There was no psychogenic cause of the vertigo; however, most studies in Thailand slight

variation of 0.2-2.6%[4-7]. Psychiatric conditions can be either primary causes of vertigo or comorbid disorders in complex tinnitus, sudden sensorineural hearing loss, and Meniere's syndrome[23]. In the patients with a long duration of dizziness and severe disability, the psychiatric disorders should be included in the differential diagnoses[24].

The percentages of the undiagnosed category, including other peripheral causes, were varied between 10.7% and 49.1% among the studies conducted in Thailand. The patient presented with the undiagnosed vertigo should be arranged for special investigations and a long-term follow-up of the patients may be required. The limitation the present study is the fact that it is performed in the retrospective way. Therefore, the collected data are incomplete and insufficient in some aspects. This issue would be corrected in the medical record system in the future.

Conclusion

In Otoneurology Clinic, Thammasat Hospital, the peripheral vestibular disorder was the main etiology of vertigo, while the three most common causes were BPPV, Meniere's disease, and recurrent vestibulopathy respectively.

Potential conflicts of interest

None.

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สาเหตุของอาการเวียนศีรษะในผู้ป่วยไทย ณ โรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติ

ปาริชาต บุณะสุวรรณ, สาครินทร์ บุญบรรเจิดสุข, อมรวรรณ นิลสุวรรณ

การศึกษานี้มีวัตถุประสงค์เพื่อศึกษาสาเหตุของผู้ป่วยเวียนศีรษะ ในคลินิกโสตประสาทวิทยา (Otoneurology Clinic) โรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติ โดยได้ทบทวนข้อมูลเวชระเบียนของผู้ป่วยเวียนศีรษะที่มารับการตรวจรักษาในคลินิกโสตประสาทวิทยา โรงพยาบาลธรรมศาสตร์เฉลิมพระเกียรติ ตั้งแต่ มกราคม พ.ศ. 2553 ถึง มกราคม พ.ศ. 2554

ผลการศึกษาพบว่าผู้ป่วยทั้งหมด 149 ราย เป็นเพศชาย 49 ราย (ร้อยละ 33) เพศหญิง 100 ราย (ร้อยละ 67) อัตราส่วนระหว่างเพศชายกับเพศหญิงเท่ากับ 1: 2 อายุเฉลี่ยประมาณ 55 ปี สาเหตุของอาการเวียนศีรษะที่พบบ่อยที่สุดคือ กลุ่มโรคระบบการทรงตัวส่วนปลาย (ร้อยละ 80.5) กลุ่มโรคระบบการทรงตัวส่วนกลางพบได้ร้อยละ 4.7 กลุ่มโรคที่ไม่ได้เกิดจากระบบการทรงตัวพบได้ร้อยละ 4 และกลุ่มโรคที่ไม่พบสาเหตุพบร้อยละ 10.7 โดยโรคที่พบบ่อย 3 อันดับแรก คือ โรคเวียนศีรษะจากการเปลี่ยนท่า (BPPV) พบร้อยละ53, โรคมีเนียร์ (Meniere's disease) พบร้อยละ10.1 และ โรค recurrent vestibulopathy พบร้อยละ8.1 ตามลำดับ โรคประจำตัวของผู้ป่วยที่พบบ่อย ได้แก่ โรคเบาหวาน พบร้อยละ 11.4, โรคความดันโลหิตสูง ร้อยละ 32.2 และโรคไขมันในเลือดผิดปกติ ร้อยละ 34.2 จากการศึกษา สรุปได้ว่า สาเหตุของอาการเวียนศีรษะที่พบบ่อยที่สุดคือกลุ่มโรคระบบการทรงตัวส่วนปลาย โดยโรคที่พบบ่อย 3 อันดับแรก คือโรคเวียนศีรษะจากการเปลี่ยนท่า (BPPV), โรคมีเนียร์ (Meniere's disease) และโรค recurrent vestibulopathy ตามลำดับ