INTERNATIONAL JOURNAL OF RESEARCH SCIENCE & MANAGEMENT

THE VASCULAR RISK FACTORS ON CENTRAL VERTIGO PATIENTS

Kiki Mohammad Iqbal
Lecturer in Neurology Department, Faculty of Medicine University of Sumatera Utara

DOI: https://doi.org/10.29121/ijrsm.v8.i5.2021.3

Keywords: Vascular risk factors, central vertigo, peripheral vertigo.

Abstract

Introduction: Vertigo is a balance disorder and the illusion of movement of the body or the environment. Vertigo can be classified as central and peripheral vertigo. It was found that patients with isolated vertigo with three or more risk factors have a higher risk to suffer from central vertigo. This study aims to see the number of vascular risk factors on central vertigo patients.

Method: This study is a descriptive study of a population of vertigo patients at Haji Adam Malik General Hospital Medan for the period January 2018 until December 2018. Sampling method used was total sampling and data used are secondary data from medical records. The complete set of data consists of age, gender, hypertension, diabetes mellitus, history of cardiovascular disease (CVD) and smoking.

Result: There were 55 vertigo patients and 34.5% suffered from central vertigo. It was found a frequency distribution of the number of vascular risk factors (≥3) that is more and more significant in patients with central vertigo than peripheral vertigo. It was found a frequency distribution of male gender risk factors, hypertension, a history of CVD and smoking which was more and more significant in patients with central vertigo than peripheral vertigo.

Conclusion: There was a significant relationship between the number of vascular risk factors and incidence of central vertigo.

Introduction

Vertigo is a balance disorder and the illusion of movement of the body or the environment. It may be associated with other symptoms, such as impulsion (a sensation that the body is being hurled or pulled in space), oscillopsia (visual illusion of moving back and forth), nausea, vomiting or gait ataxia. Vertigo can be classified as two types, which are central vertigo and peripheral vertigo. Peripheral vertigo is caused by peripheral vestibular lesions which affect the labyrinth of the inner ear or the vestibular division of the vestibulocochlear (VIII) nerve. Central vertigo origin usually results from lesions that affect the brainstem vestibular nuclei or their connections; rarely, vertigo can be produced by a cerebral cortical lesion.[1]

Vascular risk factors increase the formation of atheromatous plaque within the intimal layer of arteries. This may lead to chronic or acute end-organ ischemia. Nonmodifiable vascular risk factors are age, gender, and ethnicity, while modifiable vascular risk factors consist of hypertension, diabetes mellitus, atrial fibrillation, smoking and lipid metabolism disorder.[2]

Isolated vertigo can arise because of a posterior circulation infarction, transient ischemic attack of the vertebrobasilar system, and other medical causes.[3] Another study conducted by Wada et al (2015), which is an observational study about the incidence of dizziness and vertigo in patients at a Japanese primary care clinic with diseases attributed to lifestyle habits. It was found that the incidence of dizziness/vertigo is higher than what was most commonly observed in the general population. From 393 participants, 12,7% have diabetes mellitus, 82,4% have hypertension and 92,6% have dyslipidemia.[4] Another study conducted by Wang et al (2018) observed patients with central or peripheral vertigo retrospectively. Medical conditions of the patients were also recorded, including smoking history, hypertension, diabetes, cardiovascular disease and stroke history. It was found that patients with isolated vertigo with 3 or more of those risk factors have a higher risk to suffer from central vertigo.[5]

The purpose of this study is to see the number of vascular risk factors on central vertigo patients.

Method

This research is a descriptive study of a population of vertigo patients at Haji Adam Malik General Hospital (RSUP HAM) Medan for the period January 2018 until December 2018. Sampling method used was total

sampling and data used are secondary data from medical records. The complete set of data which consists of age, gender, hypertension, diabetes mellitus, history of cardiovascular disease and smoking.

Age was limited to 60 years, because age older than 60 is considered to be a vascular risk factor. Gender consists of male and female, with male being the vascular risk factor. Hypertension is defined as high blood pressure in which systolic blood pressure ≥ 140 and diastolic blood pressure ≥ 90.[6] Diabetes mellitus is defined as a group of metabolic disorders characterized by hyperglycemia which is fasting glucose level ≥ 126 mg/dL, 2 hour PP glucose level ≥ 200 mg/dL or plasma glucose level ≥ 200 mg/dL.[7] History of cardiovascular disease is defined as cardiovascular disease suffered by the patient before (coronary heart disease, peripheral vascular disease, congestive heart failure, atrial fibrillation). Smoking is defined as history of patient smoking where the patient is still actively smoking 1-4 cigarettes a day.

Result

Table 1 Characteristics of patients (n=55)

Data	Percentage (%)
Age	
<60 years	76,4
≥60 years	23,6
Gender	
Male	41,8
Female	58,2
Hypertension	
Yes	49,1
No	50,9
Diabetes Mellitus	
Yes	14,5
No	85,5
Cardiovascular Disease	
Yes	56,4
No	43,6
Smoking	
Yes	38,2
No	61,8
Vertigo	
Central Vertigo	34,5
Peripheral Vertigo	65,5

Table 2 The number of Vascular Risk Factors on Central or Peripheral Vertigo patients

	Central Vertigo (n=19)	Peripheral Vertigo (n=36)	***p value***
Number of Vascular Risk Factors (≥3)	16	7	<0,001
Age (≥60)	7	6	0,094
Male	13	10	0,004
Hypertension	15	12	0,001
DM	5	3	0,072
Cardiovascular Disease	17	14	<0,001
Smoking	14	7	<0,001

INTERNATIONAL JOURNAL OF RESEARCH SCIENCE & MANAGEMENT

Discussion

The number of patients were 55 people. Table 1 shows that most patients are younger than 60 years of age (76,4%), are female (58,2%), don't suffer from hypertension (50,9%), don't suffer diabetes mellitus (85,5%), have a history of cardiovascular disease (56,4%), don't smoke (61,8%) and suffer from peripheral vertigo (65,5%).

Table 2 shows that after the bivariate analysis between number of vascular risk factors and incidence of central or peripheral vertigo with Pearson's chi-square on a level of significance of 0,05, the p value is less than 0,001, which means that there is a significant relationship between the number of vascular risk factors and central or peripheral vertigo. This is consistent with a research conducted in Qinhuangdao University in 2018. The research shows that there is a significant relationship between patients with 3 or more vascular risk factors with the incidence of central or peripheral vertigo.[5] This is also consistent with another study by Lee, *et al* (2010) in which used data from 2004 to 2007 which comes from the National Health Insurance Research Database which was publicized by the National Health Research Institute in Taiwan. The results of the study shows that stroke risk is higher in vertigo patients with more than 3 vascular risk factors.[8]

Table 2 shows that after the bivariate analysis between age and incidence of central or peripheral vertigo with Pearson's chi-square on a level of significance of 0,05, the p value is 0,094, which is more than the level of significance (p>0,05) which means that there is no significant relationship between age and central or peripheral vertigo. This is consistent with a study by Zuo, *et al* (2018) in which found that there is no significant relationship between patients above the age of 55 with the incidence of central vertigo (p>0,05).[9] However, this result is not consistent with the study conducted by Wang, *et al* in which found that there is a significant relationship between patients above the age of 60 with the incidence of central or peripheral vertigo (p<0,05). This result could be caused by the small number of samples in this study above the age of 60.[5]

Table 2 shows that after the bivariate analysis between gender and incidence of central or peripheral vertigo with Pearson's chi-square on a level of significance of 0,05, the p value is 0,004, which is less than the level of significance (p<0,05), which means that there is a significant relationship between gender and central or peripheral vertigo. This is consistent with the study conducted by Wang, *et al* (2018) in which found that there is a significant relationship between gender and incidence of central or peripheral vertigo (p<0,05).[5] This is also consistent with another study by Lopes, *et al* (2013) in which 76,3% of subjects which suffer from vertigo are women and it is found that there is a significant relationship between gender and the incidence of vertigo (p<0,05).[10] However, this study is not consistent with the study conducted by Kurre, *et al* (*cit* Wada et al, 2017) in which it is found there is no significant relationship between gender and the incidence of vertigo in that study (p=0,494).[11]

Table 2 shows that after the bivariate analysis between hypertension and incidence of central or peripheral vertigo with Pearson's chi-square on a level of significance of 0,05, the p value is 0,001, which is less than the level of significance (p<0,05) which means that there is a significant relationship between hypertension and central or peripheral vertigo. This is consistent with the study conducted by Wang, *et al* (2018) in which patients with hypertension suffers more from central vertigo (68,3%) and patients without hypertension suffers more from peripheral vertigo (73,9%). It is also found that there is a significant relationship between hypertension and the incidence of central or peripheral vertigo (p<0,05).[5] This result is also consistent with the study conducted by Lopes, *et al* (2013) in which found that most of the patients suffering from dizziness also suffers from hypertension (67,7%).[10] The study also obtained a p value of 0,01, which means that there is a significant relationship between hypertension and dizziness in that study.

Table 2 shows that after the bivariate analysis between diabetes mellitus and incidence of central or peripheral vertigo with Pearson's chi-square on a level of significance of 0,05, the p value is 0,072, which is more than the level of significance (p>0,05) which means that there is no significant relationship between diabetes mellitus and central or peripheral vertigo. This is consistent with the study conducted by Zuo, *et al* (2018) in which found that there are more patients with diabetes mellitus who don't suffer from cerebral infarction.[9] However, the result of this study is not consistent with Wang, *et al* (2018) in which most patients with diabetes suffers from central vertigo (80%) and patients with no diabetes suffers form peripheral vertigo (62,7%).[5] The study also found that there is a significant difference between diabetes and incidence of central or peripheral vertigo (p<0,05). This result could be caused by a small sample of vertigo patients with diabetes.

INTERNATIONAL JOURNAL OF RESEARCH SCIENCE & MANAGEMENT

Table 2 shows that after the bivariate analysis between cardiovascular disease history and incidence of central or peripheral vertigo with Pearson's chi-square on a level of significance of 0,05, the p value is less than 0,001, which means that there is a significant relationship between cardiovascular disease history and central or peripheral vertigo. This is consistent with the study conducted by Wada, *et al* (2017) in which found that there is a significant relationship between carotid plaque with the incidence of vertigo (p=0,001).[11] This result is also consistent with the study conducted by Oron, *et al* (2017) in in which the study found that there is a significant relationship between a previous cerebrovascular accident (CVA) / transient ischemic attack (TIA) with the incidence of vertigo (p<0,001).[12] This result is not consistent with the study conducted by Wang, *et al* (2018) in which the majority of patients who suffer from central or peripheral vertigo don't have a previous cardiovascular disease history.[5] There was also no significant relationship between history of cardiovascular disease with the incidence of central of peripheral vertigo. However, the study also states that this could be cause by small sample size.

Table 2 shows that after the bivariate analysis between smoking and incidence of central or peripheral vertigo with Pearson's chi-square on a level of significance of 0,05, the p value is less than 0,001, which means that there is a significant relationship between smoking and central or peripheral vertigo. This result is consistent with the study conducted by Wang, *et al* (2018) in which patients who smoke suffers more from central vertigo than peripheral vertigo.[5] It is also found that there is a significant relationship between smoking and the incidence of central or peripheral vertigo. This result is also consistent with the study conducted by Wada, *et al* (2017) in which found that there is a significant relationship between smoking and new incidence of vertigo (p<0,05).[11]

Conclusion

There is a significant relationship between the number of vascular risk factors and incidence of central vertigo at Haji Adam Malik Central General Hospital, Medan.

References

[1] Aminoff JM, Greenberg DA and Simon RP. Disorders of Equillibrium. In : *Clinical Neurology*, 9th Ed. pp.184-216. United States of America: McGraw-Hill Education 2012

[2] Sahathevan R, Brodtmann A and Donnan GA. Dementia, stroke, and vascular risk factors; a review. *International Journal of Stroke* 2012; 7(1): 61–73

[3] Zhang DP, Lu GF, Zhang WS, Zhang JL, Ma QK and Yin S. Vertebral Artery Hypoplasia and Posterior Circulation Infarction in Patients with Isolated Vertigo with Stroke Risk Factors. *Journal of Stroke and Cerebrovascular Diseases* 2017; 26(2): 295–300

[4] Wada M, *et al.* Incidence of dizziness and vertigo in Japanese primary care clinic patients with lifestyle-related diseases: An observational study. *International Journal of General Medicine* 2015; 8; 149–154

[5] Wang Y, Liu J, Cui Z, Yan L and Si J. Analysis of Risk Factors in Patients with Peripheral Vertigo or Central Vertigo. *Neurologist* 2018; 23(3): 75–78

[6] Joint National Committee. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *NHLBI*, United States of America. 2004

[7] Perkumpulan Endokrinologi Indonesia, Konsensus Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 di Indonesia. PB. PERKENI, Indonesia. 2015

[8] Lee CC, Su YC, Ho HC, Hung SK, Lee MS, Chou P, *et al*. Risk of Stroke in Patients Hospitalized for Isolated Vertigo: A Four-Year Follow-Up Study. *Stroke* 2010; 42(1): 48–52

[9] Zuo L, Zhan Y, Liu F, Chen C, Xu L, Calic Z, *et al*. Clinical and laboratory factors related to acute isolated vertigo or dizziness and cerebral infarction. *Brain and Behavior* 2018; 8(9): 1-8

[10] Lopes AR, Moreira MD, Trelha CS, and De Moraes MLL. Association between complaints of dizziness and hypertension in non-institutionalized elders. *In. Arch Otorhinolaryngol* 2013; 1792); 157–162

[11] Wada M, Takeshima T, Nakamura Y and Nagasaka S. Association between smoking and the peripheral vestibular disorder : a retrospective cohort study. *Scientific Reports* 2017; 7(1): 1–8

[12] Oron Y, Shemesh S, Shushan S, Cinamon U, Goldfarb A, Dabby R, *et al*. Cardiovascular Risk Factors Among Patients With Vestibular Neuritis. *Annals of Otology, Rhinology & Laryngology*, 2017; 126(8): 1-8.