ORIGINAL RESEARCH PAPER

ENT

KEY WORDS: Vertigo, Dix Hall pike test, Nystagmus, Videonystagmography.

DIX HALLPIKE METHOD CLINICALLY VERSUS DIX HALLPIKE METHOD BY VIDEONYSTAGMOGRAPHY IN DIAGNOSIS OF THE PATIENTS WITH VERTIGO

Dr. Arup Senapati* Post Graduate Trainee, Department of ENT, Silchar Medical College and Hospital. *Corresponding Author

Dr. Shuklima Sengupta Post Graduate Trainee, Department of ENT, Silchar Medical College and Hospital

Dr. Abhinandan Bhattacharjee Associate Professor, Department of ENT, Silchar Medical College and Hospital

Dr. Smrity Rupa Borah Dutta Professor and Head of the Department, Department of ENT, Silchar Medical College and Hospital

ABSTRACT

Background: Vertigo is an illness that needs a multidisciplinary approach and is one of the most common primary problems, among the elderly. Symptoms and indications are sometimes imprecise, non-speci□c, and di**ff**icult to characterize but Patients may characterize their vertigo symptoms using phrases such as disequilibrium, unsteadiness, dizziness, and light headedness. Dix hallpike test is done for diagnosis of vertigo and Nystagmus is measured for both its latency and duration. Intense Vertigo, sometimes accompanied by nystagmus that begins after a brief lag, is a favourable response. Nystagmus, a type of involuntary eye movement, is also measured via a technique known as videonystagmography (VNG). The Aim here is to assess the role of Videonystagmography and Dix-Hallpike test in the diagnosis of patients with vertigo and do a comparative analysis. **Materials and Methods:** A Prospective Observational Study over a period of 1 year with inpatients and outpatients at ENT Department, SMCH. **Results:** The VNG was found to be more efficient than Dix-Hallpike clinical method for diagnosis of BPPV. **Conclusion:** The overall diagnostic accuracy is greatly improved by VNG based Dix-Hallpike test.

INTRODUCTION

Vertigo is an illness that needs a multidisciplinary approach; it presents a unique problem in medicine. Vertigo is one of the most common primary problems, particularly among the elderly 1. These core complaints usually cause doctors to feel nervous and disoriented due to the extensive range of potential di**ff**erential diagnoses 2. It is one of the most common presenting symptoms. Symptoms and indications are sometimes imprecise, non-speci□c, and di**ff**icult to characterize, posing a substantial challenge to the attending physician 1. Vertigo is the ninth most common clinical symptom, rising to third among those aged 65 to 75 and □rst among those over 75 2. Patients may characterize their vertigo symptoms using phrases such as disequilibrium, unsteadiness, dizziness, and light headedness. A seemingly in□nite number of illnesses can cause vertigo and disequilibrium symptoms [1].

The Dix-Hallpike test involves the examiner rotating the patient's head 45 degrees to one side while standing next to them. During the procedure, the patient's neck is stretched roughly 30 degrees from the supine ear-down position. Nystagmus does measure for both its latency and duration. Intense Vertigo, sometimes accompanied by nystagmus that begins after a brief lag, is a favourable response. The possible outcomes are bringing the patient progressively back to an upright position and watching for a reversal of nystagmus after perceived vertigo and Nystagmus resolution 3. The diagnosis further veri□ed if the Dix-Hallpike test repeats with a weary reaction.

Nystagmus, a type of involuntary eye movement, is measured via a technique known as videonystagmography (VNG) 4. Slow or quick, steady or jerky, these movements might be employed. To maintain your equilibrium, your brain communicates with various systems throughout your body 5. A condition known as nystagmus can cause your eyes to jerk from side to side, up and down, or both. When your eyes and the balance system in your inner ear send con□icting signals to your brain, you may experience dizziness 4. It's possible to momentarily experience nystagmus if you move your head in a specific way or stare at certain patterns.

A camera can record nystagmus using video to test the balance system. Balance systems in the inner ear are linked to muscles in the eye via neural connections. Computers and Frenzel's goggles can only detect minor eye jerks caused by a malfunction in the balance mechanism 5 this is where VNG is very helpful to detect nystagmus. The Dix Hallpike test and the Roll Over test can be used to keep tabs on it. During VNG the vestibular end organs, the central vestibulo-ocular system, and the oculomotor processes are all evaluated as part of the test [4].

In this study will compare Dix- Hallpike test with video nystagmography in diagnosis of vertigo.

AIMS & OBJECTIVES

To assess the role of Videonystagmography and Dix-Hallpike test clinically in the diagnosis of patients with vertigo and do a comparative analysis.

MATERIALS AND METHODS

Source of data: Outpatient and inpatient department of ENT, Silchar Medical College, and Hospital with complaints of vertigo and giddiness. 51 patients were taken for the study and evaluated within the study period.

Duration of study: One year
Period of study: 1st April 2021 to 31st March 2022
Type of Study: Prospective Observational Study.

Before starting the study ethical clearance was taken from the Institutional Ethical committee. A total of 51 patients were taken up for the study. Informed consent was taken from all the patients who were included in our study.

The selected patients were clinically evaluated from detailed

clinical history, thorough ENT evaluation, clinical vestibular tests, pure tone audiometry, and VNG test. Based on the clinical findings and test results, the diagnosis and cause of vertigo were ascertained. The clinical results of the Dix-Hallpike test and VNG Dix- Hallpike test were recorded and compared. Apart from the routine vestibular tests, radiological tests including CT scans, and MRI were also done as appropriate.

Inclusion Criteria

1) All patients with vertigo, giddiness, dizziness, or imbalance within the age group of 18 years to 75 years.
2) All vertigo patients with associated symptoms like hearing loss. aural fullness, tinnitus, and nausea/vomiting.

Exclusion criteria

1. Patients who are unable to see a target due to any physical problems.
2. Patients with Cervical spondylitis or neck disease with restricted neck movements.
3. All patients below 18 years.
4. Patients who were unable to comprehend and follow instructions.
5. Patients who were having fear of enclosed spaces or mental illness.

RESULTS AND OBSERVATIONS

Demographic Characteristics

Demographic Characteristics of the vertigo patients are presented in Table 1. Fifty-one vertigo patients were included in the present study. Among these patients, 32 (63%) were males and 19 (37%) were females. Occupation details of the patients are also presented in Table 1. Majority of the patients were Government employee (13.73%), businessman (13.73%), and daily wage worker (13.73%).

RESULTS AND OBSERVATIONS

Table 1: Demographic characteristics of the patients

Total patients (n)	51
Male patients (n, %)	32, 63%
Female patients (n. %)	19, 37%
Occupation	
Govt. employee (n, %)	9, 17.65%
Businessman (n, %)	7, 13.73%
Teacher (n, %)	4, 7.84%
Student (n. %)	5, 9.80%
Housewife (n, %)	13, 25.49%
Daily wage worker(n, %)	7, 13.73%
Health care professional (n, %)	1, 1.96%
Others (n, %)	5, 9.80%

Table 2: Age wise distribution of the patients

Age distribution (in years)	Number	Percentage
20-30	9	18 %
30-40	14	27 %
40-50	12	23 %
50-60	11	22 %
60-70	4	8 %
70-80	1	2 %

Patients included in the current study were >20 and <80 years of age. The Mean age of all the patients was 45 ± 1.8 years. Age wise percent distribution of the patients is presented in Table 2. As it is evident from Table 2 that majority of the patients were falling under the age group of 30 - 40 y (27%) followed by 40 – 50 year (23%), 50 – 60 year (22%), 20 – 30 year (18%), 60 – 70 year (8%), and 70 -80 year (2%). The youngest patient was of 21 years and the eldest patient was 71 years old.

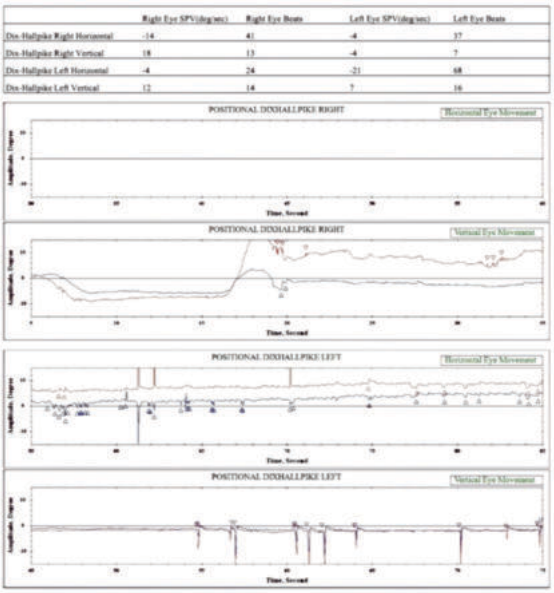
Distribution of presenting symptoms

The frequency of patients who reported vertigo on head positioning & movement was 49%. Hearing impairment was associated with 35% of the vertigo patients. Tinnitus was associated with 27% of the vertigo patients and aural fullness was found in 24% of the patients. Nausea/ vomiting were associated with 59% of the vertigo patients. Results showed that visual blurring was associated with 25% of the vertigo patients and headache was associated with 8% of the vertigo patients. None of the vertigo patients had ear discharge, history of drug use, family history, and neck pain/restriction. About 4% of vertigo patient complained of chest pain, palpitation, anxiety & hyperventilation. 2% of the vertigo patient reported double vision, dysphagia/dysarthria, and Limb weakness/ numbness as mentioned in Table 3.

Table 3: Table showing presenting symptoms in vertigo patients

Symptoms	YES	%	NO	%
Effect of head positioning and movement	25	49	26	51
Hearing impairment	18	35	33	65
Tinnitus	14	27	37	73
Aural fullness	12	24	39	76
Nausea/ vomiting	30	59	21	41
Visual Blurring	13	25	38	75
Headache	4	8	47	92
Chest pain, palpitation, anxiety, hyperventilation	2	4	48	94
Double vision	1	2	50	98
Dysphagia/Dysarthria	1	2	50	98
limb weakness/ numbness	1	2	50	98
Ear discharge	0	0	0	0
Drugs	0	0	0	0
Family history	0	0	0	0
Neck pain/restriction	0	0	0	0

Figure 1: Graph Showing positive Dix Hallpike test with Horizontal nystagmus by Videonystagmography.



On doing Clinical vestibular test : Dix-Hallpike test (clinically) 15 (29.41%) cases were positive and 36 (70.59%) were negative as shown in Table 4.

In the other hand on doing Dix-Hallpike test by VNG we found that in the case of Dix-Hallpike left, 1.96% and 23.53% of the patients showed torsional and up beating nystagmus respectively. While as in the case of Dix-Hallpike right, 3.92%

and 7.84% of the patients showed torsional and up beating nystagmus. So, 19 patients were positive I.e. 37.25% and 62.75% were negative as mentioned below in Table 4.

COMPARATIVE ANALYSIS OF CLINICAL VS VNG DIX HALLPIKE TEST AMONG BPPV PATIENTS

Table 4: Table showing the percentage of patients with BVVP as confirmed by Dix-Hallpike clinically and Dix-Hallpike on VNG. The results revealed that all the 25 patients with BVVP were diagnosed through Dix-Hallpike VNG, while as only 15 patients were confirmed through Dix- Hallpike clinically.

Tests/ Manoeuvre	Positive	Negative	Total
Dix-Hallpike clinically	15	10	25
Dix-Hallpike VNG	25	0	25
Total	40	10	50

Table 5: Table for chi-square test and comparative table showing Percentage of BPPV patients con□rmed by Dix-Hallpike clinically and Dix-Hallpike by VNG.

Tests/ Manoeuvre	Positive Total number of patients (%)	Negative Total number of patients (%)	P value
Dix Hallpike clinically	15, 60%	10, 40%	0.0004 Significantly high
Dix- Hallpike VNG	25, 100%	0, 0%	

The calculated chi-square value at 95% level of signi□cance for the above data is 12.500, and the P value is 0.0004, which signi□es that there is a high probability of any non-random association between the categories.

DISCUSSION

Altering one's head posture through repeated movements, as suggested by Brandt and Daroff, Semont's releasing technique, and Epley's canalicular repositioning, had shown symptom remission in posterior canal BPPV patients (85–95%). Our results revealed that 49% of the vertigo patients were associated with the effect of head positioning & movement. Recovery of symptoms may be attempted through head position exercises that target the central nervous system's processes for adaptation and compensation.

In the Dix-Hallpike test we found 1.96% and 23.53% of the patients with torsional and up beating nystagmus respectively. While as in the case of Dix- Hallpike right, 3.92% and 7.84% of the patients showed torsional and up beating nystagmus. Therefore, Anterior Canal BPPV appears to be rarer than reported in the literature, because we have diagnosed some cases as Apogeotropic Posterior Canal BPPV which otherwise may have been classi□ed as Anterior Canal BPPV. Vannucchi reported that the Apogeotropic Posterior Canal BPPV group showed the oculomotor pattern (Vannucchi et al., 2012)6.

In our study we compared the diagnosis of BPPV by clinical Dix-Hallpike test v/s Dix-Hallpike test done by VNG and we observed in our study that 25 patients with BVVP were diagnosed through Dix-Hallpike VNG which was 49% of the total study population and 15 (29.41%) patients were con□rmed through Dix- Hallpike clinically. Out of all BPPV patients all were diagnosed with VNG where else 60% of BPPV were con□rmed by Dix-Hallpike clinically.

The advantages of VNG over Dix-Hallpike clinically we found in our study -

1) VNG was found to be more efficient than Dix-Hallpike clinical method for diagnosis of BPPV.

2) Reports can be stored and used as documentation for future use.

The disadvantageous of VNG over Dix-Hallpike clinically we found in our study -

1) To perform the test, we need the whole setup like the VNG machine with with an extra room, we cannot perform the same in OPD like the clinical Dix-Hallpike test.
2) It is expensive for patients who belong to the lower economic class.

CONCLUSION

Careful history and clinical vestibular test provide crucial diagnostic information in the evaluation of vertigo. This results in a signi□cant increase in the "diagnostic accuracy" with a corresponding decrease in the days of hospital stay and several investigations. . This study showed that the overall diagnostic accuracy is greatly improved by Videonystagmography based Dix-Hallpike test. On comparing Dix-Hallpike VNG test versus Dix-Hallpike clinical test signified that there is a high probability of any non-random association between the categories with P value of 0.0004 which is highly significant. We suggest that general awareness and significance of the Dix Hallpike test in diagnosing cases of vertigo due to peripheral vestibular disorder could be increased at every level from primary health care to the hospital settings via ongoing seminars, training, etc.

REFERENCES

1. Staibano, P., Lelli, D. & Tse, D. A retrospective analysis of two tertiary care dizziness clinics: a multidisciplinary chronic dizziness clinic and an acute dizziness clinic. Journal of Otolaryngology-Head Neck Surgery 48, (2019) 1- 8.
2. Ten Voorde, M., Van Der Zaag-Loonen, H. & Van Leeuwen, R. Dizziness impairs health-related quality of life. Quality of Life Research 21, (2012)961- 966.
3. Hornibrook, J. Benign paroxysmal positional vertigo (BPPV): history, pathophysiology, office treatment and future directions. International journal of otolaryngology 2011, (2011).
4. Mekki, S.J.T.E.J.o.O. The role of videonystagmography (VNG) in assessment of dizzy patient. The Egyptian Journal of Otolaryngology 30, (2014)69-72.
5. Vivek, S. et al. Videonystagmography (VNG) Findings in Patients with Vestibular Migraine: A Hospital-Based Study. Indian Journal of Otolaryngology and Head & Neck Surgery, (2021) 1-8.
6. Vannucchi, P., Pecci, R. & Giannoni, B. Posterior semicircular canal benign paroxysmal positional vertigo presenting with torsional downbeating nystagmus: an apogeotropic variant. International Journal of Otolaryngology 2012, (2012).