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Shashank Nema
Department of ENT, Head & Neck Surgery, All India Institute of Medical Sciences (AIIMS), Raipur, Chhattisgarh, India

Rupa Meheta
Department of ENT, Head & Neck Surgery, All India Institute of Medical Sciences (AIIMS), Raipur, Chhattisgarh, India

Renu Rajguru
Department of ENT, Head & Neck Surgery, All India Institute of Medical Sciences (AIIMS), Raipur, Chhattisgarh, India

Correspondence Author:
Shashank Nema
Department of ENT, Head & Neck Surgery, All India Institute of Medical Sciences (AIIMS), Raipur, Chhattisgarh, India

From dizziness to diagnosis: Etiological spectrum and clinical profile of vertigo in a tertiary care hospital of central India

Shashank Nema, Rupa Meheta and Renu Rajguru

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Abstract
This study aimed to evaluate the etiology, clinical profile, morbidity, diagnosis, and management of vertigo among adult patients at a tertiary care teaching hospital of Central India. Fifty nine adult patients with average age of 45 years those who attended/referred Vertigo clinic during April 2024 to January 2025 were included in the study. The detailed etiology, clinical presentations, diagnostic methods, and treatment were assessed. Out of '59'patients, '34'of them i.e. (57.62%) have been diagnosed with significant differential vestibular and balance pathology, rest '25' (42.37%) of them had absolutely normal findings in Vestibular evaluation. The most common vestibular disorders were benign peripheral paroxysmal positional vertigo (BPPV) (64.7%), Vestibular migraine (8.82%) acute vestibular neuritis (8.82%). Hypertension was most common systemic disorder found to be associated in 46% vertigo patient whereas Diabetes mellitus was found in 36% patients suffering from vertigo. The study established Balance disorder as potential pathological burden in the society of Central India with lack of awareness about its assessment and management.

Keywords: Vertigo, dizziness, BPPV, vestibular disorder, epidemiology, central India

Introduction
Balance disorders are common and can occur in patients of all ages, constituting a significant personal and public healthcare burden. It is often reported that dizziness is the third most common complaint among outpatient medical visits [1] and the single most common complaint among elderly patients. Dizziness and balance disorders may result from abnormalities in a variety of organ systems including the vestibular system, central or peripheral nervous system, cardiovascular system, and cerebrovascular system. Additionally, medications taken by patients can contribute to symptoms of dizziness.

When a patient presents to the balance clinic, the primary goal of the healthcare provider is to investigate the symptoms and conduct evaluations to narrow the differential diagnosis. Although most patients with dizziness have a benign condition, a small percentage may have a potentially life-threatening underlying cause involving the brain, heart, or the circulation of blood necessitating more immediate medical management. In many cases the patient with an acute balance disorder will recover spontaneously requiring only short-term treatment for the symptoms. However, patients demonstrating more chronic symptoms may require significant intervention from healthcare providers to evaluate and manage the dizziness.

In the states of central India there is lack of well-established full-fledged lab for the extensive balance assessment also there is huge scarcity of professionals practicing particularly in the area of vestibular and balance disorder. We at All India Intitute of Medical Sciences (AIIMS), Raipur got our full-operational lab dedicated to extensive vestibular and balance evaluation in April 2021. Since then due to above mentioned scarcity AIIMS Raipur has become last and the only resort for the individuals with balance issues, patients not only from the native state of Chhattisgarh but also from the neighboring states like Madhya Pradesh, Oddisa, Jharkhand and Maharashtra are reporting on daily basis. The present study is aimed towards finding the potential burden and variety of balance disorders existing in this

region of India also this study will fulfill the need of a comprehensive literature which highlights the impact of Balance and vestibular disorder in the Indian society.

Materials and Methods

The study was conducted at ENT, Head and Neck surgery department of All India Institute of Medical Sciences Raipur, India from April 2024 to January 2025. All the patients those who have attended Vertigo clinic during aforesaid period were assessed using Neuroequilibrium TM assessment platform.

Inclusion criteria

All the patients above age of 18 years and having any sort of balance & vestibular symptoms like Vertigo, dizziness, light headedness, spinning sensation, oscillopsia, motion sickness, falling, unconsciousness swaying, were included in the study. Average age of participants in the study was 45 years.

Procedure

Detailed history was taken about patient's auditory-vestibular symptoms like dizziness, nausea, lightheadedness, demographic data, frequency, duration and type of vertigo using Self-assessment questionnaire and personnel interview.

Tests administered

HINTS+ paradigm: Battery of test which includes Head impulse test, Spontaneous nystagmus test, test of skew and audiological evaluation was administered uniformly on all the patients. This battery helped us in the differential diagnosis of Central versus Peripheral vertigo. Presence or absence of hearing loss also has key role in differentiating conditions like Vestibular Neuritis Versus Labyrinthitis and AICA stroke versus PICA stroke.

VNG battery

Different tests from this battery was used as per their requirement to reach diagnostic conclusion. Positional tests like Dix hallpike, Supine roll, Deep head hanging, Bow & Lean test were used in the patients complaining positional vertigo which are short in duration and benign in nature. Central tests like Gaze test, Optokinetic test, and Smooth pursuit were administered on the patient having spontaneous nystagmus during visual fixation, in order to confirm central component. Caloric test was done for identifying the unilateral versus bilateral canal paresis.

Other tests

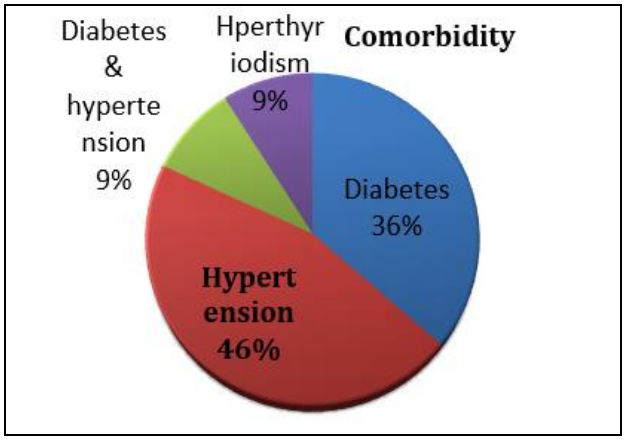
Tests like Computerized dynamic Posturography (CDP), DVA, and VOR were also used when the patients were showing overlapping symptoms. Blood pressure monitoring at three positions, 1) Supine 2) sitting erect 3) Standing was also done in some patients to rule out Postural hypotension.

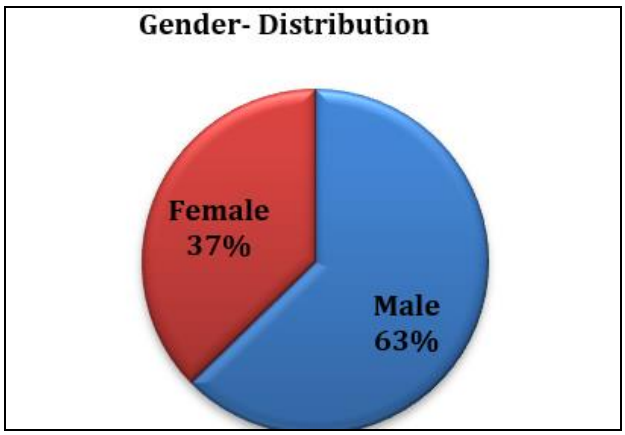
Referrals

Appropriate referrals were made to various other departments like Neurology, Ophthalmology, and Psychiatry etc when above mentioned test batteries yielded inconclusive results. Inferences were drawn from their findings like ophthalmological evaluation, neurological evaluation. Radiological evaluations like CT-Scan, MRI were also advised for the confirmation of disorders like Vertibro-basilar insufficiency (VBI), AICA, PICA strokes.

Results

A total of '59' patients have been assessed during April 2024 and January 2025 for this retrospective study, out of them '37' (62.7%) were male and '22' (37.2%) were female. Out of '59'patients, '34'of them i.e. (57.62%) have been diagnosed with significant differential vestibular and balance pathology, rest '25' (42.37%) of them had absolutely normal findings in Vestibular evaluation and were referred to significant departments for assessments like Ophthalmological evaluation, Neurological evaluation &Radiological evaluation like X-ray, CT-scan, MRI etc. '22' among all those who have been assessed were having co- morbid conditions like Diabetes, Hypertension and Hyperthyroidism

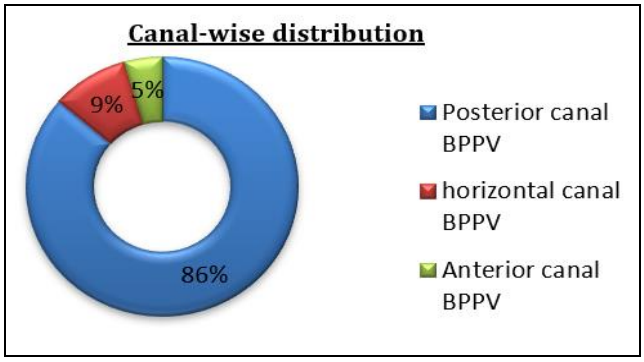




A wide variety of vestibular pathologies have been found which ranges from peripheral pathology like Benign paroxysmal positional vertigo (BPPV) to Central pathologies like Vestibular neuritis. Non-vestibular conditions causing balance issues like Postural hypotension, Visual defects, gastritis, anemia, etc were also got diagnosed with the help of concerned departments.

Benign paroxysmal positional vertigo (BPPV)

Among all '34' diagnosed cases maximum number 'of patients '22' (64.70%) were having BPPV of various semicircular canals. Posterior canal BPPV was most common and frequent finding i.e. '19' out of 22 patients (86.36%). Cases of Horizontal and Anterior canal BPPV were also reported respectively '2' (9.09%) and '1' (4.54%).

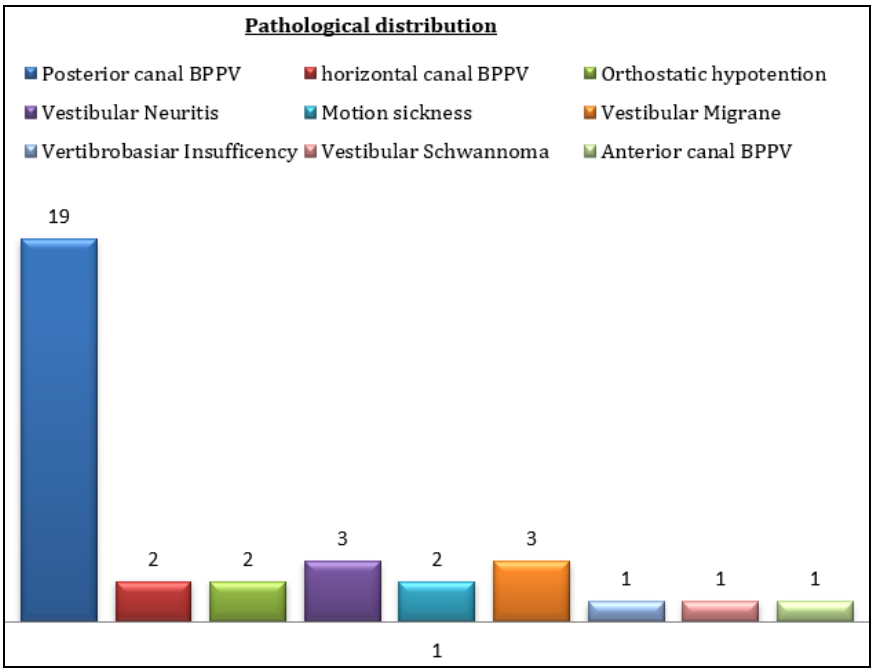


Other vestibular pathologies

In spite of the fact that major chunk of vestibular disorder was BPPV, other vestibular pathologies had also been reported. '3' cases each of Vestibular Neuritis and Vestibular migraine (8.82%) and '1 case of Vestibular Schwannoma (0.02%) were diagnosed. In the entire study no Bilateral vestibular disorder case was diagnosed, all the cases were unilateral with '16'of them having right side weakness while 11 of them having left side weakness.

Non-Vestibular disorders

In the present study there were '25' (42.37%) patients with normal vestibular functioning have been referred to various departments for different assessments as mentioned in the methodology. Few patients reported back to our department for follow-up but majority of them didn't turn up. Non vestibular pathologies like Postural/orthostatic hypotension 0.05% (2 cases), Motion sickness 5.88% (2 cases) and '1' case of Vertibrobasilar Insufficiency (2.94%) were also the part of Balance pathological diversity found in this study.



Discussion

The present study was aimed at finding the pathological burden of balance disorders among adult population of Central India. Wide variety of disorders was diagnosed raging from peripheral vestibular disorders like BPPV to Central vestibular disorders like vestibular neuritis. Non vestibular pathologies like Postural hypotension, Vertibrobasilar insufficiency were also found to have their significant share.

Benign paroxysmal positional vertigo (BPPV)

BPPV is the most common causes of vertigo [2] It causes brief episodes of mild to intense dizziness which usually gets triggered by specific changes in head or body positions. Maximum number of subjects assessed using Dix- Hallpike for this study has been diagnosed with BPPV i.e. 64.7% out of which 86.36% of patients were having BPPV of posterior semicircular canal. Posterior semicircular canal being the only one which is oriented towards the gravity (g) makes it more prone to receive otoconia particles from the adjacent canals due to the direction of flow of the endolymph during head movement. Horizontal and Anterior semicircular canal BPPV were found in very less number of cases 9.09% and 0.02% respectively. Our findings were consistent with the study of Ishiyama, Jacobson, and Baloh 2000 who reported predominant canal affected by BPPV is posterior SCC which accounts for 80-90% of all cases followed by10% horizontal SCC and anterior canal is involved in only 2% of the cases.

Previous studies reported BPPV to be more prevalent in females with the ratio of 2.6:1 [4], findings of current study contradict previous ones with BPPV reported to be more prevalent in Males with sex ratio of 1.3:1, this variation could be due to the difference in the sample size and needs to be reassessed in the further studies with comparatively higher sample size.

Epley's Maneuverer was administered on the entire patient those who were diagnosed with Posterior SCC BPPV. Out of '19' patients only '2' patients (10.52%) came back with the complaint of persisting vertigo which got resolved in the second session of Epley's Manoeuvre, rest of all patient's complaints got resolved after first session itself.

In the cases of Horizontal SCC BPPV firstly we had administered Barbeque-roll manoeuvre but it was found to be ineffective for all the cases. In the second visit of the subjects Guffoni maneuever was administered, post manoeuvring both the cases got relieved from the symptoms. Effectiveness of Barbeque-roll maneuever is

found to be questionable in this study which has to be verified with sizable data in the further studies.

In the entire duration of study we found only one case of Anterior SCC BPPV, which was treated using deep-head hanging manoeuvre, after the first administration of the manoeuvre, vertical nystagmus that was present during first session got replaced with torsional right beating nystagmus which suggests that the Otoconia which was present in the Anterior SCC has now flowed down to Posterior SCC and causing it's canalithiasis. Epley,s maneuever was finally administered on the patient after which patient got relieved from the vertigo.

Other Vestibular pathologies

Wide variety of Vestibular pathologies were got diagnosed in this current study, Vestibular Neuritis was significant findings in 8.82% cases, previous studies also found similar rate of occurrence 7% [5], 4% [5]. All the patients of Vestibular neuritis are currently attending Vestibular rehabilitation therapy (VRT) session at our institute.

Vestibular migraine was also found in 8.82% of the total diagnosed cases in the current study. Both migraine and vertigo are common in the general population with lifetime prevalence of about 16% for migraine and 7% for vertigo. Therefore, a concurrence of the two conditions can be expected in about 1.1% of the general population by chance alone [6]. Few other studies also showed 7% to 9% occurrence of vestibular migraine [7, 8]. Very high prevalence rate 28.2% was reported only in one study conducted by [9].

Non-Vestibular disorders

Balance maintenance system of human body can be simulated with an example of tripod stand which has Vision; Proprioception and Vestibular system being its three legs, weakness of any one of leg may leads to imbalance. In the current study 42.37% patients with significant balance issues were diagnosed to have normal vestibular functioning and referred for various other examination which ranges from Ophthalmological evaluation to neurological and radiological evaluation. '7' such patients with normal vestibular functioning but having significant complaint of dizziness, oscillopsia and positional vertigo got relieved from the symptoms post lens corrections prescribed by Ophthalmologist.

Orthostatic hypotension was also found in '2' (5.88%) (patients with major complaint of vertigo across postures. Orthostatic hypotension (OH) is defined by a significant reduction in systolic (>20 mmHg) and/or diastolic (>10 mmHg) blood pressure within 3 minutes upon standing from sitting or during head-up tilt test [10]. Lifestyle and dietary modifications like increased intake of salt, water etc were suggested and patients were referred to concerned specialists to rule out the presence of anemia, hypovolemia, heart failure, deconditioning.

In the due course of study we came across a patient having BPPV like vertigo with absence of spontaneous nystagmus and corrective saccades present in Head impulse test, after getting normal findings in all vestibular tests like Dix-Hallpike, Supine-roll, deep head hanging caloric etc we administered Vertebrobasilar Deprivation Nystagmus test in which we got nystagmus while extending and rotating head towards right side. The vertebrobasilar deprivation nystagmus, according to [11] is the nystagmus obtained using an extension and rotation of the neck for three minutes, when every other possible cause of nystagmus has been discarded. This nystagmus would occur because of a decrease in the blood flow in the opposite vertebral artery because of the head rotation. Patient who got diagnosed with VBI was referred for radiological evaluation for the confirmation and not yet reported back.

Conclusion

Balance disorder has significant pathological burden and diversity in Central India. Wide variety of disorders ranging from Posterior SCC BPPV being most prevalent to lesser occurring non vestibular issues like VBI & orthostatic hypotension were reported in the subjects. Maximum number of patients those who were part of this study had already consulted one or more different physicians, neurologist and on vestibular suppressants like Vertin, Stemetil Cinnarazine etc, prior to visiting us. Prescribing merely vestibular suppressants even to the cases with pure complaint of positional vertigo indicates the poor awareness level regarding Vestibular diagnosis and management not only in patients but also among general physician. Even though sample size of the stud y was small but it established the following facts.

1. Vertigo and dizziness are common and very frequent issue in among all age groups of patients in central India.
2. Major chunk of Vestibular disorder (BPPV) can be treated easily without any medication or surgery.
3. There is huge scarcity of awareness among Medical Professionals regarding assessment and management of vestibular disorder in this part of country.
4. There is a need for the development and administration of mandatory Geriatric balance screening program, andhigh-risk balance screening program for all adults in India.

Abbreviations

BPPV- Benign paroxysmal positional vertigo, SCC-Semicircular canal, VBI- Vertibrobasilar insufficiency,

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