

Cervicogenic Dizziness Misdiagnosed Initially As BPPV**Pavankumar Patted¹, Prathvi P. Nayak², S. Rakshitha³, Sushmitha Nagaraj⁴**¹ Assistant Professor, Department of Orthopaedics, SSPM Medical College and Lifetime Hospital, Sindhudurg, Maharashtra, India² Assistant Professor, Department of ENT, Haveri Institute of Medical Sciences, Haveri, Karnataka, India³ Senior Resident, Department of ENT, ESIC Medical College and PGIMSR and Model Hospital, Rajajinagar, Bangalore, Karnataka, India⁴ Assistant Professor, Department of ENT, ESIC medical college and PGIMSR and Model Hospital, Rajajinagar, Bangalore, Karnataka, India

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Abstract

Background: Vertigo and dizziness affect around 15% to 20% of people annually. Benign paroxysmal positional vertigo (BPPV) and cervicogenic dizziness (CGD) are often confused because both are provoked by head movements. While BPPV is a peripheral vestibular disorder triggered by changes in head position relative to gravity, CGD is characterized by non-rotatory giddiness caused by aberrant proprioceptive afferents from the upper cervical spine.

Objectives: The study was done to evaluate the pitfalls in diagnostic methods which lead to the initial misdiagnosis of CGD as BPPV in ENT clinics. Secondary objectives were to analyse symptomatic overlap between the two groups, neck pain as a confounding factor, and the efficacy of routinely done diagnostic method Dix-Hallpike maneuver (DHT) and supine roll over test.

Materials and Methods: It is a prospective cross-sectional study done on 110 patients of age group 18–75 years who were initially diagnosed as BPPV. Later a three-step diagnostic evaluation was employed, involving a thorough history (SO STONED approach), vestibular tests (DHT, VNG, caloric testing, and vHIT), and a cervical musculoskeletal examination for patients who were wrongly diagnosed as BPPV but with normal vestibular function. Assessments included the Joint Position Error (JPE) test, the Seated Cervical Torsion Test, and active range of motion (ACROM) measurements.

Results: Out of 76, 34% (n=26) were found to have CGD but were initially diagnosed with BPPV by ENT surgeons using DHT or supine roll tests. Among 110 patients, 29% (n=32) were women and 61.8% (n=68) were men with male preponderance, and with a mean age of 48.5 years. BPPV attacks were triggered by positional changes relative to gravity, while CGD symptoms were exacerbated by head movement relative to the body. True BPPV patients primarily reported rotatory vertigo (45.4%), whereas misdiagnosed CGD patients experienced non-rotatory symptoms (54.5%). About 92% of CGD patients showed significant improvement after one week of conservative manual therapy and neck-specific exercises.

Conclusion: The high incidence of misdiagnosis suggests that ENT surgeons should look beyond the Dix-Hallpike maneuver, especially when symptoms are non-rotatory or do not respond to canalith repositioning manoeuvre. The study recommends a structured diagnostic algorithm that incorporates specialized vestibular testing and cervical musculoskeletal assessments to ensure accurate diagnosis and prevent treatment delays.

Keywords: cervicogenic dizziness; Benign paroxysmal positional vertigo; Dix-Hallpike manoeuvre.

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Introduction

Vertigo and dizziness are highly prevalent symptoms, affecting approximately 15% to 20% of adults annually.[1] Benign paroxysmal positional vertigo (BPPV) is the most common peripheral vestibular disorder, characterized by sudden, brief episodes of spinning vertigo triggered by changes in head position relative to gravity.[2] On contrary, cervicogenic dizziness (CGD) is defined by non-

rotatory giddiness that is usually associated with cervical pain or dysfunction. The physiological mechanism of CGD is due to sensory mismatch, where the aberrant proprioceptive afferents from upper cervical spine segments jeopardise the normal integration of visual and vestibular signals to the brain.[1]

Although the underlying mechanisms is different for both the conditions, they are usually misdiagnosed because both are provoked by head movements. Doctors usually get confused about the two conditions because they are triggered by positional variation and falsely assume it as BPPV, without distinguishing between giddiness triggered by gravity and giddiness triggered by head movement with respect to the body.[3] The neck pain further adds on to the confusion as it is sometimes present in both the groups.

Some patients with BPPV develop secondary neck pain and stiffness because of locking the head mechanism and assume rigid posture in order to avoid head movement triggered vertigo attacks. CGD is often a diagnosis of exclusion since it doesn't have a gold standard diagnosing methods, hence it is important to rule out other causes of vertigo by performing simple tests like Dix-Hallpike manoeuvre. The main aim of this study is to design a structured clinical distinction between the two groups to prevent initial misdiagnosis and to provide individually tailored treatment for patients without any further delay.[1,4]

Objectives [1]

Primary Objective

- To evaluate the clinical findings and diagnostic pitfalls that result in the initial wrong diagnosis of cervicogenic dizziness (CGD) as benign paroxysmal positional vertigo (BPPV) when patient presents to ENT OPD.

Secondary Objective

- To analyse the symptomatic overlap between these two groups
- To analyse the role of neck pain as a confounding factor
- To assess the efficacy of the diagnostic test like Dix-Hallpike manoeuvre which is commonly performed by ENT surgeons.
- To suggest a structured algorithm to help ENT surgeons in distinguishing CGD from BPPV thus decrease the incidence of misdiagnosis and inefficient treatment in dizziness patients.

Materials And Methods

Study Design: prospective cross-sectional study

Study Group: the study population included 110 patients aged between 18 to 75years, of either sex presenting to ENT OPD with postural and positional vertigo.

Inclusion Criteria:

- aged between 18 to 75 years of either sex;
- patients with chronic postural and positional vertigo

- with an initial clinical diagnosis of BPPV made by an ENT surgeon.

Exclusion Criteria:[5]

- patient with acute brain insult
- cardiac issues
- metabolic disturbances
- active psychiatric illness
- rheumatological disorders
- visual impairment
- recent head or neck trauma (except whiplash) and surgery
- vestibular migraine and other peripheral causes of vertigo

Methodology: A standard three-step diagnostic evaluation was done in patients who presented to ENT OPD with giddiness to recognise patients whose giddiness was actually due to cervical cause and not vestibular in origin.

- Initial ENT Evaluation:** ENT specialists took a thorough history using the SO STONED approach [6] Clinical tests like Dix-Hallpike maneuver (to diagnose posterior canal BPPV) and the supine roll test (for lateral canal BPPV) were performed.
- Specialized Vestibular Testing:** To rule out primary vestibular pathology, patients underwent a videonystagmography (VNG), caloric testing, and video head impulse tests (vHIT).[7] Patients with vestibular dysfunction or BPPV were managed by the ENT surgeon, whereas those with normal vestibular function were referred to orthopaedics department to partake cervical evaluation.
- Cervical musculoskeletal system examination:[1,5]** Patients referred to orthopaedic department were assessed for cervicogenic dizziness (CGD) by exclusion method like
 - Manual Cervical Spine Examination: digital palpation of the upper cervical spine (C1–C3) for muscle tightness, trigger points and zygapophyseal joint tenderness.
 - Active Range of Motion (ACROM): to measure maximum displacement angles in flexion, extension, rotation, and lateral tilt by a fleximeter or inclinometer.
 - Seated Cervical Torsion Test: Rotating the patient's body underneath a stable head to isolate cervical afferents; nystagmus exceeding 2 degrees per second was recorded as a positive result for CGD.

Outcome Measures [5,7,8]

Both subjective and objective scales were employed for quantification of burden of disease:

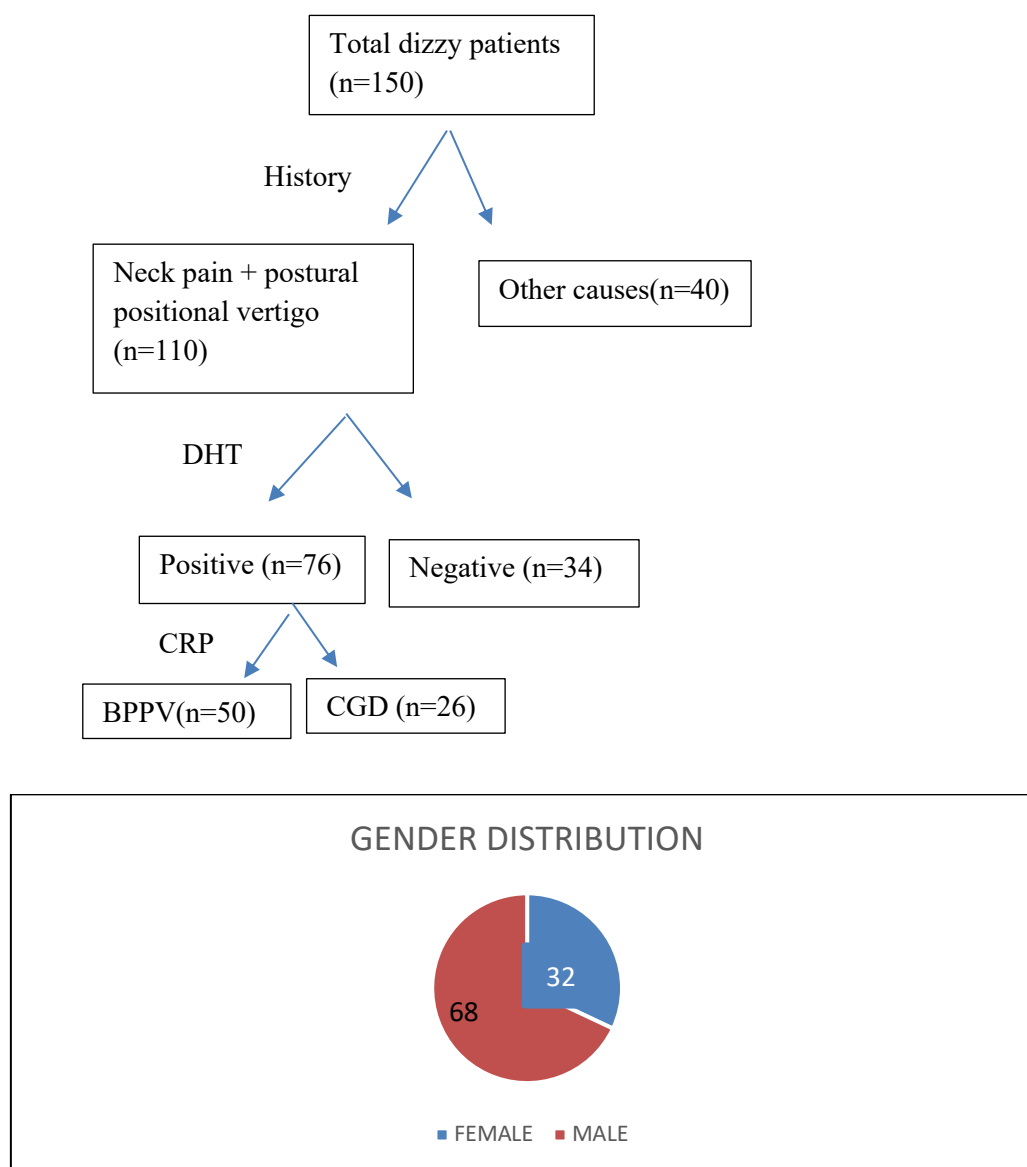
- Dizziness Handicap Inventory (DHI): A 25-item tool to assess physical, functional, and emotional impairment.
- Visual Analogue Scale (VAS): To quantify the intensity of both neck pain and dizziness (0–10).
- Hospital Anxiety and Depression Scale (HADS): To evaluate emotional mediators that may influence symptom perception.
- Berg Balance Scale (BBS) and Timed Up-and-Go (TUG): To quantitatively assess postural stability and functional mobility.

Statistical Analysis: Data were analyzed using IBM SPSS Statistics version 27.0. Descriptive statistics (means, standard deviations, frequencies) were

calculated for all demographic variables. Univariable logistic regression was employed to determine which clinical findings (e.g., JPE results, neck pain intensity, or VNG findings) most strongly predicted the initial misdiagnosis of CGD as BPPV. A significance level of $p < 0.05$ was maintained throughout the analysis

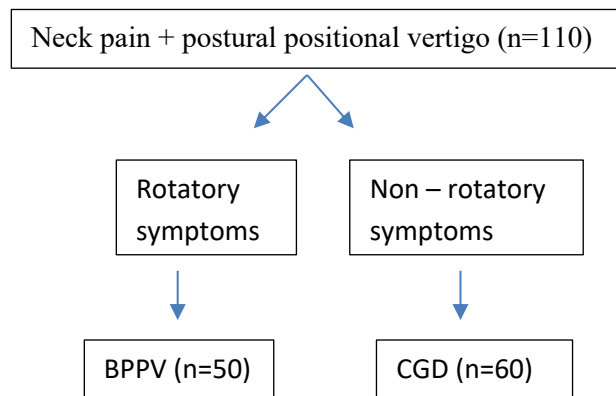
Results

Of the 76 patients initially diagnosed with benign paroxysmal positional vertigo (BPPV) by a treating ENT surgeon, later it was found that only 65% (n=50) had BPPV. The remaining 34% (n=26) were found to have cervicogenic dizziness (CGD) based on the exclusion criteria and musculoskeletal findings. Among 110 patients, 29% (n=32) were women and 61.8% (n=68) were men with male preponderance, and with a mean age of 48.5 years.



Total (n=110)	DHT Positive (n=76)	DHT Negative (n=34)
Mean age (years)	41	56

Quite a significant difference was noted in the qualitative characteristic of giddiness between the two groups. Patients with actual BPPV noticed rotatory vertigo (45.4%), and those misdiagnosed as BPPV group noticed non-rotatory symptoms (54.5%).[8]



Considering the triggering mechanism- most of CGD patients noticed that their symptoms were exacerbated by head movement with respect to the body like sudden backing up in a car, while BPPV patients developed attacks during positional changes with respect to gravity like turning to sides in bed. Also, a high temporal correlation ($r=0.65$) was noted between the intensity of neck pain and the intensity of dizziness in the CGD group. [1,8]

Patients who were previously misdiagnosed as BPPV noticed significant cervical dysfunction compared to the actual BPPV group: [5,8]

- **Active Range of Motion (ACROM):** 87% of CGD group patients noticed significant restriction and painful neck flexion, with a mean reduction in range exceeding 30% of normal values.
- **Trigger Points:** Myofascial pain syndrome was the primary aetiology for neck pain in 52% of the misdiagnosed patients, with trigger points most frequently identified in the sternocleidomastoid and upper trapezius muscles.
- **Palpation:** 88% of CGD patients demonstrated tenderness at the C1–C3 vertebral segments, compared to only 35% in the true BPPV group.

The below objective tests were used to confirm CGD:[1]

- **Joint Position Error (JPE) test:** they used a threshold of >4.5 degrees, the CGD patients showed a sensitivity of 87%.
- **Seated Cervical Torsion Test:** This test was considered positive (nystagmus >2 degrees per second) in 70% of the CGD group. This test was done to identify cervical afferent dysfunction as

the head remained earth-fixed, thereby ruling out a vestibular (gravitational) trigger.

- **VNG and vHIT:** all the confirmed CGD patients showed normal caloric responses and normal VOR gains on the video head impulse test, thus ruling out peripheral disease.

The mean Dizziness Handicap Inventory (DHI) score for the CGD group was 36.9 which indicates moderate level of functional impairment. Following a one-week trial of conservative manual therapy and neck-specific exercises, 92% of the CGD patients showed a significant reduction in dizziness intensity. This rapid therapeutic response served as the final confirmation of the cervicogenic origin of their symptoms. [1,5,9]

Discussion

Around 150 patients with symptoms of giddiness who presented to the ENT OPD were initially scrutinised for the study. A detailed clinical history was taken and a thorough otoscopic examination was done and those patients with giddiness associated with postural and positional vertigo with or without neck pain were selected for the study.

Among these 150 participants around 110 patients with postural and positional vertigo were recruited for the study. The main challenge faced by ENT surgeon is that both CGD and BPPV are frequently provoked by head movements, leading to frequent misdiagnosis. ENT surgeon get confused by giddiness triggered by gravity (BPPV) with giddiness triggered by head movement relative to the body (CGD). These 110 patients underwent Dix-Hallpike maneuver and supine roll test. The test was positive in 76 patient and negative in 34 patients. The population who tested positive were termed as BPPV patients and canalith repositioning maneuver

was done in all of them. The other category of population in whom DHT and supine roll test was negative were termed as CGD patients and referred to orthopaedics department for further management. The problem rose when the patients labelled as BPPV did not show any improvement with canalith repositioning maneuver and showed up again with giddiness again in ENT OPD. For such patients it is advisable to do VNG, caloric testing, and video head impulse tests (vHIT). Patients with vestibular dysfunction or BPPV were managed by the ENT surgeon, whereas those with normal vestibular function were referred to orthopaedics department to take further cervical evaluation.

The Incidence of Misdiagnosis: Out of the 76 patients initially diagnosed as BPPV by ENT surgeons, our study showed that 34% (n=26) were actually suffering from CGD. These patients were initially wrongly considered as BPPV cases due to positive Dix-Hallpike maneuver (DHT) or supine roll test. But they did not improve with canalith repositioning maneuvers and turned up again in ENT OPD with giddiness symptom. This throws light on significant diagnostic pitfall where DHT positivity may not always indicate primary vestibular pathology because sometimes CGD patients can demonstrate nystagmus which is explained by sensory mismatch in vestibular nuclei and cervico-ocular reflex (COR).[8,10]

A crucial distinguishing factor was elicited in the characteristic of the giddiness patients:

- The real BPPV patients usually demonstrated rotatory vertigo about 45.4% exacerbated by positional changes relative to gravity, such as turning over in bed.
- The misdiagnosed CGD patients more frequently experienced non-rotatory symptoms about 54.5% exacerbated by head movements relative to the body, such as backing up a car

Neck pain acted as a main confounding factor because it can be sometimes present in both the patient groups. Whereas, CGD is defined by a high temporal correlation ($r=0.65$) between neck pain intensity and dizziness, some BPPV patients also develop secondary neck pain and stiffness due to locking their heads to avoid triggering vertigo attacks.

In our study it is well understood that the standard Dix-Hallpike maneuver (DHT) or supine roll test failed in making the correct diagnosis in some patients, thus the study suggests that videonystagmography (VNG), caloric testing, and video head impulse tests (vHIT) should be included in routine initial diagnostic method to rule out peripheral vestibular disease. In our study, the confirmed CGD patients had normal vestibular function on these tests.

Further evaluation with musculoskeletal system assessments helped in confirming CGD:

- Joint Position Error (JPE) test: Showed a sensitivity of 87% in CGD patients.
- Seated Cervical Torsion Test: Identified cervical afferent dysfunction in 70% of the CGD group by isolating neck movement from vestibular (gravitational) triggers.
- Manual Examination: 88% of CGD patients had tenderness in the C1–C3 vertebral segments, and 87% showed significant restrictions in active range of motion (ACROM).

The study found that 92% of CGD patients experienced a significant reduction in dizziness after just one week of conservative manual therapy and neck-specific exercises. This rapid response to treatment served as the final clinical confirmation of the cervicogenic origin of their symptoms.

Conclusion

Our study highlights the necessity of a detailed structured diagnostic algorithm for ENT surgeons to prevent misdiagnosis and inefficient treatment and also to prevent further delay in the recovery. ENT surgeons should think out of box and look beyond the Dix-Hallpike maneuver to diagnose vestibular disorders especially when symptoms are non-rotatory and not responding to standard canalith repositioning maneuver. Also to include cervical musculoskeletal assessment as part of diagnosis.

Bibliography

1. De Hertogh W, Micarelli A, Reid S, et al. Dizziness and neck pain: a perspective on cervicogenic dizziness exploring pathophysiology, diagnostic challenges, and therapeutic implications. *Front Neurol*. 2025; 16:1545241.
2. Molnar A, McGee S. Diagnosing and treating dizziness. *Med Clin North Am*. 2014;98:583–596.
3. Kerber KA, Newman-Toker DE. Misdiagnosing the dizzy patient: common pitfalls in clinical practice. *Neurol Clin*. 2015;33(3):565–viii.
4. Seemungal BM, Agrawal Y, Bisdorff A, et al. The Bárány Society position on ‘Cervical Dizziness’. *J Vestib Res*. 2022;32:487–499.
5. Vural M, Karan A, Albayrak Gezer İ, Çalışkan A, Atar S, Yıldız Aydın F et al. Prevalence, etiology, and biopsychosocial risk factors of cervicogenic dizziness in patients with neck pain: A multi-center, cross-sectional study. *Turk J Phys Med Rehab* 2021;67(x):399-408.
6. Wuyts FL, Van Rompaey V and Maes LK (2016) “SO STONED”: Common Sense Approach of the Dizzy Patient. *Front. Surg*. 3:32. doi: 10.3389/fsurg.2016.00032

7. De Vestel C, De Hertogh W, Van Rompaey V, Vereeck L. Comparison of clinical balance and visual dependence tests in patients with chronic dizziness with and without persistent postural-perceptual dizziness: a cross-sectional study. *Front Neurol.* 2022;13:880714.
8. Saraiva MB R, Nedison GPA, Garcia CB. Clinical evaluation of neck in patients with proprioceptive cervicogenic dizziness. *Int Tinnitus J.* 2021;25(2):143–148.
9. Takahashi S. Importance of cervicogenic general dizziness. *J Rural Med.* 2018;13(1):48–56.
10. Li Y, Yang L, Dai C, Peng B. Proprioceptive cervicogenic dizziness: a narrative review of pathogenesis, diagnosis, and treatment. *J Clin Med.* 2022;11:6293.