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DIZZINESS HANDICAP INVENTORY IN PATIENTS WITH LABYRINTHITIS: A CLINICAL STUDY

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ABSTRACT

Background:

Labyrinthitis is a peripheral vestibular disorder characterized by acute onset of vertigo, imbalance, hearing loss, and tinnitus. The functional impact of labyrinthitis on daily living and quality of life can be substantial. The Dizziness Handicap Inventory (DHI) is a validated, self-administered questionnaire designed to quantify the handicapping effects of dizziness on physical, emotional, and functional domains. This study aims to evaluate the utility of the DHI in measuring the severity and progression of dizziness-related handicap in patients diagnosed with labyrinthitis over a 3-month follow-up period.

Methods:

A total of 50 patients diagnosed with labyrinthitis were included in the study. Each patient was assessed using the DHI at three time points: before treatment, at one month, and at three months post-treatment. The DHI scores were statistically analyzed using repeated measures ANOVA to determine the change in handicap over time and to assess the effectiveness of medical and vestibular rehabilitation interventions.

Results:

The mean baseline DHI score was 58.2 ± 12.4, which significantly decreased to 34.5 ± 10.6 at one month and further reduced to 25.8 ± 9.3 at three months ($p < 0.001$). Improvements were significant in all three subdomains of DHI: physical, emotional, and functional. These findings indicate that targeted medical management and vestibular rehabilitation significantly improve the perceived handicap associated with dizziness in labyrinthitis.

Conclusion:

The DHI is a reliable and sensitive tool to evaluate and monitor functional recovery in patients with labyrinthitis. Early identification and follow-up using DHI can guide clinicians in tailoring rehabilitation strategies and tracking patient progress effectively.

Keywords: Labyrinthitis, Dizziness Handicap Inventory (DHI), Vestibular Dysfunction, Vertigo, Peripheral Vestibular Disorder, Vestibular Rehabilitation, Quality Of Life, Functional Assessment, Hearing And Balance Disorders, Acute Vestibulopathy,Vestibular Symptoms, DHI Scoring, Patient-Reported Outcomes, Audiovestibular Evaluation, Inner Ear Infection.

1. INTRODUCTION

Labyrinthitis is a sudden inflammatory condition affecting the labyrinth of the inner ear, which includes both the cochlear and vestibular systems. It often follows viral infections or less commonly, bacterial infections or autoimmune conditions. The condition results in acute onset of vertigo, hearing loss, imbalance, and nausea. In most cases, symptoms develop rapidly and may persist for several days, with gradual recovery following appropriate treatment.

The pathophysiology involves inflammation of the membranous labyrinth and the vestibulocochlear nerve (cranial nerve VIII), resulting in disrupted transmission of sensory information from the ear to the brain. This disruption impairs balance, hearing, and spatial orientation. While hearing loss in labyrinthitis may recover, some patients are left with permanent damage and lingering imbalance, necessitating vestibular rehabilitation.

To assess the functional impact of vestibular dysfunction, the Dizziness Handicap Inventory (DHI) has emerged as a gold-standard clinical tool. It evaluates three dimensions: physical impairment, functional limitations, and emotional impact. It provides both qualitative and quantitative insights into a patient’s self-perceived disability and progress during recovery.

Although DHI is widely used in conditions such as vestibular neuritis, benign paroxysmal positional vertigo (BPPV), and Meniere’s disease, there is limited data evaluating its utility specifically in labyrinthitis. This study aims to investigate the pattern of change in DHI scores following standard treatment protocols in labyrinthitis patients and explore its role as a prognostic marker.

2. REVIEW OF LITERATURE

Labyrinthitis, characterized by inflammation of the labyrinthine structures of the inner ear, frequently presents with vertigo, imbalance, nausea, and sensorineural hearing loss. As the vestibular system plays a pivotal role in postural control and spatial orientation, damage caused by labyrinthitis often results in significant handicap in daily functioning. The Dizziness Handicap Inventory (DHI) is a standardized, self-reported questionnaire that assesses the impact of dizziness on an individual's life across functional, emotional, and physical domains. The DHI has been validated across numerous vestibular disorders, including vestibular neuritis, Meniere's disease, and BPPV. However, its application in labyrinthitis-specific populations remains underrepresented in the literature. Below are detailed analyses of both recent and foundational studies:

Jacobson & Newman (1990)

This landmark study introduced the DHI and validated its utility in quantifying perceived handicap due to dizziness. The scale, comprising 25 items across emotional, physical, and functional subdomains, demonstrated strong internal consistency and test-retest reliability (Cronbach's alpha > 0.85).

Yardley et al. (1992)

In a study of 120 patients with chronic vestibular dysfunction, DHI scores strongly correlated with perceived disability and quality of life impairments. The emotional subscale was particularly elevated in patients with anxiety symptoms, emphasizing DHI's sensitivity to psychosocial consequences.

Bamiou et al. (2000)

This study focused on vestibular patients, revealing that DHI scores were significantly elevated in cases of unilateral vestibular loss, including labyrinthitis. The study highlighted the emotional toll, with 65% of patients reporting fear of recurrence and limitations in social activities.

Perez et al. (2003)

In this controlled trial involving vestibular rehabilitation, patients with labyrinthitis showed a 40% reduction in DHI scores after six weeks of therapy, reinforcing DHI's responsiveness to intervention. The largest improvement was seen in the functional subscale.

Whitney et al. (2004)

Whitney et al. emphasized the clinical relevance of DHI as a screening tool to triage patients for vestibular rehabilitation. Labyrinthitis patients with high DHI scores were more likely to experience falls and showed greater benefit from customized balance retraining.

Hansson et al. (2005)

This study observed patients over a 6-month period following acute unilateral vestibular loss. Labyrinthitis patients initially exhibited higher DHI scores compared to vestibular neuritis, likely due to concurrent hearing loss exacerbating the perceived disability.

Shepard & Telian (2006)

These researchers assessed DHI in 80 patients with various vestibular pathologies. Patients with labyrinthitis reported moderate-to-severe handicap across all subdomains, further justifying the need for multidimensional assessment tools like DHI.

McCaslin et al. (2010)

This prospective study evaluated DHI in patients undergoing treatment for inner ear inflammation. Statistically significant reductions in DHI scores ($p < 0.01$) were observed post-treatment, especially among patients who received corticosteroid therapy.

Faralli et al. (2011)

The study noted a direct correlation between vestibular compensation and declining DHI scores in labyrinthitis patients. The rate of compensation was slower in older adults, who also showed prolonged high scores on the functional subscale.

Lopez-Escamez et al. (2015)

This comprehensive vestibular study included a subgroup with labyrinthitis and confirmed that DHI could predict poor postural stability as measured by computerized dynamic posturography ($r = 0.68$).

Singh et al. (2017)

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Among South Asian populations, this study highlighted cultural considerations in interpreting DHI scores. Labyrinthitis patients tended to underreport emotional distress due to stigma, but still demonstrated functional and physical handicaps clearly through DHI scores.

Kim et al. (2018)

This study utilized DHI as a prognostic indicator in acute vestibular syndromes. Labyrinthitis cases had higher baseline DHI scores and slower decline over 8 weeks compared to vestibular neuritis, reaffirming the dual burden of auditory and vestibular deficits.

Shafik et al. (2020)

A longitudinal study across three timepoints (baseline, 1 month, 3 months) revealed sustained improvement in DHI scores with vestibular rehabilitation and medication. Emotional scores improved most significantly between 1 and 3 months.

Kumar & Rao (2023)

In a cohort of 60 patients with labyrinthitis, DHI scores were used alongside VEMP and caloric tests to correlate subjective and objective markers of dysfunction. The study concluded that DHI remains a robust subjective measure that complements objective testing.

3. AIM OF THE STUDY

To evaluate the effectiveness of standard medical treatment and vestibular rehabilitation in reducing dizziness-related disability in patients diagnosed with labyrinthitis, as measured by the DHI.

Objectives of the Study

- To assess the changes in total and domain-specific DHI scores before and after treatment in patients with labyrinthitis.
- To correlate changes in DHI scores with clinical improvement and audiological recovery.

4. METHODOLOGY

Study Design

Prospective observational study.

Setting

Department of Audiology and ENT, conducted from January to June 2025.

Participants

50 patients (22 males, 28 females), aged 20–60 years.

Diagnosis of labyrinthitis based on history, otological and vestibular findings, and audiological assessments.

Inclusion Criteria

Acute onset vertigo with unilateral hearing loss.

Positive findings on vHIT/caloric testing.

DHI score > 20 at baseline.

Exclusion Criteria

Central vestibular pathology.

Pre-existing Meniere's disease or BPPV.

Neurological disorders (e.g., stroke, MS).

Treatment Protocol

Oral prednisolone taper (40 mg to 10 mg over 10 days).

Betahistine 48 mg/day for 4 weeks.

Vestibular rehabilitation therapy: gaze stabilization, habituation, balance exercises (twice weekly).

Outcome Measures

DHI Scores: Recorded at baseline, 1 month, and 3 months.

Audiological Testing: Pure-tone average (PTA) and speech discrimination.

Statistical Analysis: Paired t-test and Pearson correlation ($p < 0.05$ considered significant).

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5. RESULTS

The study assessed the Dizziness Handicap Inventory (DHI) scores at three time intervals—baseline (pre-treatment), 1 month, and 3 months post-treatment—in 50 patients with clinically confirmed labyrinthitis. The analysis focused on total DHI score and its three domains: physical, emotional, and functional.

There was a statistically significant reduction in total DHI scores between baseline and follow-up at 1 month (mean reduction: 23.7 points) and between baseline and 3 months (mean reduction: 32.4 points). The p-value < 0.001 indicates strong statistical significance, rejecting the null hypothesis that there was no change over time.

This reflects a meaningful clinical improvement in patient-perceived dizziness handicap. According to the literature, a change of more than 18 points in DHI is considered clinically significant. Thus, both follow-up scores surpass this threshold.

Physical Domain: This domain includes items related to activities that provoke or worsen dizziness (e.g., looking up, getting out of bed). The largest reduction occurred here, which is consistent with vestibular compensation and physical improvement after acute inflammation subsided.

Emotional Domain: Involves questions about fear, frustration, embarrassment, or worry due to dizziness. Significant improvement indicates a psychological adaptation and reduced anxiety after therapy.

Functional Domain: Addresses the impact on daily activities such as walking, working, and social participation. The marked reduction reflects restoration of daily independence and improved mobility.

All subdomains showed statistically significant changes, suggesting that the recovery in labyrinthitis is not just physical, but also psychosocial and functional.

Correlation with Clinical Variables

A moderate positive correlation was observed between the reduction in DHI scores and improvement in hearing thresholds ($r = 0.46$, $p = 0.002$), indicating that patients whose hearing improved also reported lower dizziness handicap.

Similarly, improvement in vestibular function tests (caloric and vHIT) corresponded with better functional subscale scores.

Patients who adhered more consistently to vestibular rehabilitation showed more substantial DHI score reductions, especially in the functional domain.

Clinical Significance

The findings demonstrate that DHI is sensitive to treatment outcomes in labyrinthitis.

The greatest improvement occurred between baseline and 1 month, likely due to the rapid action of corticosteroids in reducing inflammation.

Continued improvement from 1 to 3 months suggests a role for vestibular rehabilitation in promoting long-term compensation and functional recovery.

6. DISCUSSION

The DHI scores demonstrated a significant reduction over three months, suggesting that a combination of steroid therapy and vestibular rehabilitation effectively improves patient-perceived dizziness handicap in labyrinthitis. Improvement in the physical domain was most prominent, likely due to vestibular compensation and resolution of inflammation.

The emotional and functional domains also showed marked improvement, reflecting enhanced confidence, social participation, and psychological well-being as vertigo subsided.

These results align with previous research (Michel et al., 2022; Nola et al., 2010), confirming that DHI is a reliable instrument for both diagnosis and monitoring recovery. Limitations include lack of a control group, short follow-up duration, and reliance on subjective scoring.

7. CONCLUSION

The Dizziness Handicap Inventory is a robust, patient-centered outcome measure for evaluating recovery in labyrinthitis. Standard treatment significantly reduces the perceived impact of dizziness across all domains of functioning. Incorporating DHI into clinical practice facilitates patient monitoring and treatment adjustment.

8. REFERENCES

[1] Baloh, R. W., & Honrubia, V. (1989). Clinical neurophysiology of the vestibular system (2nd ed.). F.A. Davis.
[2] Brandt, T. (2000). Vertigo: Its multisensory syndromes (2nd ed.). Springer-Verlag.

[3] Chang, L., Huang, Y., & Chen, Y. (2021). Clinical course and recurrence pattern of drop attacks in vertigo patients. Neurology, 96(11), e1542–e1549. https://doi.org/10.1212/WNL.0000000000011613

[4] Furman, J. M., & Cass, S. P. (1999). Vestibular disorders: A case-study approach. Oxford University Press.

[5] Gupta, M., Sharma, R., & Arora, A. (2023). Imaging biomarkers in central causes of drop attacks: A prospective MRI study. European Archives of Oto-Rhino-Laryngology, 280(4), 1123–1129. https://doi.org/10.1007/s00405-022-07531-2

[6] Hain, T. C., Cherchi, M., & Yacovino, D. A. (2005). Evaluation and classification of sudden falls and vestibular syncope. Otolaryngologic Clinics of North America, 38(3), 547–556. https://doi.org/10.1016/j.otc.2005.01.003

[7] Halmagyi, G. M., Aw, S. T., & Curthoys, I. S. (1990). Brainstem vestibular function in vertebrobasilar insufficiency. Archives of Neurology, 47(12), 1296–1300. https://doi.org/10.1001/archneur.1990.00530120068020

[8] Hiller, S. L., & Davies, C. (2006). Psychological impact of drop attacks and vestibular falls. Audiology and Neurotology, 11(6), 331–338. https://doi.org/10.1159/000095611

[9] Kwon, Y. J., Lee, H. S., & Choi, K. D. (2023). Vertebrobasilar insufficiency and drop attacks: A vascular imaging approach. Stroke, 54(6), 1820–1826. https://doi.org/10.1161/STROKEAHA.122.041087

[10] Lee, H., Kim, J. S., & Oh, S. Y. (2024). Differential diagnostic value of drop attack duration in vertigo disorders. Journal of Vestibular Research, 34(2), 112–119. https://doi.org/10.3233/VES-230010

[11] Mehndiratta, A., Prasad, K., & Singh, R. (2022). Role of VEMPs in assessing vestibular otolithic dysfunction in drop attacks. Neurology India, 70(3), 960–965. https://doi.org/10.4103/0028-3886.346292

[12] Rao, S., Sharma, M., & Natarajan, K. (2022). BPPV mimicking drop attacks: Clinical red flags and diagnostic errors. Indian Journal of Otolaryngology and Head & Neck Surgery, 74(2), 313–318. https://doi.org/10.1007/s12070-021-02767-2

[13] Strupp, M., Dieterich, M., & Brandt, T. (2013). The vestibular system: Central vestibular disorders. In M. J. Aminoff, F. Boller, & D. F. Swaab (Eds.), Handbook of Clinical Neurology (Vol. 116, pp. 227–240). Elsevier. https://doi.org/10.1016/B978-0-444-53455-9.00018-7

[14] Tanaka, T., Nakamura, Y., & Mori, F. (2023). Postural control and fall risk in elderly patients with vestibular drop attacks. Otology & Neurotology, 44(1), 55–61. https://doi.org/10.1097/MAO.0000000000003585

[15] Tumarkin, A. (1936). The otolithic crisis of Ménière. Brain, 59(4), 403–412. https://doi.org/10.1093/brain/59.4.403

[16] Black, F. O., Wall, C., & O'Leary, D. P. (1983). Vestibulospinal control of posture in humans with unilateral labyrinthine deficits. Brain Research, 295(2), 273–278. https://doi.org/10.1016/0006-8993(83)91208-0

[17] Schuknecht, H. F. (1993). Pathology of Ménière's disease. The American Journal of Otology, 14(3), 329–334.

[18] Nuti, D., & Mandalà, M. (2005). Tumarkin attacks and their management. Otology & Neurotology, 26(5), 1052–1055. https://doi.org/10.1097/01.mao.0000178194.40976.6e

[19] Lanska, D. J. (2002). Historical aspects of drop attacks and the role of vestibular dysfunction. Seminars in Neurology, 22(1), 27–34. https://doi.org/10.1055/s-2002-23520

[20] Jacob, R. G., Redfern, M. S., & Furman, J. M. (2011). Psychological factors in vestibular disorders and balance-related falls. Journal of Vestibular Research, 21(3), 117–125. https://doi.org/10.3233/VES-2011-0428