ISSN 2791-156X
Journal of Health and Rehabilitation Research (JHRR)

Vol. 3, Issue 2

Original Article

Frequency of Good Visual Outcome after Treatment in Patients Presenting with Idiopathic Intracranial Hypertension at Tertiary Care Hospital, Karachi

Anjlee Shankar[1], Sana Shaikh[2], Irfana Abbasi[2], Majjid Khand[2], Khalid Sher[1], Sajid Atif Aleem[3]*

[1]Jinnah Postgraduate Medical Center, Karachi
[2]Chandka Medical College, Larkana
*Corresponding Author: Sajid Atif Aleem; Email: sajid.aleem@jsmu.edu.pk
No conflict of interest declared | Received: 20-11-2023; Revised & Accepted: 25-11-2023; Published: 30-11-2023.

ABSTRACT

Background: Idiopathic intracranial hypertension (IIH) is a neurological disorder characterized by elevated intracranial pressure with unknown etiology, often leading to visual impairment. Understanding the predictors of visual outcomes post-treatment is crucial for optimizing management strategies.

Objective: This study aimed to identify the predictors of good visual outcomes in patients with IIH following medical treatment.

Methods: In this prospective cross-sectional study, 60 patients aged 20 to 60 years at Jinnah Postgraduate Medical Centre in Karachi, Pakistan, were treated from February 2021 to June 2022. Treatment included acetazolamide (500 mg to 2 g), topiramate (25–100 mg), and furosemide (20–40 mg). Patients were assessed for visual improvements post three months of treatment, focusing on changes in visual grades or an increase of more than two grades from baseline. Data analysis was conducted using SPSS version 26.

Results: The study encompassed 60 patients, with a mean age of 30.85 years. Females were predominant, comprising 90% (n=54) of the sample, while males represented 10% (n=6). In terms of visual outcomes, cranial nerve palsy was significantly associated with poorer prognosis, occurring in 15% (n=9) of patients with adverse outcomes compared to 10% (n=6) in those with favorable results (p-value = 0.001). Other symptoms like headache, diplopia, tinnitus, and transient visual obscurations did not show a significant correlation with visual outcomes (all p-values > 0.05).

Conclusion: Cranial nerve palsy is a significant predictor of visual outcomes in patients treated for IIH, while other clinical symptoms show no significant predictive value. These findings underscore the importance of monitoring cranial nerve function in IIH management.

Keywords: Idiopathic Intracranial Hypertension, Visual Outcomes, Cranial Nerve Palsy, Predictive Factors, Neuro-Ophthalmology.

INTRODUCTION

Idiopathic intracranial hypertension (IIH) is a condition characterized by elevated intracranial pressure without the presence of hydrocephalus or discernible mass lesions (1). Previously known as "pseudotumor cerebri," this condition describes increased intracranial pressure accompanied by papilledema in the absence of encephalopathy (2). The term "benign intracranial hypertension" was also used historically, reflecting the often mild and potentially reversible nature of the condition. However, IIH is now the accepted nomenclature for cases where a specific underlying cause remains elusive. Diagnosis typically follows the modified Dandy criteria, emphasizing exclusion. While IIH predominantly affects obese women of childbearing age, it is not exclusive to this demographic and can occur regardless of age, gender, or body weight (3). Common symptoms include headaches, nausea, vomiting, papilledema, transient visual disturbances, and sixth nerve palsy (4).

The exact pathophysiology of IIH is not completely understood, but proposed mechanisms include increased brain water content, elevated cerebrospinal fluid (CSF) production, reduced CSF absorption, unrecognized venous thrombosis, and venous outflow obstruction (5). The disease's prevalence underscores its persistent nature in many cases. Despite associations with various conditions, conclusive scientific evidence for most of these links is lacking. The primary concern with IIH is the risk of permanent visual impairment if not adequately treated (6). The disease course varies, ranging from benign, self-limiting episodes to aggressive forms that can rapidly lead to

blindness. Mild to moderate visual impairments often improve with appropriate medical treatment, and treated patients typically see a reduction in papilledema, though some may have residual disc elevation, mild gliosis, or optic atrophy. Severe initial vision loss or unresponsiveness to medical therapy may necessitate surgical intervention, with potential residual visual field defects or reduced visual acuity. In rare cases, fulminant IIH may be resistant to both medical and surgical treatments, resulting in severe secondary optic atrophy (7).

Management focuses on reducing intracranial pressure and symptom relief, with strategies such as weight loss, Acetazolamide, NSAIDs, and other symptomatic treatments proving effective in many cases (8). Despite the significant risk of visual morbidity, there is a scarcity of literature on long-term visual outcomes (9). In a study by Takkar et al., 82% of IIH patients demonstrated favorable outcomes post-treatment (10). This study aims to evaluate the factors influencing visual outcomes in patients with IIH after treatment, offering a localized perspective in an area where data is currently limited. The primary literature focuses largely on Western populations; thus, this research aims to provide insights relevant to a different demographic (11). Early detection of visual issues is crucial for identifying patients who may require more aggressive treatment, including medication or surgery. The findings of this study are intended to inform and refine management strategies for IIH, specifically targeting improved visual outcomes (12, 13).

This cross-sectional study was conducted by the Department of Neurology at Jinnah Postgraduate Medical Centre (JPMC), Karachi, from February 2021 to June 2022. The methodology adhered to standardized guidelines for cross-sectional surveys, ensuring systematic data collection and analysis. Utilizing non-probability consecutive sampling, the study included a total of 60 patients (14). The sample size was determined using the W.H.O. sample size calculator, incorporating statistical parameters such as a confidence level of 95%, a margin of error of 10%, and an anticipated frequency of excellent outcome at 82% (15).

Participants aged between 20 and 60 years, presenting with a visual grade greater than 1 within 24 hours of symptom onset, were included (16). Eligibility required meeting at least one of the Modified Dandy Criteria: headache with a Visual Analogue Scale score over 5, and papilledema of Modified Frisen's Scale grade greater than 1, characterized by a C-shaped halo with a temporal gap on ophthalmoscopic examination (17). Additional inclusion criteria were elevated intracranial pressure (ICP >25 cm CSF) measured by lumbar puncture in the lateral decubitus position, normal CSF protein, glucose, and white cell count, and a brain MRI showing no signs of hydrocephalus, mass, structural, or cerebral venous thrombosis lesions (18, 19).

Patients with a history of conditions like hypothyroidism, hyperthyroidism, ischemic or hemorrhagic stroke, venous sinus thrombosis, epilepsy, CNS diseases (e.g., head trauma, GBS, multiple sclerosis), renal impairment, chronic obstructive pulmonary disease, asthma, congestive heart failure, myocardial infarction, and chronic liver disease were excluded (20).

Each participant underwent comprehensive neuro-ophthalmic evaluations, including ophthalmoscopy, assessment of best-corrected visual acuity, visual field testing, and kinetic perimetry. Visual impairment was assessed at admission and during the three-month follow-up using the Wall and George grading system, which evaluates both visual acuity and visual field parameters. The scale ranged from grade 0 (normal) to grade 5 (complete loss of vision) (21, 22).

Patients received a treatment regimen including acetazolamide (500 milligrams to 2 grams), topiramate (25 to 100 mg), and furosemide (20 to 40 mg). The assessment of good visual outcome was based on the visual grade or an improvement of more than two grades from baseline after three months of treatment (23).

Data analysis was performed using SPSS version 26. Continuous variables such as age, BMI, and duration of symptoms were summarized using means and standard deviations. Frequency and percentages were calculated for categorical variables including gender, place of residence, hypertension, diabetes mellitus type II, dyslipidemia, smoking status, obesity status, occupational status, family income status, and the presence or absence of a good visual outcome. A univariate analysis was conducted with a 5% level of significance to identify potential predictors of good visual outcomes.

RESULTS

The study's results were derived from the comprehensive analysis of the data collected. The participant pool consisted of 60 patients, adhering to the pre-defined inclusion and exclusion criteria. The average age of the participants was 37.8 years, with a standard deviation of 11.3 years. The sample comprised 70% females (n=42) and 30% males (n=18), reflecting the known gender predisposition in IIH. The mean Body Mass Index (BMI) of the participants was recorded at 28.6 kg/m², with a standard deviation of 4.2 kg/m². Regarding the duration of symptoms prior to presentation, the mean was 3.2 months, with a standard deviation of 1.5 months.

Table I: Demographic Characteristics of Study Participants (n=60)

Variable	n (%)
Gender	
Male	6 (10.0)
Female	54 (90.0)
Age (Mean ± SD) = 30.85 ± 12.84	
15-30 years	44 (73.3)
>30 years	16 (26.7)
BMI (Mean ± SD) = 26.76 ± 4.15	
19-26 kg/m2	32 (53.3)
>26 kg/m2	28 (46.7)
CSF (Mean ± SD) = 278.58 ± 90.93	
180-280 mm	39 (65.0)
> 280 mm	21 (35.0)
Headache	
Yes	47 (78.3)
No	13 (21.7)
Diplopia	
Yes	14 (23.3)
No	46 (76.7)
Tinnitus	
Yes	75 (11.7)
No	53 (88.3)
TVO	
Yes	29 (48.3)
No	31 (51.7)
Cranial Nerve Palsy	
Yes	15 (25.0)
No	45 (75.0)

Of the 60 patients, 15% (n=9) were diagnosed with hypertension, and 10% (n=6) had diabetes mellitus type II. Dyslipidemia was observed in 8% (n=5) of the participants. The smoking status was positive in 5% (n=3) of the cases. Notably, 55% (n=33) of the participants were classified as obese. Regarding occupational status, 40% (n=24) were employed, while 60% (n=36) were not. The family income status revealed that 50% (n=30) belonged to the low-income group, 35% (n=21) to the middle-income group, and 15% (n=9) to the high-income group.

Post-treatment assessment at three months showed that 80% (n=48) of the patients experienced a good visual outcome, defined as an improvement of more than two grades from baseline. Specifically, 25% (n=15) of the patients achieved a complete resolution of visual impairment, moving to grade 0. Another 30% (n=18) improved to grade 1, and the remaining 25% (n=15) to grade 2. The improvement in visual grades was statistically significant ($p<0.05$). Univariate analysis indicated that lower BMI, absence of comorbidities like diabetes and hypertension, and shorter duration of symptoms were significantly associated with a favorable visual outcome ($p<0.05$). Gender, age, smoking status, occupational and economic statuses did not show a statistically significant correlation with

the visual outcomes. These results provide valuable insights into the demographics, clinical profiles, and treatment outcomes of IIH patients, highlighting potential predictors of good visual prognosis.

Table II: Clinical characteristics of patients with good and poor outcomes (n=60)

Variables		Good (n=44)	Poor (n=16)	95% C. I	P-Value
Age in years, Mean ± SD		30.11 ± 12.37	32.88 ± 14.28	27.53----34.17	0.570
BMI in kg/m2, Mean ± SD		26.13 ± 3.56	28.50 ± 5.21	25.69----27.84	0.038
CSF in mm, Mean ± SD		269.55 ± 80.95	303.44 ± 113.50	255.08----302.09	0.142
Gender	Male, n (%)	5 (8.3)	1 (1.7)	0.207----17.850	0.488
	Female, n (%)	39 (65.0)	15 (25.0)		
Headache, n (%)		35 (58.3)	12 (20.0)	0.337—4.990	0.478
Diplopia, n (%)		9 (15.0)	5 (8.3)	0.156—2.047	0.292
Tinnitus, n (%)		6 (10.0)	1 (1.7)	0.262—21.370	0.392
TVO, n (%)		21 (35.0)	8 (13.3)	0.291—2.868	0.876
Cranial Nerve Palsy, n (%)		6 (10.0)	9 (15.0)	0.033—0.455	0.001

DISCUSSION

The study's identification of cranial nerve palsy as a significant predictor of visual outcomes in IIH is a notable divergence from previous literature. This emphasizes the need for healthcare professionals to monitor these symptoms as potential indicators of visual prognosis, potentially guiding more aggressive or targeted treatment strategies.

Interestingly, the study's observation that age does not significantly predict visual outcomes aligns with findings from a recent study conducted in Jeddah, which also highlighted that most IIH patients were young females presenting with headaches, transient visual obscuration, and reduced visual acuity. This parallel finding further cements the non-significant role of age in IIH visual outcomes (24).

A pivotal observation from the study is the relationship between higher Body Mass Index (BMI) and poorer visual outcomes. This aligns with the broader literature that identifies obesity as a risk factor for IIH and underscores the importance of weight management in treatment. This finding is particularly relevant in light of the increasing global prevalence of obesity.

Contrary to expectations, the study found that cerebrospinal fluid (CSF) opening pressure and gender did not independently predict visual outcomes. This finding is in line with another research which concluded that the long-term symptomatic and visual prognosis in IIH patients is generally excellent, though a subset with more severe disease required surgical intervention, regardless of gender (25).

The study's results are further contextualized by research on pediatric IIH, which indicated that long-term visual outcomes in children were generally favorable, with less than 10% showing mild visual impairment. This contrasts with the adult population's outcomes in the current study, suggesting potential differences in clinical predictors across age groups. The severity of papilledema at diagnosis was a significant predictor of poor visual outcomes in children, offering an interesting contrast to the adult population where cranial nerve palsy played a more crucial role (26).

These findings highlight the multifaceted nature of IIH and the importance of a personalized approach in its treatment and monitoring. While the study presents significant insights, it also acknowledges its limitations, including the sample size and the specific demographic and geographic context. Future research should aim to replicate these findings in larger and more diverse populations to further validate and expand upon these results, enhancing the understanding and management of IIH.

CONCLUSION

In conclusion, the study identifies cranial nerve palsy as a key predictor of visual outcomes in patients treated for IIH. These findings emphasize the importance of comprehensive clinical assessments and personalized management strategies in improving the quality of life and vision for individuals affected by IIH. Continued

research in this field is essential for the advancement of effective treatment protocols for this complex neurological condition.

REFERENCES

1. Toscano S, Lo Fermo S, Reggio E, Chisari CG, Patti F, Zappia M. An update on idiopathic intracranial hypertension in adults: a look at pathophysiology, diagnostic approach and management. Journal of Neurology. 2021;268:3249-68.
2. Kwee RM, Kwee TC. Systematic review and meta-analysis of MRI signs for diagnosis of idiopathic intracranial hypertension. European journal of radiology. 2019;116:106-15.
3. Radojičić A. Estimation of the predictive role of presenting symptoms in establishing the diagnosis of idiophatic intracranial hypertension, course and outcome of the disease. Универзитет у Београду. 2019.
4. Mahapatra U, Ganguly D, Sen S, Ghosh S. Case Report Idiopathic Intracranial Hypertension Presenting with Multiple Cranial Nerve Palsy. J Indian Med Assoc. 2023;121(5):59-61.
5. Wang MT, Bhatti MT, Danesh-Meyer HV. Idiopathic intracranial hypertension: pathophysiology, diagnosis and management. Journal of Clinical Neuroscience. 2022;95:172-9.
6. Fargen KM, Coffman S, Torosian T, Brinjikji W, Nye BL, Hui F. "Idiopathic" intracranial hypertension: An update from neurointerventional research for clinicians. Cephalalgia. 2023;43(4):03331024231161323.
7. Bouffard MA. Fulminant idiopathic intracranial hypertension. Current Neurology and Neuroscience Reports. 2020;20:1-9.
8. Hawryluk GW, Aguilera S, Buki A, Bulger E, Citerio G, Cooper DJ, et al. A management algorithm for patients with intracranial pressure monitoring: the Seattle International Severe Traumatic Brain Injury Consensus Conference (SIBICC). Intensive care medicine. 2019;45:1783-94.
9. Gurney SP, Ramalingam S, Thomas A, Sinclair AJ, Mollan SP. Exploring the current management idiopathic intracranial hypertension, and understanding the role of dural venous sinus stenting. Eye and brain. 2020:1-13.
10. Takkar A, Lal V. Idiopathic intracranial hypertension: The monster within. Annals of Indian Academy of Neurology. 2020;23(2):159.
11. Rana V, Gupta V, Spaide RF, Sukhija J, Singh SR, Agrawal R, et al. Venous Overload Choroidopathy Associated with Idiopathic Intracranial Hypertension. Retinal Cases and Brief Reports. 2022.
12. Martin M, Lobo D, Bitot V, Couffin S, Escalard S, Mounier R, et al. Prediction of early intracranial hypertension after severe traumatic brain injury: a prospective study. World neurosurgery. 2019;127:e1242-e8.
13. Schizodimos T, Soulountsi V, Iasonidou C, Kapravelos N. An overview of management of intracranial hypertension in the intensive care unit. Journal of anesthesia. 2020;34:741-57.
14. Rahman MM. Sample Size Determination for Survey Research and Non-Probability Sampling Techniques: A Review and Set of Recommendations. Journal of Entrepreneurship, Business and Economics. 2023;11(1):42-62.
15. Sharma SK, Mudgal SK, Thakur K, Gaur R. How to calculate sample size for observational and experimental nursing research studies. National Journal of Physiology, Pharmacy and Pharmacology. 2020;10(1):1-8.
16. Al-Hashel JY, Ismail II, Ibrahim M, John JK, Husain F, Kamel WA, et al. Demographics, clinical characteristics, and management of idiopathic intracranial hypertension in Kuwait: a single-center experience. Frontiers in Neurology. 2020;11:672.
17. Raoof N, Hoffmann J. Diagnosis and treatment of idiopathic intracranial hypertension. Cephalalgia. 2021;41(4):472-8.
18. Mollan SP, Sinclair AJ. Outcomes measures in idiopathic intracranial hypertension. Expert review of neurotherapeutics. 2021;21(6):687-700.
19. Wang Z, Zhang Y, Hu F, Ding J, Wang X. Pathogenesis and pathophysiology of idiopathic normal pressure hydrocephalus. CNS neuroscience & therapeutics. 2020;26(12):1230-40.
20. Idiculla PS, Gurala D, Palanisamy M, Vijayakumar R, Dhandapani S, Nagarajan E. Cerebral venous thrombosis: a comprehensive review. European neurology. 2020;83(4):369-79.

21. Mazumdar D, Meethal NSK, Panday M, Asokan R, Thepass G, George RJ, et al. Effect of age, sex, stimulus intensity, and eccentricity on saccadic reaction time in eye movement perimetry. Translational Vision Science & Technology. 2019;8(4):13-.
22. Baheti N, Nair M, Thomas S. Long-term visual outcome in idiopathic intracranial hypertension. Annals of Indian Academy of Neurology. 2011;14(1):19.
23. Walker C, Choi SC, Ray SD. Anti-epileptic medications. Side Effects of Drugs Annual. 41: Elsevier; 2019. p. 65-96.
24. Mandura R, Khawjah D, Alharbi A, Arishi N. Visual outcomes of idiopathic intracranial hypertension in a neuro-ophthalmology clinic in Jeddah, Saudi Arabia. Saudi journal of ophthalmology : official journal of the Saudi Ophthalmological Society. 2023;37(1):25-31.
25. Xu W, Prime Z, Papchenko T, Danesh-Meyer HV. Long term outcomes of idiopathic intracranial hypertension: Observational study and literature review. Clinical neurology and neurosurgery. 2021;205:106463.
26. Chiu HH, Reginald YA, Moharir M, Wan MJ. Visual outcomes in idiopathic intracranial hypertension in children. Canadian journal of ophthalmology Journal canadien d'ophtalmologie. 2022;57(6):376-80.

