ECRONICON OPEN ACCESS

EC NEUROLOGY
Research Article

How Successful we are in the Management of Idiopathic Intracranial Hypertension?

Buse Rahime Hasırcı Bayır[1]*, Can Ulutaş[2], Gizem Gürsoy[3], Merve Beyza Çetin[4], Kemal Tutkavul[5], Hülya Tireli[6] and Cemile Handan Mısırlı[5]

[1]Neurology Specialist, Department of Neurology, Haydarpaşa Numune Research and Training Hospital, Istanbul, Turkey

[2]Neurology Residency, Department of Neurology, Haydarpaşa Numune Research and Training Hospital, Istanbul, Turkey

[3]Neurology Specialist, Department of Neurology, Haseki Research and Training Hospital, Istanbul, Turkey

[4]Ophthalmology Specialist, Department of Ophthalmology, Haydarpaşa Numune Research and Training Hospital, Istanbul, Turkey

[5]Professor Doctor, Department of Neurology, Haydarpaşa Numune Research and Training Hospital, Istanbul, Turkey

[6]Associated Professor Doctor, Department of Neurology, Haydarpaşa Numune Research and Training Hospital, Istanbul, Turkey

***Corresponding Author:** Buse Rahime Hasırcı Bayır, Neurology Specialist, Department of Neurology, Haydarpaşa Numune Research and Training Hospital, Istanbul, Turkey.

Received: August 24, 2021; **Published:** October 29, 2021

Abstract

Aim: Idiopathic intracranial hypertension is presented by headache and visual impairment and frequently seen in women of reproductive age. The present study aimed to evaluate the recovery rates of idiopathic intracranial hypertension symptoms and patient compliance with weight control and treatment during the follow-up period.

Materials and Methods: The files of 106 patients who were diagnosed as having idiopathic intracranial hypertension were examined. Idiopathic intracranial hypertension symptoms, body mass index, fundus examinations, cerebrospinal fluid opening pressure, and cranial imaging findings were obtained from their files.

Patients who accepted a phone call were questioned about their current symptoms, body mass index, and treatment of idiopathic intracranial hypertension.

Results: Forty-one patients (37 females and four males) with a mean age of 35 years were included in the study. The mean time between the patients' symptom onset and hospitalization was 11.5 months (range, 3 days - 10 years). The mean follow-up period of the patients was 3.25 (range, 1 - 10) years and headache in 15 (36.5%) patients and visual symptoms in seven (17%) patients continued. It was observed that the average body mass index of the patients showed a minimal decrease from 32.6 kg/m2 to 31.2 kg/m2. Ten patients continued the drug treatment and 31 patients stopped the treatment within an average of 2.5 years. Eighteen patients left the follow-up voluntarily.

Conclusion: Idiopathic intracranial hypertension requires regular follow-up due to the risk of recurrence, and it was observed that our patients' compliance with treatment and outpatient follow-up was low. However, despite this, only three patients developed permanent vision loss. This indicates that the prognosis of IIH may be better than expected, even in patients with low treatment compliance in the long term.

Keywords: *Idiopathic Intracranial Hypertension; Headache; Obesity; Treatment*

Introduction

Headache and visual impairment are among the most common symptoms in idiopathic intracranial hypertension (IIH), and the pathogenesis is not fully known [1]. It is most commonly seen in women with obesity of childbearing age with an incidence of 1.2 per 100,000 individuals in the adult population [2]. Men with IIH are also mostly obese, and compared with women, the mean presentation age is higher (37 years vs. 28 years, respectively) [3].

Obesity is one of the most important risk factors because many patients gain weight before diagnosis [4]. Patients are advised to have a low-calorie diet, lose weight, and to use their treatments regularly to reduce symptoms of IIH and during long-term follow-up to prevent a recurrence. Published studies and clinical observations support the view that in addition to medical treatments, weight loss is an effective treatment in IIH [5].

Aim of the Study

The aim of this study was to evaluate the recovery rates of IIH symptoms and patients' compliance with weight control and treatment during the follow-up period.

Materials and Methods

Study population, study design, and outcome

Patients who fulfilled the clinical diagnosis criteria for IIH according to the Friedman criteria [6] [using the International Statistical Classification of Diseases and Related Health Problems - Tenth Revision (ICD-10) code G93.2] and hospitalized between January 2010 and May 2020 were selected for this study.

Out of 106 patients, 65 were eliminated for various reasons as shown in figure 1. The study continued with 41 patients who accepted to have a phone call interview.

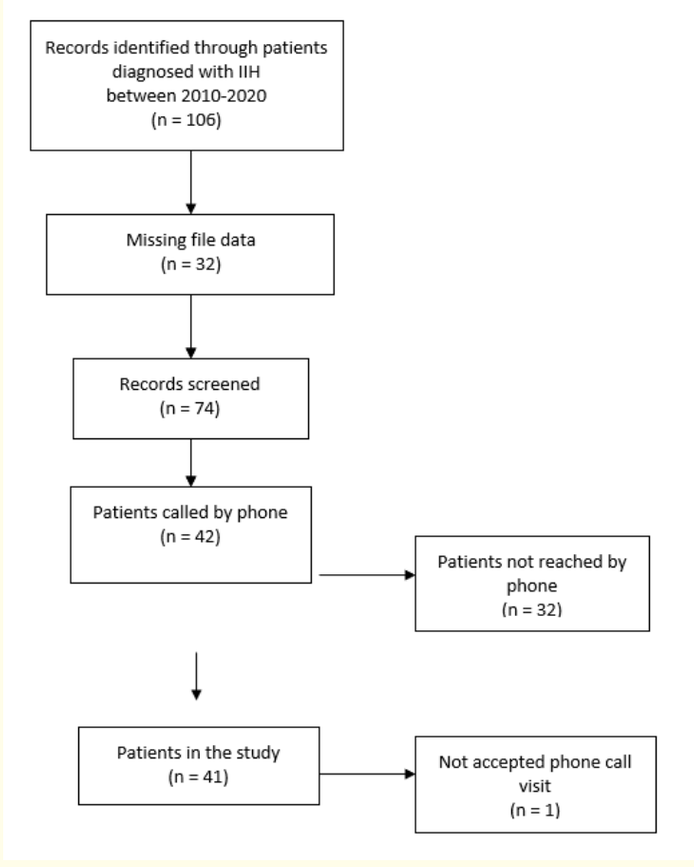

Figure 1: *Flowchart of patient selection.*

We retrospectively investigated demographic information; body mass index (BMI); the presence of headache, accompanying diplopia, visual problems such as temporary vision loss, tinnitus, vertigo, nausea, vomiting and neck pain symptoms; systemic diseases; drug use; and treatments received by the patients. In addition to a neurologic examination including visual field and fundus examinations, cerebrospinal fluid (CSF) opening pressure measurements with a manometer, cranial magnetic resonance imaging (MRI) and magnetic resonance venography (MRV) examinations were performed.

Prospectively, these patients were contacted by phone and their current headache, vision symptoms, BMI, drug use, and outpatient clinic follow-up periods were questioned.

Ethics statement

The study was approved by the Local Ethics Committee (136-2804, 2020).

Statistics

Statistical analysis was performed using the Microsoft Office 365 Excel 2019 program. For descriptive analysis, categorical data are expressed as frequency (n) and percentage (%), and continuous data are expressed as means.

Results

Forty-one patients, 37 females and four males, who were diagnosed and followed up in our clinic, were included in the study. The average age at admission was 35 (range, 17 - 60) years. The average time between the onset of symptoms and hospitalization period was found as 11.5 months. The mean BMI at the time of admission was 32.6 kg/ m^2; 23 out of 41 patients were obese, four were morbidly obese, and only four had a normal BMI (Table 1).

Sex	Patients (n)	Age (years)			BMI (kg/m^2)		
		Mean	Min.	Max.	Mean	Min.	Max.
Female	37	33.9	17	50	32.9	19.8	47.3
Male	4	45	18	60	30.3	23	33.9
Total	41	35	17	60	32.6	19.8	47.3

Table 1: *Distribution of patients age and body mass index by gender.*
Min: Minimum; Max: Maximum.

Considering the presenting symptoms, headache was the most frequent, followed by blurred vision (Table 2). Sixth cranial nerve palsy was detected in only one patient. Concentric narrowing in visual field examinations and bilateral papilledema in fundus examinations were the most common findings of the patients (Table 3).

Symptom	Frequency
Headache	36 - 87.8%
Blurred vision	22 - 53.7%
Temporary vision loss	12 - 29.3%
Tinnitus	11 - 26.8%
Diplopia	8 - 19.5%
Vertigo	5 - 12.2%
Nausea-Vomiting	3 - 7.3%
Neck pain	2 - 4.9%

Table 2: *Frequency of patients with presenting symptoms.*

	Frequency
Fundus examination	
Normal	2 - 4.9%
Unilateral papilledema	2 - 4.9%
Bilateral papilledema	37 - 90.2%
Visual field examination*	
Concentric narrowing	21 - 72%
Peripheral and central scotomas	6 - 21%
Total vision loss in one eye and vision loss at nasal region of the other eye	2 - 7%

Table 3: *Fundus and visual field examination results of the patients.*
**: Details unavailable in the missing cases.*

Lumbar puncture (LP) was performed in all patients, but could not be performed in one patient despite many attempts. The mean CSF pressure of 40 patients was 417.5 (range, 250 - 2600) mm H_2O. Cranial imaging results are evaluated in table 4. The medical and surgical treatments of the patients are evaluated in table 5. Surgical treatments were performed on patients who did not respond to medical treatment.

Cranial imaging results*	Frequency
MRI	
Normal	28 - 71.8%
Empty sella	8 - 20.4%
Enlargement in the perioptic area	1 - 2.6%
Enlargement in the perioptic area and flattening of the posterior globe	1 - 2.6%
Enlargement in the perioptic area and empty sella	1 - 2.6%
MRV	
Normal	36 - 90%
Unilateral transverse sinuse stenosis	2 - 5%
Bilateral transverse sinuse stenosis	1 - 2.5%
Unilateral transverse and sigmoid sinuse stenosis	1 - 2.5%

Table 4: *Cranial imaging results of patients.*
Details unavailable in the missing cases.
MRI: Magnetic Resonance Imaging; MRV: Magnetic Resonance Venography.

Treatments of the patients	Frequency
Medical treatments	
Acetazolamide	27 - 65.8%
Acetazolamide-topiramate	14 - 34.2%
Surgical treatments	
Ventriculoperitoneal shunt	4 - 9.7%
Optic nerve sheet fenestration	1 - 2.4%
Bariatric surgery	1 - 2.4%

Table 5: *Medical and surgical treatments of the patients.*

In the phone call visit in the June 2020 outpatient follow-up, ongoing symptoms, BMI and drug use were questioned (Table 6). The mean outpatient clinic follow-up period of the patients was 3.25 (range, 1 - 11) years. The mean BMI was 31.2 kg/m^2 and there was a minimal decrease in the mean BMI after the follow-up period. Tension-type headache that did not require the use of prophylactic medication was observed in 15 patients. Seven patients had visual symptoms. The mean duration of drug use of the patients was 9.7 months (range, 3 months - 11 years). Thirty-one patients did not use medication and these patients stopped their medication within an average of 2.5 years.

	Frequency
Outpatient follow-up	
Regularly	23 - 56%
Left	18 - 44%
Comparison to first BMI	
Lost weight/patient	17 - 41.5%
Same weight/patient	10 - 24.4%
Gained weight/patient	14 - 34.1%
Headache	
No	26 - 63.5%
Tension-type	15 - 36.5%
Vision symptoms	
No	34 - 83%
Temporary episodes of diplopia	4 - 9.7%
Permanent loss of vision	3 - 7.3%
Drug use	
Usage of acetazolamide	5 - 12.2%
Usage of acetazolamide and topiramete	5 - 12.2%
Stopped under physician control	13 - 31.7%
Stopped voluntarily	18 - 43.9%

Table 6: *Clinical findings of the patients during follow-up period.*

Discussion

This study results showed the low compliance rates of patients with drug use, dietary intervention, and out-patient follow-up examinations. A considerable amount of patients had an increase in BMI and symptoms of headache, which was consistent with tension-type headache, and unfortunately, some patients had permanent vision loss after the follow-up period of our study.

The most frequent presenting symptom of IIH in this study group was headache (87.8%) as shown by Wall., *et al*. (84%) [7]. It has been reported that headache might persist in more than half of patients after treatment, sometimes with migraine and sometimes with tension-type headache [8]. Persistent headache was observed in 15 out of 41 patients (36.5%) in our study group, which was tension-type.

This study revealed blurred vision and temporary vision loss in 53.7% and 29.3% of patients, respectively. According to Toscano., *et al*. unilateral or bilateral temporary vision obscuration and loss are observed in 68% of patients due to transient ischemia in the optic nerve head [9]. Our patients had diplopia (19.5%) and one patient had sixth cranial nerve involvement as demonstrated via clinical examination. In the diagnosis of IIH, neurologic examinations are expected to be normal except cranial nerve involvement [6], and diplopia often develops as the result of sixth cranial nerve involvement [7].

Visual field defect and papilledema are frequently detected in patients during clinical examinations. Papilledema, which occurs as a result of disruption of axoplasmic flow due to increased pressure in the optic nerve, is the most specific finding of IIH and is often seen bilaterally [10]. Fundus examination was normal in only 4.9% of our patients, and unilateral papilledema was observed in only two (4.9%) patients. Bilateral papilledema was present in all of the other patients (90.2%). Different visual field defects, especially in the inferior temporal area, are seen in 21% of patients [7,11]. In our study, all visual field examinations were re-evaluated by a specialized ophthalmologist, and the most common finding was concentric narrowing (72%).

Obesity is one of the most important risk factors in IIH, and even mild weight gains of 5 - 15% in obesity have been associated with more severe outcomes of visual defects [12,13]. IIH is usually resolved with 6 - 10% weight loss, but the risk of recurrence increases with similar weight gains [14]. The pathophysiologic mechanism of obesity and IIH is not fully understood [5]. Although patients are advised to lose weight regularly and effectively with a low-calorie diet, some patients have attitudes far from what is required given the seriousness of the disease and do not pay attention to weight control. The average BMI was determined as 31.2 kg/m^2 during the follow-up of the patients after 3.25 years. The weight of 10 patients did not change during the follow-up period; however, it was observed that the BMI of 14 patients increased compared with baseline. Bariatric surgery is a surgical option for patients with obesity and was performed in one of our patients who could not use oral treatments due to adverse effects and whose weight gain continued after the diagnosis of IHH. Bariatric surgery was performed on one patient with a BMI of 41.9 kg/m^2. The patient lost 25 kg following the surgery, her headache and diplopia improved, and the fundus and visual field examinations normalized.

In IIH, early diagnosis is important due to the risk of papilledema, which can develop rapidly in about 10% of cases and cause permanent vision loss and is often difficult to distinguish from pseudopapilledema [15]. Diagnosis is delayed when papilledema is not detected, especially in patients with chronic headache [6]. Therefore, effective and rapid treatment is required to prevent permanent damage. In our patients, the average time between the onset of symptoms and hospitalization was not less and found as 11.5 months.

The presence of neuroradiologic findings (empty sella, posterior flattening of the eyeball, distension of the perioptic subarachnoid spaces with or without optic nerve tortuosity and transverse sinus stenosis) helps with diagnosis. The presence of three of the four neuroradiologic findings for the diagnosis of IIH has 64% sensitivity and 100% specificity [16]. According to Agid., *et al*. posterior flattening of the eyeball with the eventual protrusion of the optic nerve head into the vitreous humor increases the probability of diagnosis 50 times [17]. In the studies of Bono., *et al*. increased CSF opening pressure was found in two-thirds of patients with chronic migraine and chronic tension headache with bilateral transverse sinus stenosis, and a diagnosis of IIH was made [18]. In our study, 10 patients had one of four and two patients two of the four neuroradiologic findings. In the MRI findings, empty sella was determined in 20.4% of the patients. In MRV findings, 90% of the patients had normal and 10% had uni or bilateral venous stenosis, mostly in the transverse sinus.

Strengths and Limitations

The strengths of this study are the long-term follow-up period of the patients, and the detailed evaluation of their symptoms and compliance with treatment during the follow-up period. The limitations of this study are that has a single-center design, the low number of patients, and the absence of fundus and visual field evaluation during follow-up.

Conclusion

The aim of this study was to evaluate the compliance to weight lose and treatment among patients with IIH during the follow-up period. It was observed that patients mostly discontinued treatment and did not pay sufficient attention to weight control. However, despite this, only three patients developed permanent vision loss. This indicates that the prognosis of IIH may be better than expected, even in patients who are not followed closely and with low treatment compliance in the long term.

Funding Source

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Acknowledgement

We thank to Mr. David Chapman for revising use of English.

Declaration of Interest

None.

Bibliography

1. Wall M. "Update on Idiopathic Intracranial Hypertension". *Neurologic Clinics* 35 (2017): 45-57.
2. Sundholm A., *et al*. "Infectious and inflammatory disorders might increase the risk of developing idiopathic intracranial hypertension - a national case-control study". *Cephalalgia* 40 (2020): 1084-1094.
3. Bruce BB., *et al*. "Idiopathic intracranial hypertension in men". *Neurology* 72 (2009): 304-309.
4. Andrews LE., *et al.* "Idiopathic intracranial hypertension and obesity". *Hormone Research Paediatrics* 81 (2014): 217-225.
5. Subramaniam S and Fletcher WA. "Obesity and Weight Loss in Idiopathic Intracranial Hypertension". *Journal of Neuro-Ophthalmology* 37 (2017): 197-205.
6. Friedman DI., *et al*. "Revised diagnostic criteria for the pseudotumor cerebri syndrome in adults and children". *Neurology* 81 (2013): 1159-1165.
7. Wall M., *et al*. "The idiopathic intracranial hypertension treatment trial clinical profile at baseline". *JAMA Neurology* 71 (2014): 693-701.
8. Yri HM., *et al*. "The course of headache in idiopathic intracranial hypertension: A 12-month prospective follow-up study". *European Journal of Neurology* 21 (2014): 1458-1464.
9. Toscano S., *et al*. "An update on idiopathic intracranial hypertension in adults: a look at pathophysiology, diagnostic approach and management". *Journal of Neurology* (2020).
10. Rigi M., *et al*. "Papilledema: Epidemiology, etiology, and clinical management". *Eye Brain* 7 (2015): 47-57.
11. Wall M., *et al*. "Threshold static automated perimetry of the full visual field in idiopathic intracranial hypertension". *Investigative Ophthalmology Visual Science* 60 (2019): 1898-1905.

12. Daniels AB., *et al*. "Profiles of Obesity, Weight Gain, and Quality of Life in Idiopathic Intracranial Hypertension (Pseudotumor Cerebri)". *American Journal of Ophthalmology* 143 (2007): 635-641.

13. Szewka AJ., *et al*. "Idiopathic intracranial hypertension: Relation between obesity and visual outcomes". *Journal of Neuro-Ophthalmology* 33 (2013): 4-8.

14. Appel LJ., *et al*. "Comparative effectiveness of weight-loss interventions in clinical practice". *The New England Journal of Medicine* 365 (2011): 1959-1968.

15. Ball AK and Clarke CE. "Idiopathic intracranial hypertension". *The Lancet Neurology* 5 (2006): 433-442.

16. Mallery RM., *et al*. "Utility of magnetic resonance imaging features for improving the diagnosis of idiopathic intracranial hypertension without papilledema". *Journal of Neuro-Ophthalmology* 39 (2019): 299-307.

17. Agid R., *et al*. "Idiopathic intracranial hypertension: The validity of cross-sectional neuroimaging signs". *Neuroradiology* 48 (2006): 521-527.

18. Bono F., *et al*. "The upper limit of normal CSF opening pressure is related to bilateral transverse sinus stenosis in headache sufferers". *Cephalalgia* 30 (2010): 145-151.

Volume 13 Issue 11 November 2021