



A study on clinical characteristics and imaging of idiopathic intracranial hypertension in a tertiary care hospital

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ABSTRACT

Purpose: Clinical characteristics and imaging of Idiopathic intracranial hypertension (IIH) was described in many studies but less described in Indian population. Our purpose is to study Indian population

Aims: To analyze the clinical characteristics and imaging of Idiopathic intracranial hypertension

Setting and design: Hospital-based, cross sectional study.

Materials and methods: This study analyzed 30 patients admitted in the department of Neurology (from July 2022 to July 2023) for detailed history, clinical examination, and neuroimaging. CSF manometry and routine CSF analysis were done. All participants met the modified Dandy criteria. Patients with secondary causes of raised ICP and primary ocular pathology were excluded.

Statistical analysis used: Descriptive statistics.

Results: Among 30 cases 28 (93.33%) were females. The mean age was 32 years. 17 (56.6%) cases were obese. Headache was the most common symptom (100%). Bilateral papilledema was present in all except two patients. Optic nerve tortuosity the most common radiological finding (80%), followed by posterior sclera flattening (73.3%).

Conclusion: Idiopathic intracranial hypertension commonly occurs in obese females of childbearing age group. But still, it can occur in the non-obese and male sex. Clinical features of raised intracranial pressure even if the patient is male or non-obese with normal neuroimaging should be evaluated for idiopathic intracranial hypertension

Keywords: idiopathic intracranial hypertension, IIH, CSF opening pressure, radiological findings, imaging characteristics

Key Message: Idiopathic intracranial hypertension (IIH) commonly occurs in obese females. But still, it can occur in the non-obese and male sex. Early diagnosis and treatment prevents serious sequelae like vision loss.

I. INTRODUCTION

Idiopathic intracranial hypertension (IIH) is a syndrome of elevated intracranial pressure (ICP) without any identifiable brain pathology and with normal cerebrospinal fluid (CSF) composition^[1]. The cause of this raised ICP is unknown. Historically, normal neuroimaging formed the basis of diagnosis, helping to exclude the secondary causes of raised ICP. Various imaging features suggestive of increased intracranial pressure have been recognized, which may aid to establish diagnosis in doubtful cases. So these imaging findings may suggest or support diagnosis of IIH, but cannot be solely considered diagnostic. The neuroimaging signs that may suggest a diagnosis of IIH include: tortuosity of the optic nerves, posterior scleral flattening, empty sella turcica, slit-like ventricles, distension of optic nerve sheath, enhancement of the optic nerve head, prominence of Meckel's cave and transverse sinus stenosis^[2]

Aims and objectives

This study is aimed to review the cases admitted with diagnosis of IIH in the department of Neurology at tertiary care center of India with the objectives of analyzing of clinical characteristics and imaging of idiopathic intracranial hypertension patients.

II. MATERIALS AND METHODS

It is a hospital-based observational descriptive analysis of clinical characteristics and imaging of cases of IIH patients.

This study analyzed 30 patients admitted in the department of Neurology (from July 2022 to July 2023) for detailed history, clinical examination, fundus examination and magnetic resonance imaging (MRI) of brain and magnetic resonance venogram. CSF manometry and routine CSF analysis were done. All participants met the modified Dandy criteria. Patients with secondary causes of raised ICP and primary ocular pathology were excluded.



Descriptive analysis was done for the mean and standard deviation of age and BMI. Contingency tables were prepared to analyze categorical data and the association of various study parameters. Categorical data were presented by percentage.

The study was performed with prior approval from the ethical committee and written consent was taken from each of the patient participating in this study

III. RESULTS

Demographic data

In the 30 study subjects, 28 patients (93.3%) were females and 2 (6.66%) patients were males. Age range was 19 years to 52 years, and mean age was 32 years. Patients were grouped in various age ranges. Most cases fall in 21- 40 years of age range

AGE(YEARS)	NUMBER OF PATIENTS
<20 years	2
21-30 years	12
31-40 years	9
41-50 years	6
>50 years	1

The patients were categorized into groups of normal BMI (18.5-24.9kg/m²) overweight (25–29.9 kg/m²), and obese (≥30 kg/m²) patients as per the World Health Organization criteria^[3]. In this study 5 (16.66%) patients were having normal body weight, 8(26.66%) were overweight and 17(56.6%) were obese. The mean (±SD)

BMI was 27.94 (±3.91) kg/m² (range 18.8–36.68kg/m²)

Clinical symptoms

Most common clinical symptom was headache present all of our patients in the studying followed by transient visual obscuration and visual impairment

Clinical features	Number of patients
Headache	30(100%)
Transient visual obscuration(TVO)	17(56.6%)
Visual impairment	16(53.3%)
Nausea and /or vomiting	13(43.3%)
Double vision	9(30%)
Pulsatile tinnitus	7(23.3%)



Headache presented as acute presentation in 9 patients (30%), as subacute presentation in 17 patients (56.6%) and 4 patients (13.33%) chronic presentation .

The most common characteristics of headache is holocranial, throbbing type similar to migraine reported in 56.6% of patients ,and almost daily headaches noted in 86.6% of cases

The most common ocular symptom was transient visual obscurations (TVO), presented in 17 patients (56.6%) . Visual Impairment was observed in 16 patients . In which 12 patients had

bilateral visual impairment noted and in 4 patients unilateral visual impairment noted . Double vision is due to abducens nerve paralysis observed in 9 patients

Papilledema

Bilateral papilledema was noted in 28 patients(93.33%) in it 3 patients has modified Frisen grade I papilledema, 10 patients has grade II, 7 patients has grade III, 6 patients has grade IV and 2 patients has grade V papilledema and bilateral optic atrophy (secondary) in two (6.66%) patients .

Papilledema grading	Number of patients
Grade I	3
Grade II	10
Grade III	7
GradeIV	6
GradeV	2

CSF manometry

In all patients CSF manometry was done .CSF opening pressure measurement showed all the patients enrolled has raised cut off values .The Cutoff values of CSF opening pressure to diagnose idiopathic intracranial hypertension for non obese

patients was >200 mm of H2O and in obese patients >250 mm of H2O. CSF opening pressure was recorded <350 mm of H2O in 25(83.33%) patients and ≥350 mm of H2O was recorded in 5 (16.66%) patients .

CSF OPENING PRESSURE (mm of h2o)	NUMBER OF PATIENTS
200 - 300	8
300 - 350	17
> 350	5

CSF examination

CSF is analysed for biochemistry and cytology , in all study subjects they are with in normal limits

Radiological findings

In our study , optic nerve tortuosity is most common finding seen in 24 (80%) patients,

followed by posterior scleral flattening in 22(73.33%) patients, perioptic subarachnoid space dilation in 20 patients (66.66%) , Partial empty sella in 18 patients (60%), Transverse sinus stenosis in 14 patients (46.66%) most of the patients has more than one mri signs of idiopathic intracranial hypertension



MRI Sign	Number of patients
Optic nerve tortuosity	24 (80%)
Posterior scleral flattening	22 (73.33%)
Periopic SAS dilatation	20 (66.66%)
Partial empty sella	18 (60%)
Transverse sinus stenosis	14 (46.66%)

IV. DISCUSSION

The mean age in our study is 32 years, In the idiopathic intracranial hypertension treatment trial (IIHTT)^[4], mean age of the study population was 29 years. Studies by Ayush Dubey et al.^[5] Ambika et al.,^[6] and Claire Chagot et al.^[7] had a study population with a mean age of 30 years, 32 years and 33 years, respectively.

Gender distribution in this study has 93.3 % female patients . This was almost similar Claire Chagot et al.^[7]

(92.4% females) , in IIHTT trial (97.6% females),^[4] and the studies by Ambika et al.^[6] (80% females)

Mean BMI in this study BMI of 27.94 kg/m². In the IIHTT^[4] the mean BMI was 39.9 kg/m², and 35 kg/m² in the Claire Chagot et al.^[7] study.

So relatively low BMI is present in our study population compared to other studies

The most common symptom in this study was headache present in all patients (100%) Second most common symptom is transient visual obscuration (56.6%) other symptoms are visual impairment (53.3%), nausea and or vomiting (43.3%), double vision (30%), pulsatile tinnitus (23.3%)

Headache was the most common presentation in the IIHT trial,^[4] Ambika et al.,^[6] Ayush Dubey et al.^[5] and Claire Chagot et al.^[7] studies with the incidence of headache being 84%, 94%, 92.9%, 82.3% respectively. It is usually severe and of throbbing type, generalized, continuous, and associated with neck pain.

In this study the incidence of transient visual obscuration (56.6%) and pulsatile tinnitus (23.3%) In IIHTT study,^[4] reported a incidence of transient visual obscurations (68%), pulse synchronous tinnitus (52%), non-pulsatile tinnitus

(23%), In the study by Ambika et al.,^[6] occurrence of TVO and tinnitus was 68% and 58%, respectively.

In this study the incidence of visual impairment (53.3%) The study by Ayush Dubey et al.^[5] reported blurring of vision (78.6%)

In this study Papilledema was present in 93.33% of patients Most common is grade II Papilledema with 33.3 % . In IIHTT,^[4] and , Ayush Dubey et al.^[5] reported that grade II papilledema was most common in this study optic atrophy is present in 6.66 %

In this study mean CSF opening pressure was 328.5 mmH₂O. In IIHTT^[4] where the mean was 343.5 mmH₂O. ,most of the patients in this study has opening pressures between 300-350 mm H₂O range .

Among radiological signs, optic nerve tortuosity is most common finding seen in 24 (80%) patients, followed by posterior scleral flattening in 22(73.33%) patients, these findings are similar to Nandita Prabhat et al study^[8] other findings include periopic subarachnoid space dilation 20 patients (66.66%) , Partial empty sella 18 patients (60%), Transverse sinus stenosis 14 patients (46.66%) most of the patients has more than one mri signs of idiopathic intracranial hypertension In a study by Brodsky MC et al.,^[9] the MR imaging found empty sella in 70% of patients with IIH, flattening of the posterior sclera in 80%, enhancement of the prelaminar optic nerve in 50%, distension of the periopic subarachnoid space in 45%, vertical tortuosity of the orbital optic nerve in 40%, and intraocular protrusion of the prelaminar optic nerve in 30%.

Hingwala et al.^[10] found periopic nerve sheath distension in 95.2% and empty sella in 76.2% cases



V. CONCLUSION

This study underscores the clinical and radiological profile of IIH patients. Female sex and obesity in child bearing age are more common patients in IIH already been described in many studies. In this study nonobese contributed to 43.32% patients, which is a newer observation. And many literatures emphasize more on flattening of globe and optic nerve sheath distension as radiological findings of IIH, in this study optic nerve tortuosity followed by posterior sclera flattening was observed.

Finally, patients with clinical features of raised intracranial pressure even the patient is male or non obese with normal neuroimaging should be evaluated for idiopathic intracranial hypertension as delayed diagnosis causes vision loss

Ethical clearance

Approval was obtained from the Institutional Ethics Committee

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Nil.

Conflicts of interest

There are no conflicts of interest.

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