Spectrum, Etiology and Clinical Features of Intracranial Hypertension Presenting in Neuro-Ophthalmology Clinic At AFIO Rawalpindi

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ABSTRACT

Objective: To assess the clinical spectrum and various etiological factors of idiopathic intracranial hypertension in Pakistani patients.

Study Design: Cross-sectional study.

Place and Duration: Neuro-Ophthalmology Clinic, Armed Forces Institute of Ophthalmology, Rawalpindi Pakistan, from Jan 2017 to Jul 2018.

Methodology: A total of 64 individuals with intracranial hypertension (IH) were screened. On the basis of inclusion criteria 32 patients were selected for the study. The demographics, clinical features and etiologies were recorded for each patient.

Results: High frequency was noted among females, affecting 26 (84.37%) as compared to males who were 6 (18.75%) in number. Half of the patients had body weight lying in range of overweight, 16 (50%), however, only 5 (15.6%) patients fell into the category of obesity. Among clinical features, headache was the most prominent symptom seen in 17 (53.12%) patients and severe disc swelling seen in 19 (59.3%) was the most common sign. Most prevalent systematic association was anemia, 11 (34.3%), and the most prominent etiology was idiopathic intracranial hypertension, being 26 (81.25%).

Conclusion: There was high frequency of intracranial hypertension in the females with obesity, pregnancy and in the age group of 20-30 years.

Keywords: Etiology, Intracranial hypertension, Papilledema.

How to Cite This Article: *Ijaz U, Saeed K, Sarwar I, Nazir N, Rathore HS, Shahid M. Spectrum, Etiology and Clinical Features of Intracranial Hypertension Presenting in Neuro-Ophthalmology Clinic at AFIO Rawalpindi. Pak Armed Forces Med J 2022; 72(1): 12-15. Doi: https://doi.org/10.51253/pafmj.v72i1.6868*

INTRODUCTION

Intracranial hypertension (IH) comprises of neurological disorders in which cerebrospinal fluid (CSF) pressure is increased within the skull.[1] The pressure of CSF above 20cm H_2O in children and above 25cm H_2O in adults indicates increased intracranial pressure (ICP).[2] IH usually results from a neurological injury or insult but it may be idiopathic. Variety of clinical features are associated with IH including nausea, vomiting, headache, altered consciousness level, ocular palsies, papilledema and backache.[3] If remained unchecked, papilledema can result in optic atrophy, visual disturbance and blindness.[4]

Increasing rate of obesity around the world is leading towards some life-threatening disorders like idiopathic IH.[5] It is a rare disorder with no clinical, radiographic and laboratory evidence in relation to infection, vascular abnormality, lesion and even with hydrocephalus.[6,7] The prevalence of idiopathic IH among female population is 3.5 per 100,000 in the age group of 15-44 years. However, this ratio amongst the males is 0.9 per 100,000. Chances of idiopathic IH are high when body mass index (BMI) increases to 26.[8] One mechanistic theory claimed that obesity predisposes patients to raised intra-abdominal pressure, which leads to raised intrathoracic pressure, central venous pressure and finally to idiopathic IH. However, results of other studies were in contrast with this theory and observed that lower body (gynecoid) and increased level of estrogenicity causes IH instead of central venous pressure or intrabdominal pressure.[9]

Despite the emerging prevalence of IH in various countries, Pakistan has lagged behind in exploring different aspects of this disease. Rationale of conducting this study was the absence of adequate local data of our population pertaining to IH. Owing to the increasing obesity throughout the world, it is expected that IH will continue to increase in coming years.

METHODOLOGY

This cross-sectional study was conducted to assess the etiologies and clinical features of patients labeled with IH. For this purpose, all the 64 patients, referred to neuro-ophthalmology OPD of the Armed Forces Institute of Ophthalmology (AFIO), Rawalpindi from January 2017 to July 2018 were included in the

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Received: 13 Apr 2021; revision received: 17 May 2021; accepted: 19 May 2021

study. Patients were selected through universal sampling, irrespective of the age, gender, ethnicity and residence.

Inclusion Criteria: Patients having active IH at the time of enrollment with headache and optic disc swelling were included in the study.

Exclusion Criteria: Patients with co-existing ocular diseases such as glaucoma, uveitis, ocular infection and corneal diseases were excluded from the study. Patients with papilledema secondary to space occupying lesion of brain were also not included in the study.

The study proposal was approved by the Ethical Committee of AFIO, Rawalpindi (221/ERC/AFIO).

Thirty-two patients, who were diagnosed with IH, were inducted in the study. Written informed consent was obtained from the selected participants. Detailed ophthalmic history and clinical examination of the selected participants was done. Their visual field charting, MRI brain, MR/CT venography and cerebrospinal fluid analysis were performed. Laboratory tests comprising complete blood count, urine routine examination, anti-nuclear antibody levels, thyroid hormone levels, and calcium/vitamin D levels were carried out.

The demographics of patients were noted, including age, gender and weight. Clinical features such as headache, tinnitus, diplopia, and transient visual obscurations, were recorded. Possible etiologies including cerebral venous sinus thrombosis (CVST), vasculitis, uveitis, juvenile and adult idiopathic intracranial hypertension were registered.

Statistical Package for Social Sciences (SPSS) version 21 was used for the data analysis. Quantitative Variable were summarized as Mean ± SD, while qualitative variables were summarized as frequency and percentages.

RESULTS

Thirty-two patients, who were diagnosed with idiopathic intracranial hypertension (IIH), were selected after applying inclusion and exclusion criteria. The mean age of participants was 21.5 ± 3.4 years, (range: 13-56 years). Higher frequency of IIH was noted among females 26 (84.37%) as compared to males 6 (18.75%). The demographic data of participants was shown in Table-I. Half of the patients had weight lying in range of overweight 16 (50%). However, only 5 (15.6%) patients were obese. The mean weight was 78.88 ± 2.54 kg.

Table-II depicted clinical features of patients. In total, 17 (53.12%) patients reported headaches. Tinnitus was present in 4 (12.5%) patients, diplopia in 3 (9.3%), and transient visual obscurations in 7 (21.8%) patients. However, 1 (3.1%) patient was asymptomatic. Mean intracranial pressure was 32.1 ± 2.3 cm H_2O.

Table-I: Demographic characteristics of the participants.

Characteristics	Frequency (%)
Gender	
Male	6 (18.75%)
Female	26 (84.37%)
Age (years)	
10-20	4 (12.5%)
21-30	12 (37.5%)
31-40	9 (28.1%)
41-50	5 (15.6%)
51-60	2 (6.2%)
Weight (kg)	
Underweight	1 (3.1%)
Normal	10 (31.2%)
Overweight	16 (50.0%)
Obese	5 (15.6%)

Table-II: Clinical features of participants.

Clinical Features	Frequency (%)
Headache	17 (53.1%)
Tinnitus	4 (12.5%)
Diplopia	3 (9.3%)
Transient visual obscurations	7 (21.8%)
Asymptomatic	1 (3.1%)

The signs observed for patients were; severe visual loss 3 (9.3%), moderate visual loss 2 (6.2%), mild disc swelling 5 (15.6%), severe disc swelling 19 (59.3%), swelling with hemorrhages 4 (12.5%), optic atrophy unilateral 3 (9.3%), periphlebitis 1 (3.1%), and uveitis 1 (3.1%).

The risks factors for IH were found to be systematic associations and use of medications. Systematic associations in some patients were reported with pregnancy 1 (3.1%), anemia 11 (34.3%), sleep apnea 3 (9.3%), and hypertension 6 (18.7%). Other systematic associations found in the patients were; polycystic ovary disease 1 (3.1%), increased PTH level 3 (9.3%); parathyroid adenoma 1 (3.1%), hypothyroidism 2 (6.25%), celiac disease 2 (6.25) and menstrual irregularities 3 (9.3%). Some patients had a history of medication use. These medications included hormonal supplements 6 (18.75%), vitamin A 2 (6.25%) and oral steroids 2 (6.25%). Only one case required surgical intervention.

The etiologies of participants have been shown in the Table-III. The most prominent etiology was IIH (81.25%). This was followed by cerebral venous sinus thrombosis (12.5%), followed by uveitis (3.1%) and juvenile IIH (3.1%).

Table-III: Etiologies of raised intracranial hypertension.

Etiologies	Frequency (%)
Juvenile Idiopathic Intracranial Hypertension	1 (3.1%)
Cerebral Venous Sinus Thrombosis	4 (12.5%)
Idiopathic intracranial hypertension	26 (81.25%)
Uveitis	1 (3.1%)

DISCUSSION

The findings of our study revealed that obesity was the leading factor of IH in Pakistan. Majority of the participants were in the age group of 21-40 years. There was higher frequency of IIH among females as compared to males. This observation was supported by previous works of Radhakirshnan *et al*,[10] Raoof *et al*.[11] In previous studies, researchers observed severe IH in the females of age group 20-30 years. With obesity and pregnancy patients developed severe complications in their vision. In our study, 3 (9.3%) patients had obesity and 16 (50%) were reported to be overweight. This was in accordance with the study by Sugerman *et al*.[12] Another study by Ottridge *et al*,[13] found that IH occurs mostly in females between ages 20-44 years with weight above the normal.

Clinical features of the patients had variation. Headache was observed in majority of cases 22 (68.75%). This indicated association of headache with IH. This was followed by transient visual obscurations (31.25%), tinnitus (12.5%), and diplopia (9.3%). Previous research work of Hoffman *et al*,[14] has shown association of headache (100%) with IH, which supports findings of the present study.

Other important systematic associations included anemia and hypertension. Ananth *et al*,[15] previously indicated linkage of IH with anemia, whereas, association of hypertension with IH has previously been highlighted by Pal *et al*.[4] Association of preganancy has been reproted by previous research work of Stevens *et al*,[16] our study reported pregnancy in only one individual (3.1%).

Use of different medications can also be associated with IH. This has been reported by Tan *et al*,[17] and Uldall *et al*.[18] Similar findings were deduced from the present research. The patients had history of using various medications such as oral steroids, thyroxine, isotrenoin. However, the most prominant medications among patients were hormonal supplements.

Numerous research works, such as Fiyaso *et al*,[19] Aojula *et al*,[20] and Zhang *et al*,[21] had highlighted the high prevalence of IIH. Our study was in accordance with these research works as IIH accounted for 26 % of the cases. Although our study has some limitations like small sample size and lack of diversity, the importance of our study lies in the inclusion of both subjective and objective data. It is also one of the first local studies encompassing neuro-ophthalmological dimension of IH in Pakistani population. However, we do need more studies with a more diverse and large sample in future.

The aggressive course of IH can result in blindness over a short period of time. High frequency of IH in females with age range of 20-30 years, obesity and pregnancy indicated high susceptibility of this population. Thus, individuals showing relevant clinical features and risk factors should be considered for early diagnosis in order to avoid adverse outcomes.

CONCLUSION

There was high frequency of IH in the females with obesity, pregnancy and in the age group 20-30 years.

Conflict of Interest: None.

Authors' Contribution

UI: Conception manuscript writing data collection, KS: Manuscript writing data collection, IS: Manuscript writing data collection, NN: Manuscript writing statistical analysis, HSR: Design proof reading referencing, MS: Data collection interpretation of data.

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