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Intracranial hypertension medical symptoms, etiology, and spectrum a cross-sectional study

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Abstract---Objective: To examine intracranial hypertension patients' spectrum, clinical features, and etiologies. Study Design: A Cross-sectional study. Place and duration of study: In the Department of Neurosurgery MMC Mardan from January 2019 to July 2020. Methodology: We used specific selection criteria to reduce the pool of IH patients from 67 to 32. Statistics and frequency distributions explain patients' demographics, clinical traits, and underlying reasons. Results: According to statistics, females (n = 30; 82%) with ages ranging from 21 to 35 (n = 13; 36%) and obesity (n = 2; 9%) were over represented. The most common clinical sign was headache (n = 18; 69%). On the other hand, idiopathic intracranial pressure had the greatest occurrence (44%). Conclusion: Women between the ages of 21 and 35 who are overweight or pregnant have an increased risk of developing idiopathic intracranial hypertension (IH).

Keywords---hypertension, intracranial hypertension, etiology.

Introduction

The term "intracranial hypertension" (IH) describes an increased pressure within the skull that affects the brain. It consists mainly of neurological conditions characterized by elevated intracranial pressure of cerebrospinal fluid (CSF). However, there is a maximum safe CSF pressure for each age group, even though CSF pressure fluctuates with age. A rise in intracranial pressure (ICP) is indicated when cerebrospinal fluid (CSF) pressure is above 200 mm H₂O in children or 25 mm H₂O in adults (1).

An infection may bring on acute IH in the brain, a stroke, or a severe blow to the head. However, IH's chronic form might develop when the condition persists over time. But long-term IH issues are pretty unusual. Injuries or insults to the nervous system are often the cause of IH. Nonetheless, in some instances, IH (idiopathic IH) occurs for no recognized reason (2). Causes of IH may be broadly classified as either primary or secondary.

Both primary (inside the brain) and secondary (outside the brain) factors. Stroke, brain tumor, meningitis, hydrocephalus, non-traumatic intracerebral hemorrhage, trauma, and idiopathic intracranial hypertension are all intracranial causes. Secondary causes include high blood pressure, seizures, high altitude cerebral edema, a lack of oxygen, a high body temperature, a metabolic problem, and a blocked airway (3). The epidemiology of IH may be different depending on the underlying cause. Idiopathic IH primarily affects pregnant women and is the most common kind of IH. Obesity, hypertension, medicines, and other illnesses contribute significantly to developing IH (4). IH is characterized by a wide range of clinical symptoms, such as sickness and vomiting, headache, a change in mental status, ocular palsies, Papilledema, and back pain. If not treated, Papilledema may cause blindness, visual disturbances, and optic atrophy (5). Pupil dilation, drooping eyelids, and abducens palsies are further signs of Cushing's syndrome. A broadened pulse pressure characterizes Cushing's trio, an increased systolic blood pressure, an irregular respiratory rhythm, and bradycardia (6). Cerebral stress, or the anxiety of blood flow in the brain, is maintained constantly via autoregulation under normal circumstances. Ischemia is a significant consequence of IH.

Pressure fluctuations in the brain increase the body's already high blood pressure and cause the cerebral blood vessels to widen. This might cause brain damage like infarction or bleeding within the skull, known as an intracranial hemorrhage (2). The issue of IH may be pretty dangerous. Estimates put the yearly rate of IH at 1 in 100,000 people (5). Recent estimates put the rate at 13 new cases per 100,000 people (7). Obesity is often seen as the root cause of the recent spike in illness rates. Women between the ages of 15 and 44 who are overweight had the most significant incidence (21 occurrences per 100,000 people) (8). Ireland has the highest incidence rate of 28 annual cases per 100,000 people (1). Pakistan has lagged behind other nations in studying IH, despite the growing problem it poses internationally. It is anticipated that IH will continue to rise in the future years as a result of the worldwide epidemic of obesity. Therefore, it's crucial to grasp the numerous vantage points around IH. This investigation aimed to analyze the causes of elevated intracranial pressure and the ophthalmological characteristics

of patients who presented to the Neuro-ophthalmology Outpatient Department (OPD).

Methods

Patients who reported symptoms of intracranial hypertension were included in this cross-sectional research to evaluate the potential causes and clinical characteristics of this condition (IH). For this analysis, we had 67 patients referred to the Neuro-ophthalmology Outpatient Department (OPD) between January 2019 and July 2020. The neurology outpatient department and other ophthalmology clinics referred these individuals. After informing participants about the study's goals and reassuring them that their information would be kept private, permission forms were gathered. Patients were evaluated based on their background information, physical examination, neuroimaging, and laboratory results. Participants had to meet the inclusion criteria of both a headache and optic disc edema. Patients who had missing information were disqualified. Age, gender, body mass index, and other patient information (BMI) were recorded. Patients ranging in age from 10-60 years old were considered. Patients' names, initial diagnoses, subsequent diagnoses, operations, and hospitalization dates were recorded. The incorporation Modified Dandy Criteria included papilledema, negative magnetic resonance imaging (MRI), a normal cerebrospinal fluid (CSF) analysis, and intracranial pressure of 25 cm H₂O as measured by a lumbar puncture or CSF infusion research. In addition, all patients had a CT scan, brain MRI, and MR venography. Hematological analysis was performed in the lab using RBS, urea, and FBS. Each patient also had a serological investigation consisting of HCV and HBV. Only 32 patients were included in the final analysis since they met all inclusion criteria. Some of the clinical symptoms noted were headache, tinnitus, diplopia, and brief visual obscurations. Each patient's potential causes of illness were also recorded. Hydrocephalus, brain tumors, trauma, nontraumatic intracerebral hemorrhage, and idiopathic intracranial hypertension were all included in this category.

SPSS is used to examine the data. Frequencies and standard deviations are used to illustrate the variables. Means and standard deviations for the two demographic factors of age and body mass index are shown.

Results

Table 1 displays participant demographic information. A wide range of ages (15-65) was represented among the participants, with a mean age of 21.5 ± 3.4 years. The average age of the participants was 23. The prevalence was higher in females (n = 30; 82%) than in men (n = 7; 19%). Most patients (n = 14, or 47%) had body mass indexes that put them in the overweight category. Only three patients (9 percent) reported being obese based on BMI. Body mass index averaged 30.75 ± 2.5 kg/m².

Table 1: Frequency of Demographics variables and percentage

Variables	Frequency (n)	Percentage (%)
<i>Age (years)</i>		
15-21	5	11
22-35	1	38
36-41	1	29
42-51	8	14
52-66	6	7
	3	
<i>Gender</i>		
Male	5	19
Female	2	82
	7	
<i>BMI (kg/ m²)</i>		
Underweight	2	4
Normal	1	39
Overweight	2	45
Obese	1	10
	4	
	4	

Table 2 depicts the clinical features of patients. In total, 20 (67 %) were reported with a headaches. Tinnitus was present in 6 (13 %), diplopia in 4 (9 %), and transient visual obscurations in 11 (32 %) patients. However, 2 (4 %) patient was asymptomatic. The mean intracranial pressure was 31 cm H₂O.

Table 2: Scientific features

Scientific features	Frequencies (n)	Percentages (%)
Headache	20	67
Tinnitus	6	13
Diplopia	4	9
Transient visual obscurations	11	32
Asymptomatic	2	4

Patients show signs such as severe vision loss (n = 4; 9%), moderate vision loss (n = 3; 6%), disc swelling (n = 30; 98%), mild disc swelling (n = 4; 15%), severe disc swelling (n = 20; 58), swelling with hges (n = 5; 13%), optic atrophy (n = 4; 9%), periphlebitis (n = 2; 4%), and uveitis (n = 2; 2%).

Both regular social interactions and the regular use of prescription drugs increase the probability of IH. Pregnancy (n = 1; 2%), anaemia (n = 12; 35%), sleep apnea (n = 4; 10%), and hypertension (n = 7; 19%) were all shown to have systematic correlations in certain individuals. Polycystic ovarian disease (n = 2; 4%), elevated PTH level (n = 4; 8), parathyroid adenoma (n = 2; 4%), hypothyroidism (n = 1; 7), celiac disease (n = 1; 7) and menstrual abnormalities (n = 2; 4%) were also revealed to be significant systematic correlations in patients. Medication history

was recorded for some of the individuals. Five (19%) of these patients were taking hormone supplements, 3% were taking vitamin A, and 1% were on steroids or daltacortil. Only one patient needed surgery.

Table 3 displays the participants' underlying causes. Idiopathic intracranial hypertension was the leading cause in this case (43.7%). The second most common malignancy was found in the brain, at 15.6%. There was a 3.1% prevalence of all other etiologies, which included trauma, non-traumatic intracerebral hemorrhage, and hydrocephalus.

Table 3: Frequencies of Etiologies and Percentage

Etiologies	Frequencies(n)	Percentages(%)
Trauma	2	4
Brain tumor	4	14
Non-traumatic intracerebralhemorrhage	2	2
Idiopathic intracranial hypertension	12	42
Hydrocephalus	2	4

Discussion

According to the current investigation results, IH is more common in women than in men. Prevalence was 81.25% among females and just 19% among men. Previous investigations by Ma et al. (4), Alali et al. (9), and Mondragon & Klovenski (11) corroborate this finding (2). Many studies have shown a strong correlation between IH and feminine gender. For women, the most significant risks are being between the ages of 20 and 30 and being overweight or pregnant (3). The results of the current study agree with those of those earlier studies. The recent research found the most significant occurrence between the ages of 21 and 35 (37%).

However, 3 (9%) individuals were overweight, and 14 (45%) were obese. Aside from these two, other significant systematic relationships included anemia and hypertension. Prior research by Ananth et al. (11) and Pai et al. (12) has shown that IH is linked to anemia, and previous research by these same authors has demonstrated that IH is also linked to hypertension (3). Earlier studies by Stevens et al. (10) and Pal et al. (11) have placed too much emphasis on pregnancies, whereas the current study only reports one case of pregnancy (4%). It's also possible to link IH to the use of certain drugs. The studies conducted by Tan et al. (13). Current scientific studies revealed similar conclusions. Deltacortil, thyroxine, isotretinoin, and steroids were among the several drugs previously used by the patients. In contrast, hormone supplements were the most often prescribed drugs.

Idiopathic intracranial hypertension has been stressed as a significant public health issue by many studies, including Sharma et al. (14), Zanon et al. (15), Mollan et al. (16), Lichtenberg et al. (17), and Kilgore et al. (18). Idiopathic intracranial hypertension was shown to be the cause of 43.7% of cases in the current investigation, which is consistent with previous studies on the topic.

Conclusion

The Severe symptoms of cerebral hypertension's fast development may be short-term blindness. A close association between the two disorders aids in the early diagnosis and treatment of cerebral hypertension. This has the potential to lower the risk of blindness and other complications. Women aged 20-30 who are overweight or pregnant are more likely than other women to have idiopathic intracranial hypertension (IH). As a result, it is essential to explore quick treatment for people exhibiting relevant clinical indications and risk factors to avoid unfavorable outcomes.

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