

To Assess the Characteristics of Individuals with Disc Edema/Papilledema and Their Presenting Symptoms

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Abstract

Aim: To assess the characteristics of individuals with disc edema/papilledema and their presenting symptoms.

Material & Methods: The present study is a non-randomized prospective case series being conducted in Department of Ophthalmology, AIIMS, Patna, Bihar India. All the patients with disc edema/papilledema. Proven case of disc edema and Proven case of papilledema were included in this study. Cases of pseudopapilledema were excluded from the study.

Results: Most commonly affected age group was between 21-30 years in which 32% case were observed, least common affected age group was 51-60 years in which 6% case were observed. In this study 42% affected were males and 58% females. In this study 70% cases of bilateral (papilloedema) and 30% case of unilateral disc edema were observed. In this study out of 50 patient, 30% patient were of local cause in which 22% cases were of optic neuropathy followed by 6% cases of AION in age group of 51-60 year followed by 2% cases of BRAO in age group of 41-40 years. In this study out of 50 patient, 24% cases of ICSOL in systemic causes followed by 12% cases of meningitis, 10% cases of malignant hypertension, 8% cases of drug history, 6% cases of malaria and 2% case each of diabetes, pseudotumorcerebri, anaemia, encephalopathy and head injury. Most common presenting complaint was headache in 70% cases followed by DOV in 50% cases, nausea and vomiting in 48% cases, LR palsy and Diplopia in 4% cases.

Conclusion: Because ophthalmoscopic evaluation and subjective grading of papilledema can show significant variability among observers and requires specialized clinical expertise, the estimate of ONH shape and quantification of optic disc swelling from stereo fundus photographs by three-dimensional (3-D) image analysis methodology may improve reproducibility and reliability of the assessment of papilledema and thus improve clinical decision-making regarding its diagnosis and treatment.

Keywords: Disc Edema, Papilledema, Symptoms.

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Introduction

Disc edema, also known as papilledema when associated with increased intracranial pressure, is a critical ophthalmologic finding that can signal a range of underlying systemic and neurological conditions. Understanding the profile of patients presenting with disc edema and their clinical patterns is essential for timely diagnosis and management to prevent potential vision loss and address any life-threatening causes. [1-3] Papilledema is commonly caused by intracranial hypertension, which may be idiopathic or secondary to various pathologies such as brain tumors, cerebral venous sinus thrombosis, and meningitis. The clinical presentation can vary widely, ranging from asymptomatic cases discovered during routine eye examinations to severe headaches, visual disturbances, and other neurological deficits. Early recognition and intervention are crucial in managing

these patients and mitigating complications. The demographic profile of patients with disc edema can provide insights into the etiology and risk factors associated with this condition. Studies have shown that certain age groups, genders, and comorbid conditions may be more predisposed to developing disc edema. For instance, idiopathic intracranial hypertension predominantly affects obese women of childbearing age, whereas papilledema in older adults may more commonly be linked to neoplastic processes or vascular abnormalities. The presenting symptoms of disc edema can offer clues to the underlying cause. Common symptoms include transient visual obscurations, pulsatile tinnitus, and diplopia, particularly if there is associated sixth nerve palsy. Headaches, which may worsen with Valsalva maneuvers or lying down, are frequently reported. Visual field testing often reveals an

enlarged blind spot or peripheral field loss, which can aid in the diagnostic process. Ophthalmologic examination remains the cornerstone of diagnosing disc edema. Fundoscopy typically reveals swollen optic discs with blurred margins, venous engorgement, and hemorrhages. [4-9] Ancillary tests such as optical coherence tomography (OCT) can quantify the extent of disc swelling, while visual field testing and neuroimaging help delineate the underlying cause. The management of patients with disc edema involves addressing the underlying etiology and reducing intracranial pressure if elevated. Therapeutic approaches may include medical treatments such as acetazolamide or surgical interventions like optic nerve sheath fenestration or cerebrospinal fluid shunting. Regular monitoring of visual function and disc appearance is vital to ensure therapeutic efficacy and prevent long-term sequelae. [10-18]

Material & Methods

The present study is a non randomized prospective case series being conducted in Department of Ophthalmology, AIIMS, Patna, Bihar India for 12 months. All the patients with disc edema/papilledema. Proven case of disc edema and Proven case of papilledema were included in this study. Cases of pseudopapilledema were excluded from the study.

All patients underwent a complete medical evaluation including careful history taking, ophthalmic examination, complete blood count, blood sugar, urea, creatinine, serum lipid profile, thyroid, chest x-ray in specific cases. and CSF analysis (including opening pressure). Ocular examination consists of visual acuity measurement with Snellen's chart, anterior segment examination using slit lamp biomicroscopy, applanation tonometry, stereoscopic fundus photography and visual fields evaluation using automated perimetry with the Humphrey 30-2 program. The degree of papilledema was graded using Frisen's scheme.^{3,4}

Thorough ophthalmic examination including: a. Assessment of visual acuity on Snellen's chart and near vision. b. Relative afferent pupillary defect- by swinging flash torch light examination.

c. Colour vision by Ishihara's chart 3. Intra ocular pressure-recorded with Schiottz indentation tonometer 4. Slit lamp examination. 5. Optic disc evaluation Using +78D/90D Condensing lens.

Following details were noted DISC, Cup size-, Color of the disc-, Cup disc ratio-, Cup disc asymmetry between two eyes-, Blurring of the disc margins-, Hemorrhage over disc-

Tortuosity of vein-, Venous pulsation.

In normal eye venous pulsation is present, if it is absent and not appear on pressing the globe it is indication of papilledema. Fundus evaluation with indirect ophthalmoscope and +90 D slit lamp examination done. In early papilledema we may get following fundus findings.

- Hyperemia of the disc
- Blurring of the disc margin
- Apparent forward protrusion of disc
- Blurring of the physiological cup
- Overfilling of the vein
- In some early case of papilledema, haemorrhage and exudates may be present at some distance from the disc. Fully developed and late papilledema.

The physiological cup becomes partially or completely obliterated, the margin of the disc becomes definitely blurred, the surrounding retina may have grayish tinge and the vessels are seen to climb to attain the disc, the veins become engorged. Haemorrhage may appear as a linear streak on the disc or around it.

Persistent papilledema: The arteries are not any time narrowed because when the arteries exhibit narrowing atrophic changes in the disc invariably follow.

Visual acuity, optic disc changes, and visual field defects were checked in all the patients during follow-up, which was done every 2 weeks for a month, monthly for 3 months, and after that every 6 months for 2 years.

Statistical Analyses

The analyses were largely descriptive, with means, standard deviations, and ranges reported for continuous variables and counts and percentages reported for categorical variables. Associations between continuous variables are described using either Pearson correlation coefficients or Spearman rank correlation coefficients, as appropriate.

Results

Table 1: age.

Age	No of Patient (n=50)	% of Patient
0-10	06	12
11-20	12	24
21-30	16	32
31-40	8	16
41-50	5	10
51-60	3	6
Total	50	100

Most commonly affected age group was between 21-30 years in which 32% case were observed, least common affected age group was 51-60 years in which 6% case were observed.

Table 2: Sex distribution

Sex	No of Case(n=50)	% of Case
Male	21	42
Female	29	58
Total	50	100

In this study 42% affected were males and 58% females.

Table 3: Laterality

Laterality of Disc Edema	No of Case(n=50)	% of Case
Unilateral	15	30
Bilateral	35	70
Total	50	100

In this study 70% cases of bilateral (papilloedema) and 30% case of unilateral disc edema were observed.

Table 4: Local Causes

Local Causes	Causes	No of Case	% of case
	Optic neuropathy	11	22
	Aion	3	6
	Brao	1	2
	Hypotony	0	0
	Raised iop	0	0
Total		15	30

In this study out of 50 patient, 30% patient were of local cause in which 22% cases were of optic neuropathy followed by 6% cases of AION in age group of 51-60 year followed by 2% cases of BRAO in age group of 41-40 years.

Table 5: Systemic Causes

Systemic Causes	Causes	No of Cases	% of Cases	
	Icsol	12	24	
	Diabetes	1	2	
	Malignant hypertension	5	10	
	Meningitis	6	12	
	Drug history	4	8	
	Pseudo tumor cerebri	1	2	
	Malaria	3	6	
	Anaemia	1	2	
	Encephalopathy	1	2	
	Head injury	1	2	
	Total		35	70

In this study out of 50 patient, 24% cases of ICSOL in systemic causes followed by 12% cases of meningitis, 10% cases of malignant hypertension, 8% cases of drug history, 6% cases of malaria and 2% case each of diabetes, pseudotumorcerebri, anaemia, encephalopathy and head injury.

Table 6: Symptoms of disc edema/papilledema

Symptom	No of Cases	% of Cases
Dov	25	50
Headache	35	70
Nausia/vomiting	24	48
Transient obscuration of vision	8	16
Lr palsy	2	4
Diplopia	2	4

Most common presenting complaint was headache in 70 % cases followed by DOV in 50 % cases, nausea and vomiting in 48 % cases, LR palsy and Diplopia in 4 % cases.

Discussion

Papilledema simply means oedema of the optic disc, without reference to its underlying cause. Recognition of papilledema is of great clinical importance because it is the classic and most important clinical sign of raised intracranial pressure. Modern diagnostic methods have advanced to such an extent that the recognition and treatment of raised intracranial pressure is usually undertaken before papilloedema appears. [18] Among symptomatology, headache is the most common symptom in our study similar study is by Julayanont P et al¹⁹ they studied, idiopathic intracranial hypertension (IIH) is an uncommon disorder characterized by increased intracranial pressure without radiological or laboratory evidence of intracranial pathology except empty sellaturcica, optic nerve sheath with filled out cerebrospinal fluid spaces, and smooth-walled nonflow-related venous sinus stenosis or collapse. This condition typically affects obese women. The incidence of IIH is increasing with the rising prevalence of obesity. Persistent headache is the most common symptom. Visual impairment is a serious complication that may not be recognized by the patients. This paper reviews clinical manifestations, diagnostic challenges, and current treatments of IIH in adults. Various imaging modalities have been studied on their validity for detection of IIH and papilledema. This review also includes new studies on medical, surgical, and interventional management of this condition. [19] Compression of optic nerve and optic nerve ischemia are the two major theories explaining papilledema caused by elevated ICP in IIH. [20] Papilledema is one of the hallmarks for diagnosis of IIH. Even though, papilledema is commonly symmetric or only mildly asymmetric, significant asymmetry may be found in some patients and can be explained by difference in size of bony optic canals or variation of trabecular meshwork in subarachnoid space surrounding optic discs. [21,22]

Unilateral papilledema is not commonly reported. [23,24], similar to our study. Fundoscopic examination is very important to evaluate this condition. Frisén's¹⁴ criteria has been widely accepted for grading severity of papilledema. It is very important to differentiate true papilledema from pseudoedema, which is the physiologic variant, or benign changes of the optic disc. Findings from fundoscopic examination showed that the presence of retinal or choroidal folds is a pathognomonic sign of true papilledema. However, this finding was seen only in 23% of the patients with true papilledema. The combination of four features from fundoscopic examination, including the swelling of the peripapillary retinal nerve fiber layer, peripapillary hemorrhages, papilla elevation, and congestion of peripapillary vessels, provides very good validity in differentiating true papilledema from pseudoedema (accuracy 93%, sensitivity 95%, and specificity 89%). [25] There is a study aimed at identifying the CSF proteome in IIH patients as the new biomarkers. Six proteins were upregulated in IIH, namely, sterol regulatory element-binding protein 1, zinc- α -2-glycoprotein, immunoglobulin heavy constant α -1, α -1-antitrypsin, serotransferrin, and haptoglobin. Four proteins were downregulated in IIH, including hemopexin, angiotensinogen, vitamin-D-binding protein, and transthyretin. Angiotensinogen was the first protein validated in the study, and it was found that down-regulation of angiotensinogen may contribute to the increased CSF production, which subsequently causes IIH. The study of other proteins may provide more knowledge on the new biomarkers for diagnosis of IIH. Moreover, these proteins may be the target for therapeutic intervention. [26] As expected, the majority of patients in this series reported headaches, consistent with previous studies. [27,28,29] Depression was present in about half the patients in both groups; this finding is also consistent with previous studies [30]. Pulsatile tinnitus was a common symptom in both IIHWP patients (48%) and IIHWOP patients (33%); this was consistent with previous findings. [28] A significant number of IIHWOP patients in this series reported auras. This may indicate that a significant number of IIHWOP

patients are also migraine sufferers. Indeed, it has been observed that most patients with IHH have migrainous headaches unrelated to increased intracranial pressure. [31] Some may argue that IHHWOP is merely migraine in obese individuals. However, all of our IHHWOP patients underwent carefully performed measurements of OPs or they were not included in the study. In addition, 65% of our patients had 2 or more elevated reading on more than one occasion. Furthermore, 11 of our patients with IHHWOP had one or more other symptoms of increased ICP (besides headache). Finally, 4 of our IHHWOP patients also had aura symptoms with migraine in addition to intracranial hypertension, headache is also common symptom in our study. Vertigo was more frequently present in IHHWOP although nearly half of the IHHWOP subjects also endorsed dizziness or vertigo on a review of systems. In a study reviewing complaints of patients with IHH, vertigo and dizziness are more common when clinicians routinely query for them. [32] Children with IHH frequently complain of dizziness and are ataxic. [33] In the recent William F. Hoyt Lecture of the American Academy of Ophthalmology, Dr Jonathan Trobe posited that papilledema is only a reliable indicator of chronically high ICP because the development of papilledema tends to lag behind the rise in ICP. Trobe noted that fewer than 20% of patients examined within a few days of head trauma or ruptured aneurysm have papilledema and only 6% of patients with chronically high ICP lack papilledema. [34] In this study out of 50 patient, 30% patient were of local cause in which 22% cases were of optic neuropathy followed by 6% cases of AION in age group of 51-60 year followed by 2% cases of BRAO in age group of 41-40 years. 24% cases of ICSOL in systemic causes followed by 12% cases of meningitis, 10% cases of malignant hypertension, 8% cases of drug history, 6% cases of malaria and 2% case each of diabetes, pseudotumor cerebri, anaemia, encephalopathy and head injury, similarly Agrawal et al¹⁸ found systemic causes are more prominent than local causes, in which ICSOL are most common among all causes. In this study 70% cases of bilateral (papilloedema) and 30% case of unilateral disc edema were observed which is correlated with many studies^{2,3,4} while Bidot S et al²¹ studied, asymmetric papilledema in idiopathic intracranial hypertension (IHH) and found Of the 559 adult patients with definite IHH, 20 (3.6%; 95%CI: 2.3-5.6%) had very asymmetric papilledema at initial evaluation. They were older (39 versus 30 years; $p < 0.001$), had lower cerebrospinal opening pressure (35.5 versus 36 cm of water; $p = 0.03$), and were more likely to be asymptomatic compared to patients with symmetric papilledema (27% versus 3%; $p < 0.001$). Visual fields were worse on the side of the highest-grade papilledema ($p = 0.02$). The bony optic canal was smaller on the side of the lowest-

grade edema in all 8 patients (100%) in whom the imaging was sufficient for reliable measurements ($p = 0.008$).

Conclusion

Because ophthalmoscopic evaluation and subjective grading of papilledema can show significant variability among observers and requires specialized clinical expertise, the estimate of ONH shape and quantification of optic disc swelling from stereo fundus photographs by three-dimensional (3-D) image analysis methodology may improve reproducibility and reliability of the assessment of papilledema and thus improve clinical decision-making regarding its diagnosis and treatment.

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