

An Observational Study to Evaluate the Clinical Profile and Analysis of Visual Field Pattern in Optic Disc Edema

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Received: 09-02-2024 / Revised: 16-03-2024 / Accepted: 23-04-2024

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Conflict of interest: Nil

Abstract

Aim: The aim of the present study was to evaluate the clinical profile and analysis of visual field pattern in optic disc edema cases.

Methods: This study was prospective observational study conducted on patients diagnosed with disc edema attending outpatient clinic or referred from other departments to Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India. In the present study, a total of 100 patients were enrolled.

Results: Most common age group was 21 to 40 years (53%), followed by 41 to 60 years (28%), more than 60 years (14%) and only 5% were aged less than 20 years. Mean age of all patients in the present study was 39.7±15.43 years. There were 60 females and 40 males. The most common presenting complaint was headache, which was reported by 64% of the patients. Out of 100 patients, 25 (25%) patients had hypertension. There were 9% patients with diabetes mellitus and 8% with tuberculosis. There was no change in visual acuity of the right and left eye in any of the patient after 48 hours of presentation. There was no change observed in stages of papilledema in any of the patient even after 48 hours of presentation.

Conclusion: While evaluating a patient of disc edema both systemic and local causes should be kept in mind. Detailed history taking, supportive examinations such as visual field, color-vision and imaging tests should be performed. Ocular examination and neuroimaging helps in early diagnosis of several intracranial lesions in patients with papilledema which provides better prognosis and may save the life of patient by early intervention. Thus thorough ocular examination helps in early diagnosis of disc edema and prompt treatment may prevent progress of disease and loss of vision.

Keywords: optic disc edema, headache, altitudinal defect, centrocaecal scotoma

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Introduction

Optic disc oedema (ODE) can be a vital manifestation of varied ocular as well as systemic disorders. [1] Some of them are relatively benign, while others may have devastating visual and neurological consequences. ODE is a collective term including 'papillitis', that is, disc oedema due to inflammation of optic disc, 'papilloedema', that is, disc swelling due to elevated intracranial pressure, and 'pseudopapilloedema', that is, the normal physiological variant without any pathological feature. ODE can also result from ischemic optic neuropathy, which results from the infarction of the optic nerve head due to occlusion of the posterior ciliary arteries. [2]

Ophthalmologists may be the person whom a patient with ODE consults first and foremost. Thus, ophthalmologists must know how to differentiate among the varied aetiologies based on the history and clinical features. Systemic investigations and radiological imaging should be tailored according to the patient's provisional diagnosis based upon history and examination. It is the clinician's role to place the swollen optic disc in the context of the patient's demographic and clinical profile (age, sex, medical comorbidities and body habitus) and careful neuro-ophthalmic evaluation. [1] A prompt diagnosis and treatment may be sight and life-saving in many of these cases. Clinical examination on

fundoscopy still remains the most preferred investigation to diagnose ODE and differentiate it from cases of pseudopapilloedema. The morphological and vascular signs of disc oedema help an ophthalmologist to diagnose ODE with high accuracy and sensitivity. It includes a combination of four features, that is, swelling, haemorrhage, papilla elevation and peripapillary vessel congestion. The presence of retino-choroidal folds is most specific for true disc oedema. [3]

Spectral-domain optical coherence tomography (SD-OCT) of the optic nerve head has recently proved its suitability in identifying and quantifying ODE in limited studies by measuring the retinal nerve fibre layer (RNFL) thickness. [4–6] This is an in vivo quantitative and objective measure that can detect, characterize and monitor axonal swelling associated with ODE. It is also an important tool to differentiate true ODE cases from pseudopapilloedema and also in cases with early ODE, where the clinical examination is inconclusive. [5,6] However, there is no definitive evidence yet that OCT can define a particular pattern of ODE.

Recent studies also looked at the OCT angiographic (OCTA) features in patients with papilloedema, papillitis and non-arteritic ischemic neuropathy (NAION). In the acute phase, the clinical picture may not be diagnostic of specific aetiology and quantitative measurement on OCT can be inconclusive. On OCTA, there may be pattern alteration in the peripapillary capillary vessels in cases with NAION and papillitis, whereas surface capillaries can be dilated and tortuous in patients with papilloedema. [7]

The aim of the present study was to evaluate the clinical profile and analysis of visual field pattern in optic disc edema cases.

Materials and Methods

This study was non randomized prospective case study conducted on patients diagnosed with disc edema attending outpatient clinic or referred from other departments to Department of Ophthalmology, Patna Medical College and Hospital, Patna, Bihar, India for one year. In the present study, a total of 100 patients were enrolled. Patients were registered and informed consent was taken from them for the study.

Inclusion Criteria

- All the patients above 15 years of age
- Patients presenting with unilateral or bilateral disc edema
- Patients willing to participate in the study.

Exclusion Criteria

- Patients with hazy media impairing the visualization of fundus.

- Patients not giving consent.

Methodology

Patients were evaluated with detailed history of symptoms including defective vision for distant and near, headache, double vision, transient visual-obscuration, nausea, vomiting, altered consciousness, deviation of eyeball to left or right along with their onset, duration and progression. In all patients were history of hypertension, diabetes mellitus and any other systemic illness, head injury, brain tumour, ocular infection was noted. Past history of ocular infection, surgery, trauma, history of any drugs use like amiodarone, tetracycline etc were also noted. In female patients, obstetric history was taken carefully. Examination findings including general physical examination, pulse, blood pressure was done.

Thorough ophthalmic examination was performed as under: Distant uncorrected visual acuity of all patients using Snellen's chart or illiterate E chart of both eyes along with corrected visual acuity using pinhole. Pupil size and reaction. Relative afferent pupillary defect by swinging flash light examination. External eye examination for conditions like exophthalmos, buphtalmos, deviation of eyeball. Extraocular movements both for ductions and versions in all cardinal positions. Slit lamp examination to see any opacity in all media, anterior chamber depth, lens for evidence of cataract, pseudophakia, aphakia and anterior vitreous for pigment and cells. Color vision by Ishihara's chart. Intraocular pressure with schiotz tonometer. Visual fields evaluation using automated perimetry with Humphrey 30-2 program. Dilatation of pupils with tropicamide 1% eye drops in patients with normal IOP and normal anterior chamber depth. Fundus evaluation using direct ophthalmoscope (Heine beta 200s) and +90D aspheric volk lens and Haag streit B M 900 slit lamp biomicroscope. Optic disc evaluation using +90D condensing lens was done and disc cup size, colour, cup disc ratio, cup disc asymmetry between two eyes, hyperaemia of disc, blurring of disc margins, forward protrusion of disc, haemorrhage over disc, tortuosity of vein and venous pulsation were noted. Fundus photography was done in all patients. Investigations including complete hemogram, serum lipid profile, thyroid test, chest x ray and cerebrospinal fluid analysis was done in specific cases. Magnetic resonance imaging and computerized tomography scan was done all patients.

Follow up

Visual acuity, optic disc changes and visual field defects were evaluated in all the patients during

follow up which was done after 48 hours.

Results

Table 1: Baseline characteristics

Age groups in years	N	%
<20 years	5	5
21-40 years	53	53
41-60 years	28	28
>60 years	14	14
Sex		
Male	60	60
Female	40	40
Presenting complaints		
Blurring of vision	2	2
Headache	64	64
Nausea/Vomiting	8	8

Most common age group was 21 to 40 years (53%), followed by 41 to 60 years (28%), more than 60 years (14%) and only 5% were aged less than 20 years. Mean age of all patients in the present study

was 39.7 ± 15.43 years. There were 60 females and 40 males. The most common presenting complaint was headache, which was reported by 64% of the patients.

Table 2: Associated systemic illness of patients with disc edema

Systemic illness	N	%
Diabetes Mellitus	9	9
Hypertension	25	25
Tuberculosis	8	8
PIH	2	2
Polycythemia Vera	2	2
HIV	2	2

Out of 100 patients, 25 (25%) patients had hypertension. There were 9% patients with diabetes mellitus and 8% with tuberculosis.

Table 3: Best corrected visual acuity in both eye of patients with disc edema

BCVA	Right eye				Left eye			
	Initial visit		After 48 hours		Initial visit		After 48 hours	
	N	%	N	%	N	%	N	%
6/6	41	41	40	40	48	48	49	49
6/9-6/18	22	22	23	23	16	16	15	15
6/24-6/60	20	20	19	19	24	24	24	24
< 6/60	17	17	18	18	12	12	12	12
Total	100	100	100	100	100	100	100	100

There was no change in visual acuity of the right and left eye in any of the patient after 48 hours of presentation.

Table 4: Visual field pattern in patients with disc

Visual Fields	Initial visit		After 48 hours	
	N	%	N	%
Centrocaecal Scotoma	5	5	4	4
Altitudinal defect	12	12	13	13
B/S enlarged	26	26	26	26
Severely depressed field	1	1	1	1
Not done	29	29	28	28
Normal	27	27	28	28

There was no change observed in stages of papilledema in any of the patient even after 48 hours of presentation.

Discussion

Optic disc edema refers to the swelling of the optic disc with concurrent increase in fluid within or surrounding the axons. Swollen disc implies axonal distension and elevation of the optic disc. Optic disc swelling is distinct from optic disc atrophy which refers to a loss of nerve fibres at the optic nerve head and which results in a pale disc.⁸ The work up for optic disc edema should be individualized based upon the history and examination, but in general neuroimaging is recommended for unexplained optic disc edema (especially bilateral). Optic disc swelling is a characteristic presentation of various diseases, such as intrinsic ocular disease, as well as intracranial lesions and systemic diseases. [9,10]

Most common age group was 21 to 40 years (53%), followed by 41 to 60 years (28%), more than 60 years (14%) and only 5% were aged less than 20 years. Mean age of all patients in the present study was 39.7 ± 15.43 years. There were 60 females and 40 males. Solanki et al [11] conducted a prospective case study on 50 patients with optic disc edema, out of which 42% of patients were males and 58% of patients were females. The most commonly affected age group in that study was between 11 to 20 years. Unilateral and bilateral disc edema was observed in 30% and 70% of patients respectively in their study. These findings were consistent with our study findings.

The most common presenting complaint was headache, which was reported by 64% of the patients. Out of 100 patients, 25 (25%) patients had hypertension. There were 9% patients with diabetes mellitus and 8% with tuberculosis. There was no change in visual acuity of the right and left eye in any of the patient after 48 hours of presentation. There was no change observed in stages of papilledema in any of the patient even after 48 hours of presentation. In a study conducted by Rani et al¹² 58 patients (77.4%), had a best corrected visual acuity of $>6/18$ at presentation, while in our study 46 patients (63%) in right eye and 47 patients (64.4%) in left eye had a best corrected visual acuity of $>6/18$ at presentation. This can be due to papilledema in most of the patients. In the acute phase of papilledema, there is a mismatch between a markedly swollen disc and relatively spared optic nerve function, particularly central visual acuity. While causes for poor visual acuity included cavernous sinus thrombosis, optic neuritis, NAION, ethambutol toxicity and diabetic papillopathy.

In a study conducted by Vangla et al [13] headache was the commonest symptom (85%) and usually was followed by vomiting which occurred in 56% of

the cases. The headache is often reported as the worst pain experienced. In patients with brain tumours and increased intracranial pressure, the headache due to the mass lesion is difficult to separate from the headache due to idiopathic intracranial hypertension. [14] Diplopia and facial pain are suggestive of multiple cranial neuropathies seen in inflammatory or neoplastic lesions of the posterior orbit or parasellar region. Transient diplopia and headache should raise the suspicion of raised intra-cranial pressure. [15] In a study conducted by Jung et al [16] most common type of visual field defect observed in patients with NAION was inferior altitudinal field defect. Centrocecal scotoma was observed in 4 out of 6 patients with optic neuritis (5.5%). Severely depressed field was observed in patient with traumatic optic neuropathy and in one patient with ethambutol induced optic neuritis. [17]

Conclusion

While evaluating a patient of disc edema both systemic and local causes should be kept in mind. Detailed history taking, supportive examinations such as visual field, color-vision and imaging tests should be performed. Ocular examination and neuroimaging helps in early diagnosis of several intracranial lesions in patients with papilledema which provides better prognosis and may save the life of patient by early intervention. Thus thorough ocular examination helps in early diagnosis of disc edema and prompt treatment may prevent progress of disease and loss of vision.

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