

Clinical profile and analysis of visual field pattern in optic disc edema cases

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Abstract

Background: Optic disc edema refers to the swelling of the optic disc with concurrent increase in fluid within or surrounding the axons. The work up for optic disc edema should be individualized based upon the history and examination.

Aim: To evaluate the clinical profile and analysis of visual field pattern in optic disc edema cases. **Material and Methods:** A total of 73 patients diagnosed with disc edema were evaluated for clinical features. Thorough ophthalmic examination was performed and analysis of visual field pattern was noted. **Results:** The most common presenting complaint was headache, which was reported by 63% of the patients. Next common presenting complaint was decreased vision in 49.3%. Visual field examination revealed enlarged b/s in 26%, altitudinal defect in 12.3% and centrocaecal scotoma in 5.5%. **Conclusion:** While evaluating a patient of disc edema detailed history taking, supportive examinations such as visual field, color-vision and imaging tests should be performed. 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 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.¹ 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.^{2,3} Usually, most cases with bilateral ODS are considered to be caused by elevated intracranial pressure and on the other hand, unilateral ODS is

considered to be mainly caused by ocular conditions, such as anterior ischemic optic neuropathy or optic neuritis. The present study was conducted to evaluate the clinical profile and analysis of visual field pattern in optic disc edema cases.

MATERIAL 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 of our tertiary care centre. Prior permission of institutional ethics committee was obtained. 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

In the present study, a total of 73 patients were enrolled. Most common age group was 21 to 40 years (54.8%), followed by 41 to 60 years (28.8%), more than 60 years (12.3%) and only 4.1% were aged less than 20 years. Mean age of all patients in the present study was 39.7±15.43 years. There were 43 females and 30 males.

Table 1: Age and sex distribution

Characteristics	No. of patients	Percentage
Age groups		
≤20 years	03	4.1%
21-40 years	40	54.8%
41-60 years	21	28.8%
≥60 years	09	12.3%
Sex		
Male	30	58.9%
Female	43	41.1%

Bilateral involvement was seen in 61.6 % and unilateral involvement was found in 38.4% of patients.

Table 2: Presenting complaints of patients with optic disc edema

Presenting Complaints	No. of patients	Percentage
Blurring of vision	2	2.7%
Headache	46	63.0%
Decreased vision	36	49.3%
Diplopia	5	6.8%
Nausea/ Vomiting	7	9.6%

The most common presenting complaint was headache, which was reported by 63% of the patients. Next common presenting complaint was decreased vision in 49.3%. Less common complaints were nausea/vomiting, diplopia and blurring of vision. Out of 73 patients, 19 (26%) patients had hypertension. There were 9.6% patients with diabetes mellitus and 8.2% with tuberculosis. Less common associated systemic illnesses were PIH, polycythemia, HIV and mucormycosis.

Table 3: Associated systemic illness of patients with disc edema (N=73)

Systemic Illness	No. of patients	Percentage
Diabetes Mellitus	07	9.6%
Hypertension	19	26.0%
Tuberculosis	06	8.2%
PIH	01	1.4%
Polycythemia Vera	01	1.4%
HIV	01	1.4%
Mucormycosis	01	1.4%

At presentation best corrected visual acuity in the right eye was 6/6 in 41.1% of the patients, 6/9 to 6/18 in 21.9% of the patients, 6/24 to 6/60 in 19.2% of the patients and less than 6/60 in 17.8% of the patients. There was no change in visual acuity of the right eye in any of the patient after 48 hours of presentation. Best corrected visual acuity in the left eye was 6/6 in 49.3% of the patients, 6/9 to 6/18 in 15.1% of the patients, 6/24 to 6/60 in 24.7% of the patients and less than 6/60 in 11% of the patients. There was no change in visual acuity of the left eye in any of the patient after 48 hours of presentation.

Table 4: Best corrected visual acuity in both eye of patients with disc edema (N=73)

BCVA	Right eye				Left eye			
	Initial visit		After 48 hours		Initial visit		After 48 hours	
	N	%	N	%	N	%	N	%
6/6	30	41.1%	30	41.1%	36	49.3%	36	49.3%
6/9-6/18	16	21.9%	16	21.9%	11	15.1%	11	15.1%
6/24-6/60	14	19.2%	14	19.2%	18	24.7%	18	24.7%
< 6/60	13	17.8%	13	17.8%	8	11%	8	11%
Total	73	100.0%	73	100.0%	73	100%	73	100%

Relative afferent pupil defect was observed in 29 (39.7%) of the patients, RNL was observed in 43 (58.9%) and anisocoria was seen in 1 (1.4%) of the patients. Functions of extra-ocular muscles was normal in 67 (91.8%) of the patients, restricted movements in 6 (8.2%), out of which 5.5 % had sixth nerve palsy. Color vision was normal in 42 (57.6%) of patients and 24 (32.9%) of the patients had defective color vision whereas in 7 (9.5%) patients the examination was not done.

Table 5: Visual field pattern in patients with disc edema (N=73)

Visual Fields	Initial visit		After 48 hours	
	N	%	N	%
Centrocaecal Scotoma	4	5.5%	4	5.5%
Altitudinal defect	9	12.3%	9	12.3%
B/S enlarged	19	26.0%	19	26.0%
Severely depressed field	2	0.67%	2	0.67%
Not done	21	28.76%	21	28.76%
Normal	18	24.65	18	24.65
Total	73	46.6%	73	46.6%

Visual field examination revealed enlarged b/s in 26%, altitudinal defect in 12.3% and centrocaecal scotoma in 5.5%. Visual field examination could not be done in 28.7% of the patients. There was no change observed in visual field in any of the patient after 48 hours of presentation. Papilledema was present in 43 patients. Of these, stage 2 papilledema was observed in 2.3%, stage 3 in 23.2%, stage 4 in 37.2% and stage 5 in 37.2% of patients. There was no change observed in stages of papilledema in any of the patient even after 48 hours of presentation.

DISCUSSION

Optic disc edema is the end result of a wide range of pathological processes. In our study, a total of 73 patients with optic disc edema were enrolled in the study, out of which, 43 (58.9%) were females and 30 (41.1%) were males. The work up for optic disc edema was individualized based upon the history and examination but in general neuroimaging was recommended for unexplained optic disc edema (especially bilateral). Mean age of all patients in the present study was 39.7±15.43 years and the most common age group was 21 to 40 years (54.8%). Unilateral and bilateral disc edema was observed in 38.4 % and 61.6 % of patients respectively in our study. Solanki *et al.*⁴ 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. Best corrected visual acuity in the right eye was 6/6 in 41.1% of the patients, 6/9 to 6/18 in 21.9% of the patients, 6/24 to 6/60 in 19.2% of the patients and less than 6/60 in 17.8% of the patients. BCVA in the left eye was 6/6 in 49.3% of the patients, 6/9 to 6/18 in 15.1% of the patients, 6/24 to 6/60 in 24.7% of the patients and less than 6/60 in 11% of the patients.

In a study conducted by Rani *et al.*,⁵ 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. The most common presenting complaint was headache which was present in 63% of the patients in our study. The presence of headache was common in patients with IHH, grade IV hypertensive retinopathy, space occupying lesion and meningitis. Diplopia was observed in 6.8% of patients, most commonly in patients with sixth cranial nerve palsy (5.5 %). Rani *et al.*⁵ conducted a study to analyze various causes for the papilledema at a tertiary care hospital in South India. The most common symptom was headache (88%) in their study. Diplopia was the least reported symptom with only 9% experiencing it and it was due to VI nerve palsy (false localizing sign) in 9 patients while in 2 patients it was due to III and IV nerve palsy. In a study conducted by Vangla *et al.*⁶ 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.⁷ 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.⁸ RAPD was observed in 39.7% of patients in our study, which was mostly found in patients diagnosed with NAION, optic neuritis and cavernous sinus thrombosis. In a study performed in patients with optic neuropathy of various etiologies (anterior ION, posterior ION, compressive optic neuropathy, and traumatic optic neuropathy), Nakanaishi *et al.*⁹ concluded that substantial retinal ganglion cell damage is required for the development of RAPD. They estimated 25% RNFL loss in the affected eyes compared with the unaffected eyes before RAPD was clinically detected. In the presence of bilateral symmetric optic neuropathy, a RAPD may be absent and the briskness of pupillary constriction to light will reflect the degree of optic nerve dysfunction.⁸ Color vision was normal in 57.6% of patients and defective in 32.9 % of patients. Patients with papilledema had normal colour vision in our study. Defective colour vision was observed in patients with NAION, Optic neuritis, ethambutol toxicity, CRVO and traumatic optic neuropathy in our study. Long standing or severe papilledema may result in bilateral optic nerve dysfunction and secondary optic atrophy.¹⁰ This leads to irreversible visual loss, constriction of visual fields and poor colour vision.¹¹ The Optic Neuritis Study Group¹² reported that 94% of patients had abnormal color vision in the acute phase of the disease and that about 40% had residual color defects at 6 months. One must consider the time of testing relative to onset of symptoms when evaluating color vision findings in optic neuritis.¹³ In our study, visual field showed blind spot enlargement in 26% of patients. Altitudinal field defect was present in 12.3% of patients, which was observed in patients with NAION. In a study conducted by Jung *et al.*¹⁴ most common type of visual field defect observed in patients with NA-AION was inferior altitudinal field defect.¹⁵ 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.

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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