

EVALUATION OF THE CAUSES OF OPTIC DISC OEDEMA- AN OBSERVATIONAL STUDY

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ABSTRACT**BACKGROUND**

There are very few studies on the common causes and clinical features of optic disc swelling in Asian population. Therefore, this study is to determine the clinical manifestations and aetiology of optic disc oedema.

MATERIALS AND METHODS

All patients presenting with unilateral or bilateral disc oedema who attended the Ophthalmology OP, Stanley Medical College, were included in the study. Evaluation of BCVA, colour vision, anterior segment, visual fields by Octopus field analyser, detailed fundus and optic nerve by direct ophthalmoscope/90D/indirect ophthalmoscope was done in all subjects. Fundus photograph was taken in selected cases.

RESULTS

The result of the study revealed that optic disc swellings can be due to varied causes. This study included 50 patients, out of which, 47 had bilateral presentation and 3 had unilateral presentation. The most common cause was found to be idiopathic intracranial hypertension. Cerebral venous thrombosis was found to be the second most common cause. All of them had bilateral presentation.

CONCLUSION

IIH and cerebral venous thrombosis should be considered in the main diagnosis when patients with bilateral optic disc swelling present to ophthalmology clinics. Detailed history taking, examination and imaging tests should also be performed as indicated.

KEYWORDS

Optic Disc Oedema, Idiopathic Intracranial Hypertension, Optic Neuritis.

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BACKGROUND

Optic disc swelling is a pathological condition with a variety of causes.¹ Cases with bilateral optic disc swelling are often associated with- Papilloedema, infiltrative optic neuropathy, toxic optic neuropathy, malignant hypertension and idiopathic intracranial hypertension.

Conditions associated with unilateral optic disc swelling include demyelinating Optic Neuritis (ON), Nonarteritic Anterior Ischaemic Optic Neuropathy (NA-AION), compressive optic neuropathy, retinal-vein occlusion and diabetic papillopathy.²

Aims and Objectives- There have been very few studies on the common causes and clinical features of optic disc swelling in Asians. Therefore, the purpose of this study was

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to determine the clinical manifestations and aetiology of optic disc oedema. This is a prospective, hospital-based observational study. An informed consent was obtained from all patients.

MATERIALS AND METHODS

Patients presenting with unilateral or bilateral disc oedema who attended the Ophthalmology OP, Stanley Medical College, were included in the study.

All patients underwent detailed medical and ocular history and relevant laboratory tests and physical examination in relation to optic disc oedema.

Evaluation of BCVA, colour vision, anterior segment, visual fields by Octopus field analyser, detailed fundus and optic nerve by direct ophthalmoscope /90D/ indirect ophthalmoscope. Fundus photograph and radiological investigation was done.

Inclusion Criteria- We included patients of all age group presenting with unilateral or bilateral disc oedema.

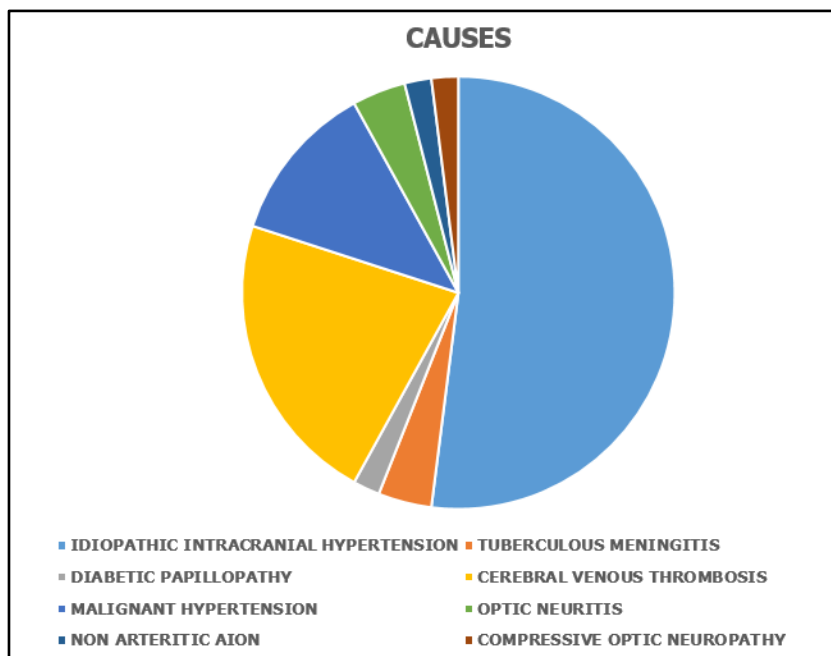
Exclusion Criteria- We excluded patients with congenital disc anomalies and patients with pseudopapillitis. The collected data were analysed and grouped according to the

cause, age/sex distribution, variations in presenting clinical features and fundus findings.

RESULTS

Optic disc swellings can be due to varied causes. In this study, the most common cause was found to be idiopathic intracranial hypertension (26 cases). Cerebral venous thrombosis was found to be the second most common cause (11 cases).

Our study included 50 patients, out of which, 47 had bilateral presentation and 3 had unilateral presentation. 6 patients had malignant hypertension, optic neuritis was found to be the cause in 2 and tuberculous meningitis in 2. Diabetic papillopathy, nonarteritic AION, compressive optic neuropathy due to thyroid ophthalmopathy was found to be the cause in one patient each.



Pie Chart 1. Shows the Frequency of Different Causes

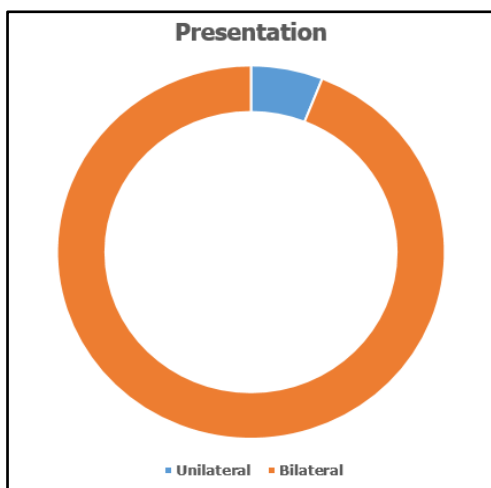
Laterality of Presentation

Cases with bilateral optic disc swelling were seen in idiopathic intracranial hypertension, cerebral venous thrombosis, TB meningitis, optic neuritis, compressive optic neuropathy and malignant hypertension. Out of the bilateral causes, idiopathic intracranial hypertension was found to be the most common cause.

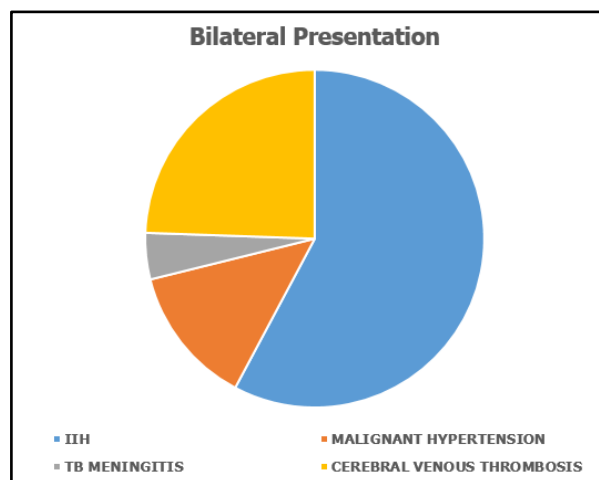
Unilateral presentation was seen in diabetic papillopathy, optic neuritis and nonarteritic anterior ischaemic optic neuropathy.

Causes	Unilateral	Bilateral
Idiopathic intracranial hypertension	0	26
TB meningitis	0	2
Diabetic papillopathy	1	0
Cerebral venous thrombosis	0	11
Optic neuritis	1	1
Nonarteritic AION	1	0
Compressive optic neuropathy	0	1
Malignant hypertension	0	6

Table 1. Unilateral and Bilateral Presentations



Pie Chart 2. Shows the Frequency of Unilateral and Bilateral Causes



Pie Chart 3. Bilateral Presentation

Age- The mean age of the patients in our study was found to be 42.54. The mean age of patients with idiopathic intracranial hypertension was 36.54. The mean age of optic neuritis was 14.5, since we had one paediatric patient of 7 years with optic neuritis due to acute demyelinating encephalomyelitis. The patient with nonarteritic AION was 55 years old. The following table shows the details.

Causes	Mean Age
Idiopathic intracranial hypertension	36.54
Tb meningitis	41.05
Diabetic papillopathy	32
Cerebral venous thrombosis	48.54
Optic neuritis	14.5
Nonarteritic AION	55
Malignant hypertension	48.63
Compressive optic neuropathy	47

Table 2. Age

Sex Distribution- A female predominance was noted in our study, 60%. In the IIH group, 20 out of 26 were found to be females.

Causes	Males	Females
Idiopathic intracranial hypertension	6	20
TB meningitis	2	0
Diabetic papillopathy	0	1
Cerebral venous thrombosis	6	5
Malignant hypertension	4	2
Optic neuritis	1	1
Nonarteritic AION	0	1
Compressive optic neuropathy	1	0

Table 3. Sex Distribution

Presentation Visual acuity- The chief complaints of the patients with optic disc oedema included decreased visual acuity, headache and neck pain. Decreased visual acuity was seen in 15 out of 26 patients with IIH and the duration of the symptoms were significantly greater in this group. It was the presenting complaint in diabetic papillopathy, cerebral venous thrombosis (5 patients), optic neuritis, nonarteritic AION and compressive optic neuropathy. In case of optic neuritis and nonarteritic AION, patients had sudden loss of vision.³ The visual acuity in these patients ranged from 0.6-0.8 (LogMAR).

Causes	Mean Visual Acuity
Idiopathic intracranial hypertension	0.35
TB meningitis	0.6
Diabetic papillopathy	0.35
Cerebral venous thrombosis	0.35
Malignant hypertension	0.48
Optic neuritis	0.6
Nonarteritic AION	0.8
Compressive optic neuropathy	0.6

Table 4. Mean Visual Acuity

Field Defects- The type of field defects varied in this study. The most common field defect found was enlargement of the blind spot.⁴ Out of 47 bilateral disc oedema cases, only 11 cases of idiopathic intracranial hypertension and 3 patients with cerebral venous thrombosis had enlargement

of blind spot. Rest were found to have normal field in spite of having papilloedema.

An inferior altitudinal defect was found in nonarteritic AION patient.⁵ The patient with compressive optic neuropathy due to thyroid ophthalmopathy revealed an overall depression, which was dense in the right eye and normal in the left eye.

Colour Vision Defects- The patients with nonarteritic AION, compressive optic neuropathy and optic neuritis⁶ had colour vision defects predominantly red green desaturation.

Assessment of Disc Oedema- The patients with IIH, cerebral venous thrombosis, malignant hypertension and TB meningitis had bilateral disc oedema of 3DD and more. Patients with optic neuritis, nonarteritic AION and compressive optic neuropathy had oedema of only 2DD.

Associated Pupillary Defects- Five patients presented with relative afferent pupillary defect. Both the patients with optic neuritis had RAPD, one had grade II. The girl child with ADEM who presented with bilateral optic neuritis had grade III RAPD in left eye and RE pupil was sluggishly reacting to light. Grade III RAPD was also present in one patient with diabetic papillopathy, compressive optic neuropathy and nonarteritic AION each.

Other Associated Features- One patient with cerebral venous thrombosis had lateral rectus palsy, which was a false localising sign.

Associated Systemic Diseases- The following table shows the details about the systemic diseases in the subjects. Diabetics and hypertension was found to be the common risk factors.⁷

Causes	Diabetes Mellitus	Hypertension
Idiopathic intracranial hypertension	6	5
TB meningitis	0	0
Diabetic papillopathy	1	0
Cerebral venous thrombosis	2	3
Malignant hypertension	3	6
Optic neuritis	0	0
Nonarteritic AION	0	1
Compressive optic neuropathy	0	0

Table 5. Comorbidities

DISCUSSION

The results of this study showed that the most common disease with optic disc oedema was idiopathic intracranial hypertension. The second most common cause was cerebral venous thrombosis. Although, nonarteritic anterior ischaemic optic neuropathy has been reported to be the most common cause of acute optic neuropathy in Caucasians 30 years of age and older, it was not found in this study.

We excluded the patients with retrobulbar optic neuritis and those with pale optic disc, which could represent sequel of optic neuritis. So, the frequency of optic neuritis maybe

higher than what we found. Therefore, further information collected by epidemiological studies based on the existence of optic nerve swelling is necessary.

Idiopathic intracranial hypertension is a condition of increased intracranial pressure in the absence of space filling disease process, sinus venous thrombosis. It was previously known as benign intracranial hypertension/pseudotumour cerebri. This disease usually present with papilledema and headache. The long-term prognosis is good. MRI may show slit like ventricles and flattening of the pituitary gland (empty sella sign). The treatment includes weight loss, steroids are controversial. The ophthalmologist role is usually confined to diagnosis and monitoring of visual function, colour vision, fields and optic nerve appearance. In our study, 20 out of 26 patients with IIH was found to be females, 12 out of them were found to be obese also. Lifestyle habits and obesity maybe associated with higher rates of IIH diagnosed in this study.⁸

CVT is a serious, potentially lethal disorder that may present a confusing and nonspecific clinical picture. The prognosis of cerebral venous thrombosis accompanied by severe haemorrhagic infarction in patients is poor. So, complete neurological examination and imaging should be done in all suspected cases.

We had a paediatric patient, 7-year-old with ADEM who presented with bilateral optic neuritis. She was a known case of ITP. Her MRI showed features of demyelination in bilateral occipital lobes, thalamus, right cerebral hemisphere and left inferior frontal gyrus. Acute Disseminated Encephalomyelitis (ADEM) is an uncommon monophasic idiopathic inflammatory demyelinating disease presenting as encephalopathy, optic neuritis and myelitis, but this girl had isolated optic neuritis. Isolated bilateral optic neuritis as the only presenting feature of ADEM is a very rare and reported only in 2% of the cases. It is thought to be an autoimmune disorder of the CNS where antiviral antibodies or a cell-mediated response to the pathogen cross-react with the myelin autoantigens.^{9,10}

Diabetic papillopathy present with progressive monocular visual loss. Ocular findings include modest decrease in VA (6/12 or better), disc swelling maybe unilateral or bilateral. Systemically, there can be evidence of peripheral diabetic vasculopathy.

Accelerated (malignant) hypertension can be asymptomatic or with decreased VA. Ocular findings include attenuation of arterioles, arteriovenous nicking, signs of vascular leakage (haemorrhages and exudates), disc swelling occurs in the presence of very high blood pressure. There will be very high blood pressure (usually greater than 200 mmHg systolic and/or 100 mmHg diastolic). Malignant hypertension is a medical emergency. It constitutes one of the most common causes of optic disc swelling. Although, the mainstay of treatment is to lower the blood pressure. This must be done progressively as a sudden drop can precipitate vascular occlusion.

This mandates routine fundus examination for all younger diabetics and malignant hypertension, also in all the cases with disc oedema DM and SHT should be ruled out.

There are several limitations in the study. The first is a small sample size. We included only 50 patients from ophthalmology OPD and all of the optic swellings were not represented by these cases. Moreover, this study design was a prospective one. Some cases were excluded because of insufficient information.

CONCLUSION

In conclusion, IIH and cerebral venous thrombosis should be considered in the main diagnosis when patients with bilateral optic disc swelling present to ophthalmology clinics. Lifestyle habits and obesity maybe associated with higher rates of IIH diagnosed.

Optic neuritis, nonarteritic AION and diabetic papillopathy should be kept in mind while dealing with unilateral optic disc oedema.

Detailed history taking, supportive examinations such as visual field, colour vision and imaging tests should also be performed as indicated. A complete neurological examination is also mandatory in these patients. DM and SHT should be ruled out in younger patients with papilloedema. Regular follow-up of such cases should also be done.

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