

# Evaluation Of Hundred Consecutive Cases Of Optic Disc Oedema At A Tertiary Care Centre In North-West Rajasthan

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**Purpose:** This study aimed at evaluation of patients diagnosed as optic disc oedema in terms of demographics, aetiology and clinical presentation.

**Methods:** This prospective, noninterventional hospital based study was conducted between January 2018 and November 2019. 100 cases of disc edema were included by consecutive sampling and comprehensive examination was done including BVCA, pupillary reaction, colour vision, detailed slit lamp examination, intraocular pressure, fundus examination, fundus photograph. CSF manometry, Lumbar Puncture, CT and MRI scan and OCT for RNFL assessment were performed as and when required.

**Abstract** **Results:** The most common cause of the disc edema was papilloedema (54%) followed by optic neuritis (18%); optic neuropathies (9%); pseudopapilledema (7%); diabetic papillopathy (5%). Most common age group affected was 21-40 years (39%). Our study population had Male to Female ratio of 1:1.1. Bilateral disc edema was 3.5 times more common than unilateral presentation. Space occupying lesions were found to be most common cause of Papilledema. Decreased vision and headache was main symptom reported by majority of patients.

**Conclusion:** From this study it was concluded that papilledema and optic neuritis should be considered in the differential diagnosis of patients with optic disc swelling. Bilateral disc swelling Could be due to papilledema, the first investigation should be urgent magnetic resonance imaging (MRI) plus magnetic resonance venography (MRV) to exclude a brain tumor or dural venous sinus thrombosis. With newer imaging technique like OCT, it is possible to differentiate pseudo from true optic disc oedema, also to recognise the aetiology.

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**Keywords:** Disc, oedema, optic neuritis

## Introduction

Optic disc edema refers to the ophthalmoscopic swelling of the optic disc with a concurrent increase in fluid within or surrounding the axons. Several optic disc conditions can simulate optic disc edema or swelling. It can be due to pathology of optic nerve itself or brain.<sup>1</sup>

Unilateral optic disc edema may be due to optic neuritis (ON), non-arteritic anterior ischemic optic neuropathy (NA-AION), compressive optic neuropathy, retinal-vein occlusion, diabetic papillopathy etc. while bilateral disc edema cases occur due to papilloedema, infiltrative optic neuropathy, toxic optic neuropathy, and malignant hypertension.<sup>2</sup>

To distinguish the different causes of optic disc edema, detailed history taking, comprehensive eye examination including fundus examination and detailed workup is required. Determination about its type whether it is true disc edema or not, causes whether it is due to raised intracranial tension or any other cause is crucial for further management.<sup>3</sup> Optic disc edema pathologies follow the dictum of "Earlier the disease is diagnosed, lesser are the complications"

The pathophysiology of optic disc edema varies according to the cause. It may be classified as papilledema; pseudopapilledema; and optic neuropathies due to ischemia, hereditary, nutritional, or toxic, while it is also classified according to unilateral or bilateral involvement or common and uncommon causes.

In 1860, Von Gräfe found that papilledema occurs as a result of altered axoplasmic flow resulting in intra-axonal edema in the area of optic nerve.<sup>4</sup> As cerebrospinal fluid pressure rises the pressure transmitted to the optic nerve sheath, acts as a tourniquet to decrease axoplasmic transport, resulting in disc edema. Clinical features of increased intra cranial pressure such as headache, nausea, blurring of vision, photophobia, ocular pain, diplopia, pulsatile tinnitus, and sixth-nerve paresis are present, and visual loss is insidious. On direct and indirect ophthalmoscopy disc hyperemia, blurring of disc margins, edema of retinal nerve fibre layer (RNFL), and absence of spontaneous venous pulsation confirm the diagnosis. As venous pulsation are absent in 10-15% of the normal population, this sign in isolation cannot be taken as conclusive evidence of papilledema. OCT shows increased RNFL thickness in all quadrants, most commonly in the inferior quadrant. Eyes with optic disc edema have statistically significant increase in RNFL thickness in all the four quadrants as compared to normal individuals.<sup>5,6</sup>

As there is paucity of data on morbidity profile of patients with optic disc edema in Rajasthan, present study has been planned to assess and evaluate these patients.

## Material & Methods

After obtaining permission from Institutional review board, a prospective hospital based study for 23 months duration (Jan 2018-Nov 2019) was conducted at Department of Ophthalmology, PBM Hospital attached to S.P. Medical

College, Bikaner. 100 cases of disc edema were included by consecutive sampling. Patients having any other concurrent ocular disease were excluded from study. All cases were examined for pupillary reaction, best corrected visual activity with pinhole, intraocular pressure, color vision, contrast sensitivity, light brightness sensitivity, visual field analysis by static perimetry, dilated fundus examination (with direct & indirect ophthalmoscopy, 78-D slit lamp microscopy), fundus photography & OCT for Retinal Nerve Fibre layer thickness assessment. CSF manometry, Lumbar Puncture, X Ray, CT and MRI (Scan±contrast) were performed as and when required. All information obtained from these cases was entered in proforma and then transferred to Microsoft excel worksheet and analysed with help of Epi info software as tables showing frequencies of various optic disc edema etiologies.

**Results**

Total 178 eyes of 100 cases [females (53%), males (47%)] were examined. Mean age of study population was 28.32±16.68 years (age ranging from <20 to 80 years). (Table 1) shows maximum number of cases belonged to 21-40 years age group (39%) followed by <20 years age group (33%). Minimum 6.00% belonged to 61- 80 years age group (Table 2).

shows causes of disc edema among study population, 54% patients had papilledema (Figure 1 and 2) followed by optic neuritis cases (18%). Decreased vision and headache was main symptom reported by majority of patients.

With reference to visual field analysis it was found that 12.00% of patients had enlargement of blind spot followed by generalised depression in 5.00% and 1.00% had central scotoma whereas 78.00% had no abnormality. 17.00% had abnormal color vision in study population. Among optic

**Table 1:** Distribution of Study Population according to Causes of Disc edema

Clinical diagnosis	Frequency	Percentage
Papilledema	54	54.00%
Optic Neuritis	18	18.00%
Optic Neuropathy	9	9.00%
Diabetic Papillopathy	5	5.00%
Retinal Vasculitis	3	3.00%
Cavernous Sinus Thrombosis	1	1.00%
CRVO	1	1.00%
Orbital Pseudotumor	1	1.00%
Papillophlebitis	1	1.00%
Pseudopapilledema	7	7.00%
Total	100	100.00%

**Table 2:** Distribution of study population according to causes of Papilledema

Clinical diagnosis	Frequency	Percentage
IIH	5	9.25%
SOL	21	38.8%
Hydrocephalus	3	5.55%
Malignant HTN	5	9.25%
Eclampsia	2	3.70%
Cortical Venous Thrombosis	2	3.70%
Craniosynostosis	1	1.85%
Posterior Reversible Encephalopathy Syndrome	1	1.85%
GBS	1	1.85%
Meningitis/Encephalitis/ Maningoencephalitis	13	24.07%
Total	54	100.00%



**Figure 1:** Papilledema RE



**Figure 2:** Papilledema LE

**Table 3:** Distribution of study population according to causes of Unilateral Disc Edema

Unilateral Disc Edema	Frequency	Percent
Optic Neuritis	9	40.90%
Neuroretinitis	1	4.54%
Diabetic Papillopathy	4	18.18%
Retinal Vasculitis	2	9.09%
Compressive Optic Neuropathy	2	9.09%
Cavernous Sinus Thrombosis	1	4.54%
Ischemic Optic Neuropathy	1	4.54%
Papillophlebitis	1	4.54%
Pseudotumor	1	4.54%
TOTAL	22	100.00%

neuritis cases 61.12% had typical optic neuritis (including Multiple sclerosis) followed by neuroretinitis (Figure 3) (16.66 %). Of papilledema cases 38.8% had SOL followed by Meningitis/Encephalitis/ Meningoencephalitis (24.07%) and malignant hypertension (9.25%) whereas least number of cases (1.85%) were each of craniosynostosis, posterior reversible encephalopathy syndrome and GBS (Table 3). Among bilateral cases 69.23% had papilledema followed by pseudo papilledema pseudo papilledema (Figure 4) (8.97%) and optic neuritis (7.69%) whereas 1.28% had diabetic papillopathy, retinal vasculitis and CRVO each (Table 5). Among unilateral cases 40.90% had optic neuritis followed by diabetic papillopathy (18.18%) whereas 4.54% had papillophlebitis, pseudotumor, ischemic optic neuropathy, cavernous sinus thrombosis and neuroretinitis each (Table 4). In our study mean visual acuity in bilateral cases was found to be 0.18 in toxic optic neuropathy whereas minimum

**Table 4:** Distribution of study population according to causes of Bilateral Disc Edema

Bilateral disc edema	Frequency	Percent
Papilledema	54	69.23%
Optic Neuritis	6	7.69%
Neuroretinitis	2	2.56%
Diabetic Papillopathy	1	1.28%
Retinal Vasculitis	1	1.28%
Toxic Optic Neuropathy	2	2.56%
CRVO	1	1.28%
Ischemic Optic Neuropathy	2	2.56%
Infiltrative Optic Neuropathy	2	2.56%
Pseudopapilledema	7	8.97%
TOTAL	78	100.00%

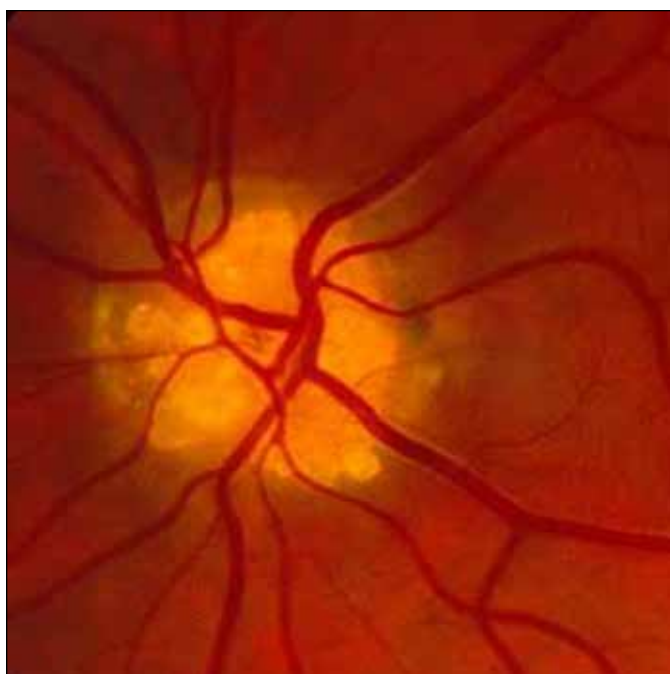
**Table 5:** Distribution of Study Population with visual field testing within normal limit

Diagnosis	No. of patients
Papilledema	39
Optic Neuritis	14
Optic Neuropathy	7
Diabetic Papillopathy	5
Retinal Vasculitis	3
Cavernous Sinus Thrombosis	1
CRVO	1
Orbital Pseudotumor	1
Papillophlebitis	1
Pseudopapilledema	6

1 in diabetic papillopathy and retinal vasculitis whereas in unilateral cases mean visual acuity was found to be 0.30 in neuroretinitis followed by Compressive Optic Neuropathy



**Figure 3:** Neuroretinitis LE



**Figure 4:** Optic Disc Drusen

**Table 6:** Distribution of cases of Papilledema according to mean visual acuity (Log MAR)

Clinical diagnosis	Mean visual acuity
IIH	0.10
SOL	0.67
Hydrocephalus	0.6
Malignant hypertension	0.9
Eclampsia	0.4
Cortical venous thrombosis	0.3
Craniosynostosis	0.48
Posterior reversible encephalopathy syndrome	0
GBS	0.3
Meningitis/Encephalitis/ Meningoencephalitis	0.15

(0.33) whereas minimum 1 in pseudotumor, papillophlebitis and Ischemic Optic neuritis.

### Discussion

Present study was conducted with the purpose of assessing etiology as well as clinical profile of patients with disc edema at Ophthalmology department of PBM Hospital attached to S.P. Medical College, Bikaner, Rajasthan. A total of 100 cases were examined during 23 months study period after explaining purpose of study and taking informed verbal consent. Maximum proportion of our study population belonged to 21-40 years age group (39.00%) as all the patients with optic neuritis and IIH presented in this age group in our series.

Solanki et al<sup>7</sup> conducted a prospective study on 50 patients with optic disc edema, out of which 42% of patients were male and 58% of patients were female. The most commonly affected age group was between 11 to 20 years. Unilateral and bilateral disc edema was observed in 30% and 70% of patients respectively in their study.

In our study, there was females preponderance (53%), whereas Distelmaier F et al<sup>8</sup> & Gandhi U et al<sup>9</sup> observed higher number of males in their respective studies, reason may be geographical diversity and different sex ratio in different geographical areas.

In this study of the 18 paediatric patients, 13 patients had Papilledema, 2 had optic neuritis and 1 patient each had Compressive optic neuropathy, Infiltrative optic neuropathy and pseudopapilledema. According to Hyde RA, et al. Can J Ophthalmol. 2019<sup>10</sup> of the 38 paediatric patients, 16 (42.1%) had idiopathic intracranial hypertension (IIH) as the underlying cause of the papilledema, 7 (18.4%) had a craniosynostosis disorder, 6 (15.8%) had intracranial tumours, 2 (5.3%) had primary hydrocephalus, and 1 (2.6%) patient each had transverse sinus thrombosis.

The patients with Hydrocephalus, IIH, cerebral venous thrombosis, malignant hypertension and TB meningitis had bilateral disc oedema of 3 Disc Diameter (3DD) and more.

Patients with optic neuritis, nonarteritic AION, compressive optic neuropathy and pseudopapilledema had oedema of only 2DD. TR Anuradha et al<sup>11</sup> obtained very similar results.

Association of systemic diseases in the subjects are as follows: Diabetes and hypertension was found to be the common risk factors in cases of Papilledema (IIH, SOL, malignant hypertension, Diabetic papillopathy and Eclampsia) and NAION. Obesity was found in cases of IIH and convulsions in cases of Papilledema.

### Conclusion

Optic disc oedema when diagnosed presents special challenges to the ophthalmologist since it is often associated with grave underlying process, hence it needs to be taken very seriously and requires thorough evaluation. We can never diagnose the cause of optic nerve dysfunction just by looking at the disc. Bilateral disc swelling could be papilledema, the first investigation should be urgent (same day) magnetic resonance imaging (MRI) with magnetic resonance venography (MRV) to exclude a brain tumor or dural venous sinus thrombosis. With newer modalities like optical coherence tomography which assist in retinal imaging, it is possible to differentiate pseudo from true disc oedema and also to recognise the aetiology of disc oedema.

### References

1. K., Khurana, A. (2015). Comprehensive ophthalmology. Khurana, Aruj K., Khurana, Bhawna. (6th ed.). New Delhi: Jaypee, The Health Sciences Publisher. ISBN 9789351526575.
2. Van Stavern GP. Optic disc edema. Semin Neurol 2007; 27:233-43.
3. Miller NR, Newman NJ, Bioussé V, Kerrison JB, editors. Walsh & Hoyt's clinical neuro-ophthalmology: the essentials. 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2008
4. Von Graefe A. Engorgement and distention of retinal as an early manifestation of papilledema. Arch F Ophthalmol 1860;7:58-71.
5. Kaufhold F, Kadas EM, Schmidt C, Kunte H, Hoffmann J, Zimmermann H, et al. Optic nerve head quantification in idiopathic intracranial hypertension by spectral domain OCT. PLoS One 2012;7:e36965.
6. Hayreh SS. Pathogenesis of optic disc edema in raised intracranial pressure. Prog Retin Eye Res 2016; 50:108-144.
7. Solanki D, Meena V, Sharma U, et al. Optic disc edema/papilledema: a clinical profile. J. Evolution Med. Dent. Sci. 2016;5(16):795-800, DOI: 10.14260/jemds/2016/184
8. Distelmaier F, Sengler U, Messing-Juenger M, Assmann B, Mayatepek E, Rosenbaum T. Pseudotumor cerebri as an important differential diagnosis of papilledema in children. Brain Dev. 2006;28:190-195
9. Gandhi U, Chhablani J, Badakere A, et al. Optical coherence tomography angiography in acute unilateral nonarteritic anterior ischemic optic neuropathy: A comparison with the fellow eye and with eyes with papilledema. Indian J Ophthalmol. 2018;66(8):1144-1148.
10. Robert A. Hyde, M.D., Ph.D., Mehmet C. Mocan, M.D., Urmi Sheth, Lawrence M. Kaufman, M.D., Ph.D. Department of Ophthalmology, Illinois Eye and Ear Infirmary, University of Illinois-Chicago, 1855 W. Taylor St., Chicago, IL 60612
11. Anuradha TR, Venkatesh S, Radhakrishnan B, et al. Evaluation of the causes of optic disc oedema- An observational study. J. Evid. Based Med. Healthc. 2017; 4(87), 5082-5085. DOI: 10.18410/jebmh/2017/1016

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