

# Clinical Profile of Unilateral Disc Edema: A Cross-sectional Study

Jayeshkumar C. Sadhu<sup>1</sup>, Nishant Solanki<sup>2</sup>

<sup>1,2</sup>Assistant Professor, Department of Ophthalmology, Shri M.P.Shah Government Medical College, Jamnagar, Gujarat

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## Abstract

**Background and Aim:** Optic disc swelling is due to arrest or obstruction of axoplasmic flow at the lamina cribrosa. It may be due to various pathological conditions like ischemia, infiltration, inflammation, compression, metabolic and toxic damage. In this study, the clinical profile of each case of unilateral disc edema was analysed in relation to age of presentation, gender, systemic association, risk factor and prognosis.

**Material and Methods:** The present study was done in the department of ophthalmology, medical college and hospital. The patients with the unilateral disc edema were included in the study. Visual acuity was measured using Snellen's acuity chart and converted to logmar for the purpose of statistical analysis. Intraocular pressure was recorded. Colour vision was recorded using Ishihara chart. Routine blood investigations were done. Radiological imaging was done.

**Results:** Females are affected more commonly compared to males in the study group. The commonest cause for unilateral disc edema is nonarteritic AION and the next common cause is optic neuritis. Compressive disc edema, inflammatory disc edema and neuroretinitis are the other conditions causing unilateral disc edema. In this study 60 % of the persons showed disc pallor on follow up and 40 % of person showed normal fundus. 66.67 % of patients of NAION had disc pallor on follow up. MRI BRAIN in NAION showed small vessel ischemic changes in 6.67% of persons which indicates the ischemic change were also noted in brain.

**Conclusion:** If a patient with unilateral disc swelling presents to neuroophthalmology clinic, NA-AION and ON should be considered first in the differential diagnosis. Other causes of disc edema should not be missed.

**Keywords:** Compressive disc edema, Intraocular pressure, Ophthalmology, Optic disc swelling

## Introduction

Disc edema is a common manifestation of variety of disorders. The disc edema can be unilateral or bilateral. Unilateral disc edema can be inflammatory, ischemic, compressive or infiltrative. It may also be an eye opener for detection of certain systemic diseases. Hence, it is very essential for an ophthalmologist to clinically evaluate and differentiate the causes of disc edema.<sup>1</sup>

The presenting signs and symptoms will be different depending upon the cause of the disc edema and the work up for that also should be individualized based on the history and the examination finding.

The management and prognosis depends upon the etiology of the disc edema.<sup>2,3</sup>

Optic disc swelling is due to arrest or obstruction of axoplasmic flow at the lamina cribrosa. It may be due to various pathological conditions like ischemia, infiltration, inflammation, compression, metabolic and toxic damage.<sup>4,5</sup>

Ophthalmoscopically, the early disc edema usually presents as superior and inferior margin blur and the increasing swelling can obscure the blood vessels at the disc margin. Hyperemic disc with absent spontaneous venous pulsation may be seen. In the stage of fully developed disc edema, intra retinal

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## Corresponding Author:

Dr. Jayeshkumar C. Sadhu,

Department of Ophthalmology,

Shri M.P.Shah Government Medical College, Jamnagar, Gujarat

hemorrhages, infarcts leading to soft exudate and hard exudates may be seen.<sup>6-8</sup>

In the long course, after several months, the hemorrhages and hard exudates may resolve and the hyperemia is replaced by milky gray appearance due to gliosis. The presence of optic chiasm, neovascular membrane with subretinal hemorrhages and serous fluid are also not uncommon. The final fate of any optic nerve disease is atrophy. The type of atrophy in any disc edema is secondary with dirty yellow colour disc with ill defined disc margin with surrounding vascular sheathing. Once the atrophy develops, the optic nerve does not swell.<sup>9,10</sup>

In most cases the vision can be preserved with appropriate and prompt treatment. If the disc edema is left untreated it can lead to permanent and irreversible blindness due to optic atrophy.<sup>11</sup> In this study, the clinical profile of each case of unilateral disc edema was analysed in relation to age of presentation, gender, systemic association, risk factor and prognosis.

## Materials & Method

The present study was done in the department of ophthalmology, medical college and hospital. The study was done for the period of one year. The ethical committee was informed about the study and the ethical clearance certificate was obtained prior to the start of the study. Both male and females were included in the study.

The age range of the included patients was from 20 – 65 years. The patients with the unilateral disc edema were included in the study. The exclusion criteria for the study as follow: Patient with bilateral presentation and papilledema and patient with age < 20 years.

The patients reported to the ophthalmology department were registered for the study. The patients were informed about the study, and the written informed consent was obtained prior to the start of the study. The patients who did not provide the informed consent were excluded from the study. The included patients were evaluated and followed up during the study period.

The detailed history of the present illness was recorded. Visual acuity was measured using Snellen's acuity chart and converted to logMAR for the purpose of statistical analysis. Slit lamp bio microscopy of anterior segment, fundus with +90D lens was used.

Intraocular pressure was recorded. Direct and Indirect Ophthalmoscopy was done. Colour vision was recorded using Ishihara chart. Routine blood investigations were done. Radiological imaging was done. Follow up was done at regular intervals. Various parameters were checked on follow up to check the improvement in visual activity.

Data collected were entered in Excel spreadsheet and analyzed using STATA statistical software package release 11. We used the two-sided independent-samples t test to compare means across dichotomous variables (i.e. men v. women); the one-way ANOVA test for comparison of means across multilevel variables. Simple calculations like Percentages, Proportions and Mean values were derived. A type I error of 0.05 was considered in all analyses.

## Results

Total of 60 cases diagnosed with unilateral disc edema were included in the study with each case of unilateral disc edema were analysed in relation to age of presentation, gender, systemic association, risk factor and prognosis. The mean age of presentation of NAION is 51 years and the mean age of presentation of optic neuritis is 30 years. This indicates the association of systemic disease with NAION as it affects the age group between 40 to 50 years and the association of demyelination with optic neuritis as it affects the age group between 20 to 30 years. In general females are affected more commonly compared to males in the study group.

It is evident from the study, the commonest cause for unilateral disc edema is nonarteritic AION and the next common cause is optic neuritis. Compressive disc edema, inflammatory disc edema and neuroretinitis are the other conditions causing unilateral disc edema. All the cases in our study had unilateral affection of the disease.

In this study, fundus examination of uninvolved eye showed normal fundus in 50% of cases. Other 50% of cases showed some findings which helped in diagnosing the condition. 'At risk' crowded disc was seen in 6.67% of persons, hypertensive and diabetic changes were noted in 10% of cases.

There is no specificity of the eye involved. Both eyes are equally affected in the study group. In this study 60% of the persons showed disc pallor on follow up and 40% of person showed normal fundus. 66.67% of

patients of NAION had disc pallor on follow up. All the patients of optic neuritis had disc pallor on follow up even though the vision was good. Neuroretinitis disc edema and inflammatory disc edema usually resolved without producing any disc pallor.

MRI imaging was needed only in 40 % of the patients. It was 100% useful in compressive neuropathy and also aided in diagnosing optic neuritis in some patients. It also helped in diagnosing longitudinally extensive transverse myelitis which was an important sign in diagnosing neuromyelitis optica. MRI BRAIN in NAION showed small vessel ischemic changes in 6.67% of persons which indicates the ischemic change were also noted in brain.

**Table 1: Different causes of unilateral disc edema**

Diagnosis	Frequency
NAION	32
INFLAMMATORY NEUROPATHY	6
OPTIC NEURITIS	10
COMPRESSIVE NEUROPATHY	6
NEURORETINITIS	6
TOTAL	60

**Table 2: Different fundus findings in uninvolved eye**

Other eye fundus	Frequency
GIII HT RETINOPATHY	2
ARTERIOLAR ATTENUATION	12
DM RETINOPATHY	4
HIGH MYOPIC	2
NO VIEW	2
DISC AT RISK	4
ROTH SPOTS	2
PALLOR	2
NORMAL	30
TOTAL	60

**TABLE 3: Disc pallor on follow up**

Disc pallor	Present	Absent
NEURORETINITIS	0	6
INFLAMMATORY DISC EDEMA	0	6
AION	24	8
COMPRESSIVE OPTIC NEUROPATHY	2	4

Disc pallor	Present	Absent
OPTIC NEURITIS	10	0
Total	36	24

### Discussion

Jong Jin Jung, Seung-Hee Baek<sup>12</sup> and et al conducted the study called Analysis of the Causes of Optic Disc Swelling and its result showed that the most common cause with optic disc edema was NAAION and the second most common cause was ON. There was no case of arteritic AION in this study. The NA-AION was diagnosed at an older age in this study and the common type of field defect in NA-AION was an inferior altitudinal defect. Optic neuritis was associated with a better prognosis than NA-AION. The compressive optic neuropathy causing disc edema is only 6.1%. In our study also NAION is the most common cause of unilateral disc edema and the second is optic neuritis.

Preechawat P<sup>13</sup>, Bruce BB, et al studied the characteristics of AION in patients younger than 50 years. They concluded that AION in younger patients is not uncommon and it represents 23% of AION patients. In this study, AION was also common in age group between 40 to 50 years.

MRI imaging was needed only in 40 % of the patients. It was very much useful in compressive neuropathy. MRI Brain in NAION showed small vessel ischemic changes in 6.67% of persons which indicates that the ischemic change were also noted in the brain.<sup>14</sup> In NAION, disc showed sectoral pallor in 100% of patient, disc haemorrhages in 93.75% of patients. Fellow eye fundus of NAION patient showed small crowded disc [disc at risk] in 6.67% of patients.

Fellow eye involvement was seen in 12.5% of patients with NAION. 66.7% of the NAION patients showed disc pallor on follow up and all cases of optic neuritis showed temporal pallor on follow up. The visual prognosis of NAION is very poor even with prednisolone treated group and with only control of systemic factors without oral prednisolone. All cases of optic neuritis showed improvement with intravenous steroids but it did not alter natural course of the disease.

### Conclusion

If a patient with unilateral disc swelling presents to neuroophthalmology clinic, NA-AION and ON

should be considered first in the differential diagnosis. Other causes of disc edema should not be missed. A detailed history taking, visual field, color-vision and imaging tests should be performed for each and every case of unilateral disc edema. Regular follow-up examination would be necessary for all cases to look for visual recovery and recurrence.

Ethical approval was taken from the institutional ethical committee and written Informed Consent was taken from all the participants.

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**Conflict of interest:** None declared

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