



## Clinical and Radiology Finding of Patients with Bilateral Optic Disc Swelling

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**Abstract:** **Introduction:** Optic disc swelling (ODS) is a pathological condition with a variety of causes, including optic neuritis (ON), anterior ischemic optic neuropathy, and papilledema. Determining the causes of ODS is critical due to the possibilities of vision- or life-threatening diseases, such as space-occupying lesions. **Objective:** To assess the clinical and radiology finding of Patients with Bilateral Optic Disc Swelling. **Methods:** This cross sectional study was conducted in the Department of Ophthalmology, Ad-din Akij Medical College Hospital, Khulna, Bangladesh from January to June 2019. One hundred patients with bilateral disc swelling were selected as study population where bilateral disc swelling due to congenital disc anomaly, pseudo disc edema or need emergency medical care had been purposively excluded from the study. All patients were subjected to detailed ophthalmic examination, including visual acuity (VA), red saturation, bright sensitivity, color vision, and detailed slit lamp examination. All the information's were recorded in a pre-designed data collection sheet. **Results:** Total 100 patients included in our study. Most commonly affected age group was between 21-30 years in which 32% case are observed, least common affected age group was 51-60 yr. in which 6% cases are observed. Male patients were 33% and female were 67%. The patients by presenting complaints were headache 71.0% followed by dimness of vision 63.0%. Nausea/ vomiting were present in 42.0% patients and ocular pain had 21 (21.0%) patients. Few (5.0%) had transient loss of vision. Among the patients who had IIH 34 (34%), ICSOL were 25(25%) and grade 4 Hypertensive retinopathy 9% respectively. Among the patients who had bilateral optic neuritis and VKH majority of them 13% and 13% respectively. In right eye, 44 (44.0%) had Visual acuity >0.3 while in left eye, 40 (40.0%) had Visual acuity >0.3. One third had (33.0%) sluggish pupillary response in both eye. Majority of the patients (right: 67.0%, left: 64.0%) had only disc swelling. Seventy-three patients (73.0%) did not have any ocular manifestation other than optic disc swelling while 14 (14.0%) had diplopia, 12 (12.0%) had uveitis and 1 (1.0%) had ptosis. Out of 100 patients, 70 patients (70.0%) did not have any space occupying lesion while 9 (9.0%) had meningioma and 6 (6.0%) had Cerebellopontine (CP) angle tumor. **Conclusions:** Among them headache is the most common presenting complaint and IIH is the most common clinical diagnosis.

**Keywords:** Bilateral disc swelling, clinical profile, papilloedema.

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## INTRODUCTION

Optic disc swelling (ODS) is a pathological condition with a variety of causes, including optic neuritis (ON), anterior ischemic optic neuropathy, and papilledema. Determining the causes of ODS is critical due to the possibilities of vision- or life-threatening diseases, such as space-occupying lesions. Papilledema is an exclusive term used to indicate passive edema of the optic disc associated with increased intracranial pressure [1]. The color of

optic disc is derived from peripapillary capillaries and the nerve fiber layer as well as lamina cribrosa. It measures about 1.5 mm in diameter [2]. Optic disc swelling is termed differently in different pathological process such as swollen optic disc, disc edema, papilledema, papillitis, choked disc and elevated optic nerve are terms to describe swelling of optic disc [3]. A swollen optic disc implies axonal distension and elevation of the optic disc. Disc edema suggests axonal swelling and increased fluid

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surrounding the axons [4]. Disc swelling can occur both unilaterally and bilaterally. Cases with bilateral optic disc swelling are often associated with papilloedema, infiltrative optic neuropathy, malignant hypertension and toxic optic neuropathy [5]. Patients having visual disturbance associated with bilateral disc swelling often encountered with by neuro-ophthalmologist as well as neuro-surgeon or neurologist depending on the severity of presenting signs & symptoms such as headache, vomiting, loss of vision, unconsciousness etc. The important ophthalmological examinations include visual acuity, relative afferent pupillary defect (RAPD), visual field, color vision analysis etc. Blood count, blood sugar level, parameters of acute inflammation (ESR, CRP), ANA, ANCA etc. are some important serological investigations. Neurological examinations especially cranial nerve examination, CSF parameter including various important neuro-radiological examinations is very important in case of optic disc swelling [6]. Inadequate neuro-ophthalmological evaluation and not considering the important differentials of bilateral disc swelling may cause delay in diagnosis or misdiagnosis. As for example, many intracranial space occupying lesion patients or patients with idiopathic intracranial hypertension (IIH) are often misdiagnosed as a case of headache or migraine and treated accordingly. Determining the causes is critical in view of possible vision- or life-threatening diseases. Therefore, the present study had been conducted to evaluate the clinical profile and radiological findings of patients with bilateral disc swelling. This study would provide necessary information to develop a general guideline on how to conduct ophthalmological examination in a bilateral optic disc swelling patient.

### MATERIALS & METHODS

This cross sectional study was conducted in the Department of Ophthalmology, Ad-din Akij Medical College Hospital, Khulna, Bangladesh from January to June 2019. One hundred patients with bilateral disc swelling were selected as study population where bilateral disc swelling due to congenital disc anomaly, pseudo disc edema or need emergency medical care had been purposively excluded from the study. All patients were subjected to detailed ophthalmic examination, including visual acuity (VA), red saturation, bright sensitivity, color vision, and detailed slit lamp examination. Full ocular, systemic, neurological and fundus

examination and related systemic and neurological evaluation were done. Optic nerve function mainly evaluated by four commonly used test like BCVA, color vision test, pupillary light reaction and RAPD assessment, examining visual field. Visual acuity was tested by using Snellen visual acuity wall chart and converted into Log MAR unit. Pinhole visual acuity test and subjective refraction was done in case of visually impaired patients. Color vision was tested by Ishihara Pseudo-isochromatic color plates. Pupillary light reaction was examined by penlight torch and RAPD was tested if required by swinging a flashlight from the asymptomatic eye to symptomatic one in a room with dim illumination. The visual field was assessed subjectively by confrontation method.

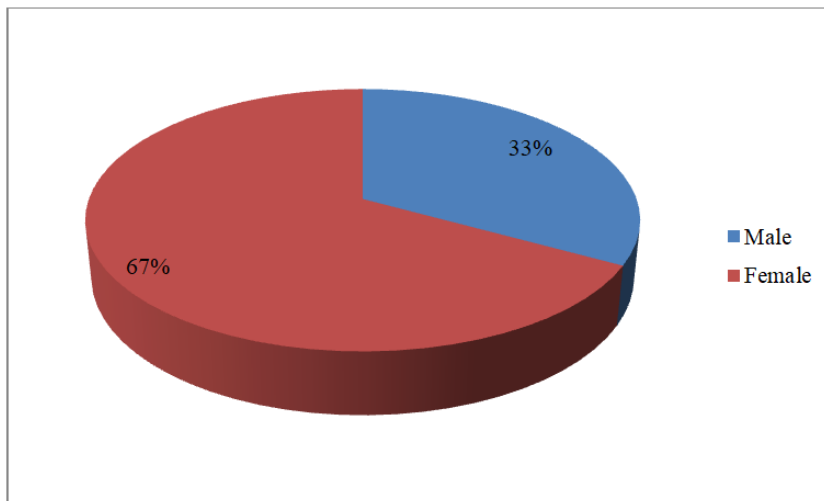
Ocular motor nerve functions were examined by assessing the ocular motility test. Other cranial nerves were also examined if required. Necessary general examinations like pulse rate, blood pressure, body weight, lymph nodes palpation, thyroid gland palpations etc. were done. Relevant systemic examinations especially neurological evaluation was when required. Relevant ocular (color fundus photograph, fundus fluorescein angiography, optical coherence tomography, B-scan ocular ultrasound, Humphrey visual field analysis etc.), systemic investigations and neuro-imaging (CT scan, MRI with or without contrast, MRV, MRA) were done to establish the clinical diagnosis. Statistical analysis of the results was done by using computer based software, SPSS version 21.

### RESULTS

**Table 1: Age distribution of the patients (N=100)**

Age(Year)	N	%
0-10	12	12.0%
11-20	24	24.0%
21-30	32	32.0%
31-40	16	16.0%
41-50	10	10.0%
51-60	06	6.0%
<b>Total</b>	<b>100</b>	<b>100.0%</b>

Most commonly affected age group was between 21-30 years in which 32% case are observed, least common affected age group was 51-60 yr. in which 6% cases are observed.



**Figure 1: Sex distribution of the patients**

**Table 2: Distribution of the patients by presenting complaints (n=100)**

Presenting complaints	N	%
Dimness of vision	63	63.0%
Headache	71	71.0%
Nausea/ vomiting	42	42.0%
Ocular pain	21	21.0%
Transient loss of vision	5	5.0%

Total 100 patients included in our study. Male patients were 33% and female were 67%. The mean age of patients was 30.22 ±10.84. The patients by presenting complaints were headache 71.0%

followed by dimness of vision 63.0%. Nausea/ vomiting were present in 42.0% patients and ocular pain had 21 (21.0%) patients. Few (5.0%) had transient loss of vision (Table-2).

**Table 3: Distribution of the patients by clinical diagnosis (n=100)**

Clinical diagnosis	N	%
IIH	34	34.0%
ICSOL	25	25.0%
Bilateral ON	13	13.0%
VKH	13	13.0%
Grade 4 hypertensive retinopathy	9	9.0%
Others	6	6.0%

Among the patients who had IIH 34 (34%), ICSOL were 25(25%) and grade 4 Hypertensive retinopathy 9% respectively. Among the patients

who had bilateral optic neuritis and VKH majority of them 13% and 13% respectively (Table-3).

**Table 4: Clinical findings of the patients (n=100)**

Clinical findings	Right N (%)	Left N(%)
Visual acuity (>0.3)	44 (44.0)	40 (40.0)
Sluggish pupillary response	33 (33.0)	33 (33.0)
Non-reacting pupillary response	04 (4.0)	03 (3.0)
Dyschromatopsia	39 (39.0)	36 (36.0)
Only disc swelling	67 (67.0)	64 (64.0)
exudate, detachment)	32 (32.0)	36 (36.0)
Restricted ocular motility	13 (13.0)	14 (14.0)
Relative Afferent Pupillary Defect (RAPD)	13 (13.0)	07 (7.0)
Field defect present	17 (17.0)	15 (15.0)

In right eye, 44 (44.0%) had Visual acuity >0.3 while in left eye, 40 (40.0%) had Visual acuity >0.3. One third had (33.0%) sluggish pupillary response in both eye. Majority of the patients (right: 67.0%, left: 64.0%) had only disc swelling.

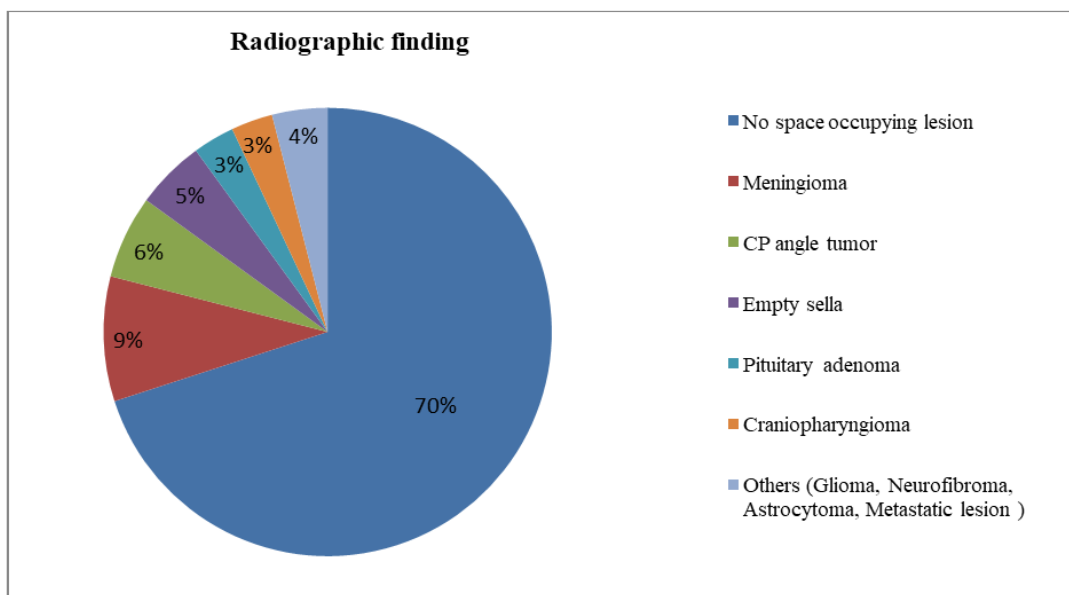
Restricted ocular motility was present in 13 (13.0%) patients in right eyes and 14 (14.0%) patients in left eyes. In right eye, 17 patients (17.0%) had visual field defect while in left eyes, 15 patients (15.0%) had visual field defect (Table-4).

**Table 5: Distribution of the patients by ocular manifestation other than disc swelling (n=100)**

Ocular manifestation	Frequency	Percentage (%)
No	73	73.0
Diplopia	14	14.0
Uveitis	12	12.0
Ptosis	1	1.0
<b>Total</b>	<b>100</b>	<b>100.0</b>

Seventy-three patients (73.0%) did not have any ocular manifestation other than optic disc swelling while 14 (14.0%) had diplopia, 12 (12.0%) had uveitis and 1 (1.0%) had ptosis (Table-5).

Out of 100 patients, 70 patients (70.0%) did not have any space occupying lesion while 9 (9.0%) had meningioma and 6 (6.0%) had Cerebellopontine (CP) angle tumor (Table-6).



**Figure 2: Radiographic finding**

**DISCUSSION**

Bilateral optic disc edema is a clinical finding that can be caused by benign or permanent visual impairment or life-threatening conditions. Total 100 patients included in our study. Most commonly affected age group was between 21-30 years in which 32% case are observed, least common affected age group was 51-60 yr. in which 6% cases are observed. Male patients were 33% and female were 67%. The mean age of patients was 30.22 ±10.84. This result was consistent with the hospital based study conducted in India which also reported that the mean age of the patients was near about 30 years [6] where majority were female [7]. The patients by presenting complaints were headache 71.0% followed by dimness of vision 63.0%. Nausea/ vomiting were present in 42.0% patients and ocular pain had 21 (21.0%) patients.

Few (5.0%) had transient loss of vision (Table-II). Study done by Solanki *et al*, [7] showed that the presenting complain was headache in 70% cases followed by diminution of vision in 50% cases, nausea and vomiting in 48% cases, lateral rectus palsy and diplopia in 4% of cases. Another study done by Rukmangathan *et al*, [8] on clinical profile of papilledema showed that 95% patient presented with headache which is followed by transient obscuration of vision, field defects, vomiting, diplopia, neck pain and giddiness. These findings correspond to the present study findings. Seventy-three patients (73.0%) did not have any ocular manifestation other than optic disc swelling while 14 (14.0%) had diplopia, 12 (12.0%) had uveitis and 1 (1.0%) had ptosis. Raised intracranial pressure often leads to 6th nerve palsy resulting in diplopia in the direction of action of that muscle. Patients whose

clinical diagnosis was VKH had complaints of floaters, ocular pain, redness, watering that means features of uveitis and cerebral venous thrombosis patients accompanied with features of cranial nerve palsy like drooping of eyelids. Study done by Iijima *et al.*, [9] showed that 70% of bilateral uveitis patients of the study population were diagnosed as VKH patients and presented with inflammation of anterior chamber, macular oedema, as well as redness and swelling of optic nerves and serous retinal detachment. This feature also corresponds to the ocular findings of VKH patients in this study. In this study, right eye, 44 (44.0%) had Visual acuity >0.3 while in left eye, 40 (40.0%) had Visual acuity >0.3. One third had (33.0%) sluggish pupillary response in both eye. Majority of the patients (right: 67.0%, left: 64.0%) had only disc swelling. Restricted ocular motility was present in 13 (13.0%) patients in right eyes and 14 (14.0%) patients in left eyes. In right eye, 17 patients (17.0%) had visual field defect while in left eyes, 15 patients (15.0%) had visual field defect (Table-IV). The study of Rukmangathan *et al.*, [8] found most of the patients had visual acuity within 0-0.3 log MAR unit, which is similar and consistent with this study finding. This is the only objective test of optic nerve dysfunction; all other tests are depended upon subjective responses from the patient. Among the patients who had IIH 34 (34%), ICSOL were 25(25%) and grade 4 Hypertensive retinopathy 9% respectively. Among the patients who had bilateral optic neuritis and VKH majority of them 13% and 13% respectively (Table-III). Out of 100 patients with 100 pairs of eyes, all the color plates were read by 62 right eyes (60.8%) and 65 left eyes (63.7%). Study done by Shah [10] on clinical and etiological profile of disc edema shows that 52% of participants had no color vision defect. This was consistent with this study finding. Theoretically, in early and established stages of disc edema has little effect on visual acuity and color vision. About one fourth of the eyes of the study subjects of this study failed to read all plates, where the main clinical diagnosis was optic neuritis. This feature is consistent with the study of Anuradha *et al.*, [11] on evaluation of the causes of optic disc oedema where they showed that, the patients with optic neuritis, NAION and other causes had color vision defects. In this study, 7.8% patients give the history of intake of oral contraceptive pill (OCP) which is an associated factor of IIH [2]. They also reported that 5% patients had grade 4 hypertensive retinopathy. Another study done by Hata & Miyamoto [12] reported that causes of bilateral disc swelling were papilloedema in near about half of the patients and optic neuritis in 12.5% patients which coincide the present study. In India, Anuradha *et al.*, [11] found that out of 50 patients, 26 cases of the bilateral disc swelling were due to increased

intracranial pressure (ICP). However, they did not found any diabetic papillopathy and bilateral nonarteritic anterior ischemic optic neuropathy (NAION) patient. Findings of the neuroimaging showed that majority of the patients (70%) were suffering from non-space occupying lesions. However, the study of Solanki *et al.*, [7] reported that one third of the patients with optic disc edema had non-space occupying lesions. The dissimilarity might be due the fact that their study was conducted in a multidisciplinary hospital and many of their study subjects were referred from the department of neuro-surgery where most of the patients were clinically diagnosed as intracranial space occupying lesion. Among the 100 patients, the most common site of intra cranial space occupying lesion in this study was cerebellopontine angle (6%) though meningioma is the most common radiologically diagnosed lesion (9%). This finding is consistent with the study conducted by Raju & Khader [13] on ocular manifestations of intracranial space occupying lesions, where cerebellopontine angle was the most common site of intra cranial tumors. It was mentionable here, the study included patients who attended in the neuro-ophthalmology clinic, those who attended in the other discipline (neurology, neurosurgery) were not included which may change the existing profile.

## CONCLUSION

All the important clinical diagnosis was very much consistent with the various findings of ocular, systemic, neurological evaluations and neuro-imaging findings. So, a systemic and methodical neuro-ophthalmological work up is very important in case of patients even with a simple headache. Headache was the most common presenting complaint followed by dimness of vision and nausea or vomiting. Raised intra cranial pressure was the most common etiology for bilateral disc swelling where IIH is the main clinical diagnosis. Also a similar study can be done involving other disciplines who also deal with bilateral disc swelling patients which can give a better epidemiological outcome.

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