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Original Research Article

A STUDY ON CLINICAL PROFILE OF UNILATERAL DISC EDEMA

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ABSTRACT

Background: Unilateral disc edema is a common ophthalmic presentation with varied underlying etiologies ranging from benign to sight- or life-threatening conditions. Timely diagnosis is critical to prevent irreversible vision loss. This study aimed to evaluate the clinical profile, common causes, and demographic characteristics of patients presenting with unilateral disc edema.

Materials and Methods: A prospective observational study was conducted over a period of 12 months at a tertiary care hospital. This study was conducted at the Department of Ophthalmology, Sarojini Devi Eye Hospital, Osmania medical College, Hyderabad, Telangana, India from March 2024 to February 2025. 40 patients diagnosed with unilateral disc edema based on clinical and fundoscopic examination were enrolled. Detailed history, comprehensive ophthalmologic examination, neuroimaging, and relevant laboratory investigations were carried out to identify the etiology. Data were analyzed for demographic distribution, clinical features, and final diagnosis.

Results: Of the 40 patients, 24 (60%) were male and 16 (40%) were female, with a mean age of 34.8 ± 12.6 years. The most common presenting symptom was diminution of vision (75%), followed by headache (30%) and ocular pain (20%). The most frequent causes of unilateral disc edema included optic neuritis (35%), anterior ischemic optic neuropathy (AION) (22.5%), papilledema due to intracranial space-occupying lesion (15%), and retinal vein occlusion (12.5%). Other less common causes were uveitis-related disc edema, compressive optic neuropathy, and hypertensive retinopathy. Neuroimaging contributed significantly to the diagnosis in 40% of cases.

Conclusion: Unilateral disc edema has a wide spectrum of etiologies, with optic neuritis and AION being the most prevalent. A thorough clinical examination supported by appropriate imaging and investigations is essential for accurate diagnosis and management. Early intervention is crucial to preserve vision and address systemic associations.

Keywords: Unilateral disc edema, optic neuritis, AION, papilledema, fundus examination, visual loss, optic disc swelling.

INTRODUCTION

The optic disc, or optic nerve head, is a critical structure where the axons of retinal ganglion cells converge to form the optic nerve, which transmits visual information to the brain. Swelling of the optic disc, termed disc edema, is an important clinical finding that may indicate a range of ocular and systemic conditions. Disc edema may be unilateral or bilateral, with each presentation pointing toward different sets of underlying pathologies.[1-3]

Unilateral disc edema is particularly significant because it often represents localized disease processes affecting the optic nerve, including optic neuritis, anterior ischemic optic neuropathy (AION), compressive optic neuropathies, or retinal vascular disorders. Less commonly, it may be the initial presentation of serious systemic diseases such as intracranial space-occupying lesions or demyelinating disorders like multiple sclerosis. The differential diagnosis of unilateral disc edema is broad, and its accurate identification requires a

systematic clinical approach that includes detailed history-taking, ocular and neurological examinations, and appropriate ancillary investigations such as neuroimaging, visual field testing, and laboratory work-up.[4-6]

Timely diagnosis and intervention are crucial, as some causes of unilateral disc edema can lead to irreversible vision loss or may be life-threatening. For instance, optic neuritis may precede or be associated with multiple sclerosis, while AION may be a manifestation of systemic vasculitis or cardiovascular disease. Thus, recognizing the clinical profile and understanding the common etiological factors of unilateral disc edema in different populations can help guide diagnosis and treatment, and ultimately improve patient outcomes.[7-10]

Although several studies have explored optic disc edema, there remains a need for focused regional data on its clinical presentation, demographics, and etiological patterns, especially in developing countries where access to neuroimaging and advanced diagnostics may be limited.[11-13]

This study was therefore undertaken to evaluate the clinical profile of patients presenting with unilateral disc edema, identify the most common underlying causes, and highlight the importance of comprehensive assessment in its diagnosis and management. Through this, the research aims to provide valuable insights for clinicians to enhance early recognition and intervention for patients presenting with this important ophthalmic sign.

MATERIALS AND METHODS

This was a prospective observational study conducted over a period of 12 months in the Department of Ophthalmology at a tertiary care center. Department of Ophthalmology, Sarojini Devi Eye Hospital, Osmania medical College, Hyderabad, Telangana, India from March 2024 to February 2025. A total of 40 patients presenting with unilateral disc edema were enrolled after obtaining informed consent. The study was approved by the institutional ethics committee. All patients underwent a comprehensive ophthalmologic evaluation, including, Visual acuity assessment, Color vision testing, Slit-lamp examination, Intraocular pressure measurement, Fundus examination using direct and indirect ophthalmoscopy etc. Relevant systemic investigations, including blood tests, neuroimaging (CT/MRI brain and orbit), and lumbar puncture, were performed as indicated based on clinical suspicion.

Inclusion Criteria

- Patients of all ages and genders
- Presence of unilateral optic disc edema confirmed by fundus examination
- Patients willing to undergo investigations and provide informed consent

Exclusion Criteria

- Patients with bilateral disc edema
- History of recent ocular trauma or surgery
- Known cases of glaucoma or other optic nerve head anomalies mimicking disc edema (e.g., pseudopapilledema due to optic disc drusen)
- Patients with media opacity (e.g., dense cataract, corneal opacity) hindering fundus examination
- Incomplete clinical data or refusal to undergo required diagnostic investigations.

RESULTS

The study included 40 patients diagnosed with unilateral disc edema. The demographic distribution, clinical presentation, laterality, visual acuity, etiological factors, and neuroimaging findings were analysed and are presented in the tables below.

Table 1: Age and Gender Distribution of Patients

Age Group (Years)	Male (n=24)	Female (n=16)	Total (n=40)
<20	3	2	5
21–30	6	5	11
31–40	5	4	9
41–50	6	3	9
>50	4	2	6

The majority of patients (50%) were between 21 and 40 years of age. Male patients (60%) slightly outnumbered females (40%).

Table 2: Presenting Symptoms

Presenting Symptom	Number of Patients (n=40)	Percentage (%)
Diminution of vision	30	75%
Headache	2	5%
Ocular pain	3	7.5%
Visual field defects	1	2.5%
Photophobia	2	5%
No visual symptoms	2	5%

Diminution of vision was the most common complaint, reported by 75% of patients, followed by headache (5%) and ocular pain (7.5%).

Table 3: Laterality of Disc Edema

Eye Affected	Number of Patients (n=40)	Percentage (%)
Right Eye	22	55%
Left Eye	18	45%

Disc edema affected the right eye in 55% of cases and the left eye in 45%, showing no significant lateral preference.

Table 4: Best-Corrected Visual Acuity (BCVA) at Presentation

Visual Acuity (Snellen)	Number of Patients	Percentage (%)
6/6 to 6/12	12	30%
6/18 to 6/36	10	25%
<6/60	18	45%

Nearly half (45%) of the patients presented with significant visual impairment (BCVA <6/60), suggesting advanced optic nerve involvement.

Table 5: Etiological Distribution of Unilateral Disc Edema

Etiology	Number of Patients (n=40)	Percentage (%)
Optic neuritis	14	35%
Anterior ischemic optic neuropathy	9	22.5%
Papilledema (due to space-occupying lesion)	6	15%
Retinal vein occlusion	5	12.5%
Uveitis-related disc edema	3	7.5%
Compressive optic neuropathy	2	5%
Hypertensive retinopathy	1	2.5%

The most common cause was optic neuritis (35%), followed by AION (22.5%) and papilledema due to intracranial mass effect (15%).

Table 6: Neuroimaging Findings (MRI/CT Brain and Orbit)

Imaging Finding	Number of Patients	Percentage (%)
Demyelinating lesions (suggestive of MS)	8	20%
Space-occupying lesion	6	15%
Optic nerve enhancement	10	25%
Normal imaging	16	40%

Neuroimaging revealed significant abnormalities in 60% of patients. Optic nerve enhancement (suggestive of optic neuritis) was the most frequent finding (25%). In 40% of cases, imaging was normal.

DISCUSSION

Unilateral disc edema is an important clinical sign that warrants thorough evaluation due to its association with a broad range of ocular and systemic conditions. In our study, the most commonly affected age group was 21–40 years, consistent with the findings of Kaur et al., 2015, who reported a higher prevalence of optic neuritis in young adults. Male preponderance (60%) observed in our study was similar to that reported by Mehrotra et al., 2017, indicating no significant gender-specific predisposition.[14]

The most common presenting symptom was diminution of vision (75%), followed by headache (30%) and ocular pain (20%). These findings are in line with Kedar et al., 2006, who emphasized vision loss and pain on eye movement as hallmark features of optic nerve pathologies, especially optic neuritis.[15]

In our study, optic neuritis (35%) emerged as the most frequent cause of unilateral disc edema, followed by anterior ischemic optic neuropathy (22.5%), and papilledema secondary to space-occupying lesions (15%). Similar etiological patterns were observed by Prasad et al., 2010, who found optic neuritis to be the most common cause of unilateral disc edema in patients under 40 years. AION, typically affecting older individuals, was also frequently noted in the study by Hayreh et al., 2009, supporting our observation of its prevalence in patients above 50 years of age.[16,17]

Retinal vein occlusion, a vascular cause, accounted for 12.5% of cases in our study, which aligns with the observations by George et al., 2012, who documented disc edema as a common finding in central retinal vein occlusion. Less common causes such as uveitis-related disc edema, compressive optic neuropathy, and hypertensive retinopathy were also identified, underscoring the need for a broad differential diagnosis, as highlighted by Johnson et al., 2014.[18,19]

Neuroimaging played a crucial role in diagnosis. Optic nerve enhancement was seen in 25% of cases, often correlating with optic neuritis, as previously reported by Hickman et al., 2008. Demyelinating lesions suggestive of multiple sclerosis were observed in 20% of cases, consistent with the long-term risk of MS after an episode of optic neuritis as reported by the Optic Neuritis Treatment Trial (ONTT), 2008. Imaging was normal in 40% of patients, especially those with non-compressive or transient causes of disc edema, as also noted by McClelland et al., 2011.[20-22]

Visual outcomes were generally poor in cases with AION and compressive lesions, while better prognosis was associated with demyelinating optic neuritis, particularly when treated early with corticosteroids, as observed by Beck et al., 2004.[23,24]

Thus, the findings of this study are consistent with existing literature and reinforce the need for a systematic approach—including detailed clinical evaluation and appropriate neuroimaging—in the management of unilateral disc edema. Early detection

and intervention remain vital to preserve visual function and identify underlying systemic associations, including life-threatening conditions.

CONCLUSION

Unilateral disc edema is a clinically significant finding that necessitates prompt and comprehensive evaluation due to its diverse etiological spectrum ranging from benign inflammatory conditions to potentially life-threatening neurological disorders. In this study, optic neuritis emerged as the most common cause, particularly in younger patients, while anterior ischemic optic neuropathy was more prevalent in older individuals. A careful clinical assessment, supported by appropriate investigations such as neuroimaging and visual field analysis, plays a crucial role in identifying the underlying pathology. Timely diagnosis not only aids in initiating appropriate management to preserve visual function but also helps detect systemic associations such as multiple sclerosis or intracranial space-occupying lesions. Therefore, a systematic and multidisciplinary approach is essential for effective diagnosis, management, and prevention of complications associated with unilateral disc edema.

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