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Ocular complications and factors affecting visual outcome in herpes zoster ophthalmicus: A prospective study in a tertiary care teaching hospital, Telangana, India

Babu Manda[1], Porika Ram Mohan Lal[2]

[1]Assistant Professor, Department of Ophthalmology, Government Medical College, Siddipet, Telangana, India,
[2]Associate Professor, Department of Ophthalmology ,Governmemt Medical College,Suryapet,Telangana,India

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ABSTRACT

Background: Herpes zoster ophthalmicus (HZO) is caused by varicella zoster virus and affects the ocular branch of the trigeminal nerve. **Aims and Objectives:** To investigate the ocular complications and factors affecting visual prognosis in patients with HZO, a Varicella zoster virus infection affecting the ocular branch of the trigeminal nerve. **Materials and Methods:** 40 patients meeting the criteria were enrolled in the study, which was conducted at the Department of Ophthalmology, SVS Medical College, Mahbubnagar, Telangana, India. **Results:** The study found that more than 50% of HZO patients experienced ocular involvement, and acute corneal lesions, such as punctate and dendriform keratitis, uveitis, and severe post-herpetic discomfort, were associated with lower visual acuity. However, none of the patients in the study experienced posterior segment HZO problems such as acute retinal necrosis or progressive outer retinal necrosis. Older age groups were found to be more likely to experience post-herpetic neuralgia (PHN), which was also associated with nasociliary nerve involvement and vision loss. **Conclusion:** The study suggests early treatment with tricyclic antidepressants to aid in the early resolution of PHN. In addition, the study aimed to evaluate the effect of HIV/AIDS on ocular complications in HZO patients but did not report any findings in this regard.

Key words: Herpes zoster ophthalmicus; Ocular complications; Visual outcome

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INTRODUCTION

Herpes zoster ophthalmicus (HZO) is a reactivation of the varicella-zoster virus infection[1,2] that can affect the ocular branch of the trigeminal nerve,[3] resulting in potential visual and socioeconomic disability.[4,5] Age is the most common predisposing factor for HZO, and other risk factors include hematological malignancies,[6] iatrogenic immunosuppression, local trauma, diabetes mellitus, and high-grade fevers.[7] HZO is more common in immunocompromised patients,[8] and these individuals are at increased risk for severe ocular involvement and complications such as extraocular muscle paresis,[9] chronic infectious, epithelial keratitis, optic neuritis, and retinitis.[10,11] However, there are no prospective studies comparing the spectrum of ocular complications in patients with HZO who are HIV-positive and immunocompetent.

Aims and objectives

This study aims to identify factors associated with increased ocular complications and poor visual outcomes in patients with HZO, as well as evaluate the effect of HIV-AIDS on the spectrum of ocular complications.

MATERIALS AND METHODS

The study aimed to investigate the ocular complications and factors influencing visual outcomes in HZO. The study was

Address for Correspondence:
Dr. Babu Manda, Assistant Professor, Department of Ophthalmology, Government Medical College, Siddipet, Telangana, India.
Mobile: 7382519337. **E-mail:** babuopthal@gmail.com

conducted at the Department of Ophthalmology in SVS Medical College, Mahbubnagar, Telangana, India, from May 2013 to October 2014. A total of 40 patients meeting the inclusion criteria were selected for the study. The inclusion criteria required all patients to have been referred to or presented to the department of ophthalmology within 3 weeks of the onset of active zoster vesicle formation affecting the ophthalmic branch of the trigeminal nerve. Pre-existing ocular disorders such as corneal disorders, glaucoma, uveitis, and severe retinal disease were excluded from the study. The study was approved by the Institutional Ethics Committee and informed written consent was taken from all patients involved in the study after explaining the study to them.

Table 1: Age distribution in the herpes zoster ophthalmicus-study group (n=40)

Age (years)	Number of cases, n (%)
1–20	3 (7.5)
21–40	16 (40)
41–60	12 (30)
61–80	9 (22.5)

Table 2: Gender distribution in the herpes zoster ophthalmicus-study group (n=40)

Sex	Number of cases, n (%)
Male	21 (51.5)
Female	19 (47.5)

There was an equal incidence in males than females

Table 3: Predisposing factors in the herpes zoster ophthalmicus-study group

Factors	Number of cases (n=40), n (%)
HIV infection	18 (45)
Hypertension	5 (12.5)
Diabetes mellitus	3 (7.5)
Tuberculosis	4 (10)
Rheumatoid arthritis	2 (5)
Fracture of femur	2 (5)
Hypothyroidism	1 (2.5)
Hansen's disease	1 (2.5)
Interstitial lung disease	1 (2.5)
Chronic liver disease	1 (2.5)
Mixed connective tissue disorder	1 (2.5)
Anaemia	1 (2.5)
Age (>60 years)	8 (20)

HIV: Human immunodeficiency virus

Table 4: Branches of the trigeminal nerve involvement in herpes zoster ophthalmicus-patients

Branch	Number of cases, n (%)
Frontal nerve	34 (85)
Nasociliary nerve	22 (55.5)
Lacrimal nerve	20 (50)
Maxillary nerve	7 (17.5)
Mandibular nerve	3 (7.5)

The study procedure included obtaining a detailed history, physical examination, dermatological examination, and ophthalmologic examination. The detailed history included information regarding past medical disorders, ocular diseases, and drug history, as well as blood transfusions and sexual history. The physical examination recorded the pulse rate, blood pressure, pallor, icterus, and lymphadenopathy. A systemic examination was done to rule out predisposing factors such as HIV infection, diabetes mellitus, and other predisposing factors. Laboratory investigations such as hemoglobin, total and differential count, blood sugar, renal function tests, and ELISA for HIV (with informed consent) were done.

The dermatological examination evaluated the rash's distribution, severity, type (classic or hemorrhagic), whether it was secondarily infected, and whether it was disseminated or multidermatomal. The diagnosis of acute HZO was based on the presence of primary vesiculo-macular and dysesthetic skin rash within the ophthalmic dermatome. Tzanck smear on the vesicular fluid was done for all patients, and the diagnosis was confirmed. The ophthalmologic examination included the assessment of visual acuity, anterior segment using slit lamp bio-microscopy, and fundus examination with the indirect ophthalmoscope.

Visual acuity was recorded using Snellen's acuity chart, and the acquired visual loss scores were evaluated at 1, 2, 4 weeks, 3, and 6 months. Visual impairment was graded as mild, moderate, and severe acuity, based on the criteria laid down by Zaal et al., for the purpose of analysis. The following categories were distinguished as visual loss, mild to moderate visual loss (VA >6/18), and severe visual loss (VA <6/18). Color vision was assessed using Ishihara's pseudo-isochromatic plates, and the Jaggers' chart was used to assess near vision.

The examination of conjunctiva involved the use of a slit lamp to look for any congestion, papillae, follicles, or discharge, and these findings were recorded. Corneal

Table 5: Visual outcome in this study group

Visual loss	0, n (%)	1 week, n (%)	2 weeks, n (%)	4 weeks, n (%)	3 months, n (%)	6 months, n (%)
None	19 (47)	17 (42.5)	17 (42.5)	22 (55)	23 (57.5)	24 (60)
Mild/moderate	6 (15)	1332.5	16 (40)	11 (27.5)	12 (30)	1127.5)
Severe	15 (37.5)	10 (25)	7 (17.5)	7 (17.5)	5 (12.5)	5 (12.5)

Table 6a: Conjunctival and corneal complications in herpes zoster ophthalmicus-patients

Complications in HZO-patients	0, n (%)	1 week, n (%)	2 weeks, n (%)	4 weeks, n (%)	3 months, n (%)	6 months, n (%)
Conjunctivitis	38 (95)	11 (27.5)	5 (12.5)	0	0	0
Acute epithelial keratitis	37 (92.5)	27 (67.5)	11 (27.5)	6 (15)	4 (10)	3 (7.5)
Chronic stromal keratitis	0	0	4 (10)	6 (15)	2 (5)	0

Table 6b: Uveitis in herpes zoster ophthalmicus patients

Uveitis	0, n (%)	1 week, n (%)	2 weeks, n (%)	4 weeks, n (%)	3 months, n (%)	6 months, n (%)
Grade 0	28 (70)	24 (60)	26 (70)	28 (65)	32 (80)	40 (100)
Grade 1	7 (17.5)	6 (15)	7 (17.5)	11 (27.5)	8 (20)	0
Grade 2	2 (5)	9 (22)	6 (15)	1 (2.5)	0	0
Grade 3	3 (7.5)	1 (2.5)	1 (2.5)	0	0	0
Grade 4	0	0	0	0	0	0

Table 6c: Pain in herpes zoster ophthalmicus patients

Herpetic pain	0, n (%)	1 week, n (%)	2 weeks, n (%)	4 weeks, n (%)	3 months, n (%)	6 months, n (%)
None	2 (5)	1 (2.5)	12 (30)	17 (42.5)	18 (45)	20 (50)
Mild	2 (5)	4 (10)	11 (27.5)	9 (22.5)	9 (22.5)	7 (17.5)
Moderate	12 (30)	10 (25)	9 (22.5)	9 (22.5)	7 (17.5)	7 (17.5)
Severe	24 (60)	23 (57.5)	6 (15)	3 (7.5)	4 (10)	4 (10)

Table 7: Effect of age on the various ocular manifestations in herpes zoster ophthalmicus patients

Signs	Number of cases	Average age	Statistics (T, df, P)	Significance
Conjunctivitis				
Absent	38	42.82 (17.4)	0.97, 38, 0.33	NS
Present	2	55 (0)		
Corneal sensation				
Absent	27	44.22 (18.54)	0.41, 38, 0.67	NS
Preserved	13	41.77 (14.5)		
Acute epithelial keratitis				
Absent	14	39.1 (14.2)	1.16, 38, 0.25	N.S
Present	26	45.7 (18.4)		
Chronic stromal keratitis				
Absent	34	45.1 (17.7)	1.50, 38, 0.14	NS
Present	6	33.8 (9.7)		
Uvetitis				
Absent	23	40.1 (14.5)	1.40, 38, 0.16	NS
Present	17	47.8 (19.8)		
Acte herpatic pain				
Absent	1	23	1.2, 38, 0.23	NS
Present	39	43.9 (17)		
Postherpatic pain				
Absent	23	36.4 (14.1)	3.3, 38, ≤0.05	Significant
Present	17	52.8 (16.7)		

NS: Not significant

lesions were assessed on the slit-lamp using yellow light, and then fluorescein staining was used with cobalt blue light. The lesions were classified as acute (to include epithelial keratitis, both punctate and dendritic), stromal (to include nummular and disciform), and chronic (to include neurotrophic keratitis, chronic infective dendritic keratitis, and mucous plaques). Corneal sensation was assessed using a wisp of cotton in all quadrants of the affected eye. The slit lamp was used to count the number of cells as a measure of the index of anterior chamber activity to evaluate the Uvea. Uveitis was graded based on the slit lamp examination into 4 grades as per the Standardization of Uveitis Nomenclature Working Group criteria:

- Grade 0: No cells seen in the anterior chamber
- Grade 1: 1–5 cells seen in the anterior chamber
- Grade 2: 6–15 cells seen in the anterior chamber
- Grade 3: More than 15 cells seen in the anterior chamber, or the presence of keratic precipitates.

Table 8: Effect of diabetes mellitus on the various ocular manifestations in herpes zoster ophthalmicus patients

Signs	DM		Statistics (FEP)	Significance
	Absent (37)	Present (3)		
Conjunctivitis				
Absent	2	0	1.0	NS
Present	35	3		
Corneal sensation				
Absent	25	2	1.0	NS
Preserved	12	1		
Acute epithelial keratitis				
Absent	13	1	1.0	NS
Present	24	2		
Chronic stromal keratitis				
Absent	31	3	1.0	NS
Present	6	0		
Uvetitis				
Absent	22	1	1.0	NS
Present	15	2		
Acte-herpatic pain				
Absent	1	0	1.0	NS
Present	36	3		
Postherpatic pain				
Absent	22	1	1.0	NS
Present	15	2		

Diabetes mellitus did not correlate significantly with the ocular manifestations. FEP: Fisher's exact probability, NS: Not significant

Table 9a: Effect of human immunodeficiency virus-acquired immune deficiency syndrome on the various ocular manifestations in herpes zoster ophthalmicus-patients

Signs	HIV		Statistics	Significance
	Absent	Present		
Conjunctivitis				
Absent	20	18	FEP=0.49	NS
Present	14	13		
Corneal sensation				
Absent	2	0	χ^2=0.33, df=1, P=0.56	NS
Present	8	5		
Acute-epithelial keraratitis				
Absent	7	7	χ^2=0.21, df=1, P=0.61	NS
Present	15	11		
Chronic-stromal keratitis				
Absent	19	15	FEP=1	NS
Present	3	13		
Uveitis				
Absent	13	10	χ^2=0.05, df=1, P=0.82	NS
Present	9	8		
Acte-herpetic pain				
Absent	1	0	FEP=1	NS
Present	21	18		
Posthepatic pain				
Absent	12	11	χ^2=0.17, df=1, P=0.67	NS
Present	10	7		

HIV: Human immunodeficiency virus, FEP: Fisher's exact probability, NS: Not significant

The intraocular pressure (IOP) was measured using a Goldmann applanation tonometer, and the findings were recorded. Gonioscopy was performed to evaluate the angle structures of the anterior chamber to rule out any angle-closure glaucoma. The optic nerve head was assessed for any signs of disc edema, pallor, or cupping using direct and indirect ophthalmoscopy. The visual acuity was measured using a Snellen chart, and the findings were recorded. The results of all these examinations were used to establish a diagnosis and guide the management of the patient's condition.

Statistical analysis

Statistical analyses were performed using SPSS version 20 (SPSS Inc., Chicago, IL, USA) software package.

Quantitative data were presented as mean±standard deviation, and qualitative data as number (%). Chi-square and Fisher's exact tests were used to compare the proportions between categorical variables. Student's t-test was used to compare the means of two groups. A $P<0.05$ was considered statistically significant.

RESULTS

The range of age group was between 6 and 75 years. The median of which was 44 years, a peak incidence was seen in the age group of 21–60 years (Tables 1-3).

Table 9b: Correlation of human immunodeficiency virus-acquired immune deficiency syndrome with age in herpes zoster ophthalmicus-patients

HIV-AIDS Age (years)	
Absent	**Present**
49.3 (17.2)	36.1 (14.4)

HIV: Human immunodeficiency virus, AIDS: Acquired immune deficiency syndrome

Table 10: Correlation of tuberculosis with age in herpes zoster ophthalmicus-patients

TB Age (years)	
Absent	**Present**
44.2 (17.5)	36.0 (12.0)

t=0.9, df=38, P=0.369. TB: Tuberculosis

HIV infection was the most common predisposing factor seen among the patients. Age was the second most common predisposing factor seen in these patients.

In this study, the most commonly involved branch of the trigeminal nerve was the frontal nerve, and the most common dermatomal presentation involved the frontal, nasal, and lacrimal branches. HIV-positive patients had both the ophthalmic and adjacent maxillary nerves involved. Multi-dermatomal involvement was seen in one patient and disseminated rash in another patient without predisposing factors to immunosuppression (Table 4).

60% of patients had no visual loss, 27.5% had mild-moderate visual loss, and only 12.5% had a severe visual loss at 6 months' follow-up (Table 5).

Ocular complications in 40 ophthalmic zoster patients

Most patients with ophthalmic zoster had conjunctival hyperemia (95%) and punctate keratitis (92.5%) during the acute phase. Only 3 patients had punctate keratitis that persisted beyond 4 weeks, with one developing severe lid scarification and 2 having associated keratoconjunctivitis sicca. Acute dendritic keratitis was seen in most patients, which gradually subsided. Six patients developed stromal keratitis, which subsided in all patients by 6 months without causing persistent corneal edema or neurotrophic ulceration (Table 6a).

Acute iridocyclitis was mostly seen at 1 and 2 weeks' follow-up, but no patients had persistent uveitis or became steroid-dependent. Two patients had secondary glaucoma (Table 6b).

Table 11: Effect of the involvement of the frontal nerve in herpes zoster ophthalmicus-patients

Signs	Frontal nerve		Statistics (FEP)	Significance
	Absent	Present		
Conjunctivitis				
Absent	1	1	0.28	NS
Present	5	33		
Corneal sensation				
Absent	4	23	1.0	NS
Present	2	11		
Acute epithelial keratitis				
Absent	2	12	1.0	NS
Present	4	22		
Chronic stromal keratitis				
Absent	6	28	0.56	NS
Present	0	6		
Uveitis				
Absent	5	18	0.21	NS
Present	1	16		
Acute herpatic pain				
Absent	0	1	1.0	NS
Present	6	33		
Postherpatic pain				
Absent	3	20	1.0	NS
Present	3	14		

FEP: Fisher's exact probability, NS: Not significant

Table 12: Effect of the involvement of the lacrimal nerve in herpes zoster ophthalmicus patients

Signs	Lacrimal nerve		Statistics	Significance
	Absent	Present		
Conjunctivitis				
Absent	2	0	FEP=0.48	NS
Present	18	20		
Corneal sensation				
Absent	11	16	χ^2=2.84, df=1, P>0.05	NS
Present	9	4		
Acute epithelial keratitis				
Absent	9	5	χ^2=1.75, df=1, P=0.1	NS
Present	11	15		
Chronic stromal keratitis				
Absent	19	15	FEP=0.18	NS
Present	1	5		
Uveitis				
Absent	15	8	χ^2=5.01, df=1, P<0.02	Significant
Present	5	12		
Acute herpatic pain				
Absent	1	0	FEP=1	NS
Present	19	20		
Postherpatic pain				
Absent	14	9	χ^2=2.55, df=1, P=0.11	NS
Present	6	11		

FEP: Fisher's exact probability, NS: Not significant

Severe acute herpetic pain persisted for a week in 24 patients, but only 4 had severe post-herpetic neuralgia (PHN) at 6 months, which was more common in older patients (Table 6c).

Age correlated with post-herpetic pain but not with other ocular manifestations (Tables 7 and 8).

It was found that HIV- AIDS was seen more often in the younger age group with a mean of about 36.1 years (Tables 9a and b).

Tuberculosis did not correlate significantly with age or ocular manifestations. Its presence did not increase the risk of developing ocular complications (Table 10).

Correlations of the involvement of the various branches of the ophthalmic branch with the severity of ocular complications

The involvement of the frontal nerve, a branch of the ophthalmic nerve did not correlate significantly with the ocular manifestations (Table 11).

When there was the involvement of the lacrimal nerve, uveitis was present in 12 patients, which is clinically significant (Table 12).

The involvement of the Nasociliary nerve led to statistically significant reduction in corneal sensation and the presence of acute corneal lesions and uveitis in 20 and 15 patients, respectively (Table 13).

Hutchinson's sign positivity correlated with ocular manifestations, including decreased corneal sensation, acute corneal lesions, and uveitis (Table 14).

Visual acuity does not correlate significantly with any of the ocular manifestations (Table 15).

DISCUSSION

HZO is more common in older individuals, but our study found a peak incidence in the younger age group (21–60 years). HIV infection was the most common predisposing condition (45% of patients), followed by hypertension, diabetes, tuberculosis, and other conditions. HIV was more common in younger patients (mean age 36.1 years).[12,13]

In this study, the high prevalence of frontal nerve involvement in HZO was consistent with previous reports, including Karbassi et al.,[13] The nasociliary and lacrimal branches were also commonly affected. Isolated frontal nerve involvement was more frequent than the classic distribution along the ophthalmic branch of the trigeminal nerve. Nasociliary nerve involvement was significantly associated with corneal sensation deficits, acute corneal lesions, uveitis, and post-herpetic pain. In addition, involvement of the lacrimal nerve correlated significantly with decreased corneal sensation and uveitis, a finding not reported in other studies.

In our study, a positive Hutchinson's sign correlated significantly with the ocular manifestations of decreased corneal sensation, acute corneal lesions such as punctate

Table 13: Effect of the involvement of the nasociliary nerve in herpes zoster ophthalmicus-patients

Signs	Nasociliary nerve		Statistics	Significance
	Absent	Present		
Conjunctivitis				
Absent	1	1	FEP=0.28	NS
Present	17	21		
Corneal sensation				
Absent	7	20	χ^2=12.21, df=1, P<0.001	Significant
Present	11	2		
Acte epithelial keratitis				
Absent	12	2	χ^2=14.42, df=1, P<0.001	Significant
Present	6	20		
Chronic stromal keratitis				
Absent	17	17	FEP=0.19	NS
Present	1	5		
Uveitits				
Absent	16	7	χ^2=13.19, df=1, P<0.001	Significant
Present	2	15		
Acute herpatic pain				
Absent	1	0	FEP=0.45	NS
Present	17	22		
Postherpatic pain				
Absent	13	10	χ^2=2.9, df=1, P>0.05	NS
Present	5	12		

FEP: Fisher's exact probability, NS: Not significant

Table 14: Prognostic effect of hutchinson's sign on the ocular manifestations in herpes zoster ophthalmicus-patients

Signs	Hutchinson's sign		Statistics	Significance
	Negative	Positive		
Conjunctivitis				
Absent	1	1	FEP=1.0	NS
Present	23	15		
Corneal sensation				
Absent	11	16	FEP=0.00	Significant
Present	13	0		
Acute epithelial keratitis				
Absent	13	1	χ^2=9.68, df=1, P<0.05	Significant
Present	11	15		
Chronic stromal keratitis				
Absent	21	13	FEP=0.66	NS
Present	3	3		
Uveitis				
Absent	21	2	χ^2=22.09, df=1, P<0.001	Significant
Present	3	14		
Acute herpatic pain				
Absent	1	0	FEP=1.0	NS
Present	23	16		
Postherpatic pain				
Absent	16	7	χ^2=2.06, df=1, P<0.05	NS
Present	1	9		

FEP: Fisher's exact probability, NS: Not significant

and dendriform keratitis and uveitis. Zaal et al., have found Hutchinson's sign to be a powerful predictor of ocular inflammation in HZO, with a relative risk of 3.35.[14]

This study found a higher incidence of corneal involvement in HZO patients at 92.5% (37/40) compared to other studies.[15] Leisegang reported corneal involvement in 65% (61/94) of patients, Zaal et al., found 63% involvement including mainly acute epithelial and stromal keratitis,[14] while Kestelyn et al.,[16] and Sandor et al.,[6] reported much higher incidences of corneal complications in HIV-positive patients at 89.4% (17/19) and 43% (23/54), respectively. Chronic corneal lesions, mainly stromal keratitis, were observed in only 15% (6/40) of patients, with nummular keratitis reported by

Table 15: Relation of visual acuity with the various ocular manifestations in herpes zoster ophthalmicus-patients

Signs	VA		Statistics (FEP)	Significance
	Decreased	Normal		
Conjunctivitis				
Absent	1	2	FEP=1	NS
Present	1	37		
Corneal sensation				
Absent	1	26	FEP=1	NS
Present	0	13		
Acute epithelial keratitis				
Absent	0	14	FEP=1	NS
Present	1	25		
Chronic stromal keratitis				
Absent	1	33	FEP=1	NS
Present	0	6		
Uveitis				
Absent	0	23	FEP=0.42	NS
Present	1	16		
Acute herpatic pain				
Absent	0	1	FEP=1	NS
Present	1	38		
Postherpetic pain				
Absent	1	22	FEP=1	NS
Present	0	17		

VA does not correlate significantly with any of the ocular manifestations. VA: Visual acuity, FEP: Fisher's exact probability, NS: Not significant

McGill in 40% of cases and by Zaal et al., in 50%. Treatment with antiviral agents was found to reduce the incidence of stromal keratitis, with Cobo et al.,[17,18] reporting 25% in the treated group compared to 56% in the non-treated group.

Long-term corneal complications like bullous keratopathy or neurotrophic keratitis were not observed in this study but reduced corneal sensitivity was seen in 67.5% of patients and was significantly associated with nasociliary and lacrimal branch involvement and a positive Hutchinson's sign. However, this did not lead to treatment-refractory corneal ulceration or perforation, indicating permanent nerve damage. Other studies, including Leisegang and Womack, have found neurotrophic keratitis in a small percentage of patients.[15]

Uveitis was present in 42.5% of the patients with HZO in this study. Anterior uveitis was reported in nearly 30% of the patients by Zaal et al.,[14] and in 43% by Womack and Liesegang[15] which is similar to the present study.

In contrast to the study by Cobo et al.,[18] where a high incidence of secondary glaucoma was reported, in this study, secondary glaucoma was seen only in two patients. Cobo et al., reported elevated IOP in 43% of patients early in the course of the disease. Thean et al., also found a high incidence of secondary glaucoma. However, in this study, the incidence of secondary glaucoma was low.

PHN was seen in 42.5% of patients in this study, with higher rates in older patients and those with nasociliary nerve involvement. Harding et al.,[19] found increasing age, male sex, and severe acute pain as risk factors for PHN. In contrast, Kestelyn et al.,[16] found higher severity and incidence of PHN in HIV-positive patients, while Margolis et al.,[17] reported only a 2.4% incidence of PHN in their study of HIV-positive patients.

Limitations of the study

One limitation of the study is small sample size, it may hinder the generalizability of the findings. The results obtained from in this study may not accurately represent the broader population of individuals with herpes zoster ophthalmicus.

CONCLUSION

The study highlights the importance of early and aggressive treatment for patients with HZO to prevent ocular complications and visual loss. The involvement of the nasociliary and lacrimal nerves, as well as a positive Hutchinson's sign, were found to be associated with an increased incidence of stromal keratitis and uveitis. Additionally, the majority of patients had reduced corneal sensitivity, indicating permanent nerve damage. Thus, prompt treatment is crucial to prevent prolonged complications and potential loss of vision. The study supports the use of vigorous acyclovir treatment to prevent serious visual loss in patients with acute ophthalmic herpes zoster disease.

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Authors' Contributions:
BM- Concept and design of the study, results interpretation, review of literature and preparing first draft of manuscript. Statistical analysis and interpretation, revision of manuscript; **PRML-** Concept and design of the study, review of literature and revision of manuscript.

Work attributed to:
SVS Medical College, Mahbubnagar, Telangana, India.

Orcid ID:
Babu Manda - https://orcid.org/0009-0000-8054-1314
Porika Ram Mohan Lal - https://orcid.org/0009-0006-9089-9647

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