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Research Paper

"Ocular involvement and visual outcome of herpes zoster ophthalmicus among patients attending a tertiary care centre"

Dr Dipanjali Majumder[1], Dr Phani Kumar Sarkar[2], Dr Pranabes Chakraborti[3] Dr Paruldeep Chakma[4], Dr Vishnu Devaraj[5]

[1](Department of Ophthalmology, Agartala Govt. Medical College) [2](Department of Ophthalmology, Agartala Govt. Medical College) [3](Department of General Medicine, Agartala Govt. Medical College) [4](Department of Ophthalmology, Agartala Govt. Medical College) [5](Department of Ophthalmology, Agartala Govt. Medical College) Corresponding author: Dr Dipanjali Majumder

***ABSTRACT**:*

***Background**: Herpes zoster ophthalmicus (HZO) is the reactivation of varicella zoster virus affecting the ophthalmic division of trigeminal nerve. In this study, the spectrum of clinical presentation of HZO patients was studied and factors influencing visual outcome were evaluated.*

***Aim**: To study the ocular manifestation and visual outcome of Herpes Zoster Ophthalmicus cases attending a tertiary health care centre.*

***Objectives:** 1. To study the ocular manifestations of Herpes Zoster Ophthalmicus cases attending AGMC & GBP Hospital. 2. To find out the proportion of subjects developing visual impairments among the study population.*

***Materials and method:** It was a hospital based observational study in Department of Ophthalmology and Department of Dermatology of AGMC & GBP Hospital in one and half years among 48HZO patients who were subjected for detailed history, examination and follow up.*

***Result:**Peak incidence was seen in the age group between 41-60 years.There was almost equal incidence between males and females.HIV infection was the most common predisposing factor seen among the patients.The frontal nerve was the most commonly involved branch. Conjunctivitis and acute herpetic pain was the most common presentation.The visual outcome in most of the patients was good with 47.9% of the patients having no visual loss. 37.5% of the patients had mild/moderate visual loss at 3 months follow up and only 14.6% had severe visual loss.*

***Conclusion:** With rising incidence of HIV infection, HZO is presentingat younger age. The involvement of nasociliary nerve and presence of Hutchinson's sign is good indicator of ocular complications. PHN was severe in elderly patients and with involvement of the nasociliary nerve.Visual acuity was decreased in patients with decreased corneal sensation, acute punctate and dendriform keratitis, uveitis and PHN.An important finding in this study was,severe visual loss could be prevented in HZO patients if vigorous acyclovir treatment is instituted early.*

***Keywords:** Herpes Zoster Ophthalmicus (HZO), HIV, Hutchinsons sign, Postherpetic neuralgia (PHN), BCVA (Best corrected visual acuity).*

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I. INTRODUCTION

Herpes Zoster Ophthalmicus (HZO) is the reactivation of varicella zoster virus affecting the ophthalmic division of the trigeminal nerve. In HZO, ocular involvement is seen in more than 50% of the patients [1, 2]. HZO is of significance not only for its potential for causing visual and socioeconomic disability but also because of its thread to life, imposed by associated cerebrovascular attacks[3, 4].Increasing age is associated with alteration in T-cells and decrease in the neutralizing varicella zoster antibody, allowing reactivation of the latent virus[5, 6]. The other risk factors are haematological malignancies, iatrogenic immunosuppression (steroids, organ transplant recipient on chemotherapy), HIV-AIDS, local trauma, irradiation, diabetes mellitus and high-grade fevers[7, 8]. HZO is 4-5 times more common in patients who are immunocompromised[9]. Extra ocular muscle paresis, chronic infections, epithelial keratitis, optic neuritis and retinitis are the unusual ocular complications[10], which

are more likely to occur in immunocompromised individuals.In North east region of India, no study is available about the clinical spectrum and ocular complications in patients with HZO. In our study, factors influencing ocular complications and visual outcome were evaluated.

II. MATERIAL AND METHODS

Study design: Hospital based observational study.
Type of study: Descriptive study.
Setting: Department of Ophthalmology and Department of Dermatology, AGMC & GBP Hospital.
Study duration: November 2017 to May 2019 (one and half years).
Study population: All Herpes Zoster Ophthalmicus patients attended the Department of Ophthalmology & Department of Dermatology of Agartala Government Medical College & GBP Hospital during the study period.
Sample size:It was a census study. Total 48 Herpes Zoster Ophthalmicus cases were enrolled in IPD & OPD register of Department of Ophthalmology & Department of Dermatology and all were included in this study.
Sampling technique: No sampling was done as it was a census study.
Operational definition: Herpes Zoster Ophthalmicus was defined as vesicular rash which affect the distribution of ophthalmic division of the trigeminal nerve.
Study tools:1) Case record proforma. 2) Snellen's Chart. 3) Near Vision test type book. 4) Slit lamp examination with +90D lens. 5) Direct & Indirect Ophthalmoscope. 6) Non Contact Tonometer.
Inclusion criteria: All patients presented to the Department of Ophthalmology & Department of Dermatology with Zoster vesicle formation affecting the ophthalmic branch of the trigeminal nerve during this study period were included in this study.

Exclusion criteria:

- Patients who did not give consent to participate in this study.
- Patients with pre-existing ocular disease like Corneal Ulcer, Glaucoma, Uveitis and severe Retinal Disease.

Data collection methods: Patients reported to the Departments of Ophthalmology and Dermatology within 3 weeks of onset of active zoster vesicles affecting the ophthalmic branch of the trigeminal nerve were approached and written informed consent for participation in this study was sought. Consenting participants was subjected to a detailed history including age, sex, place of residence, date of onset, progression of symptoms, associated complains, time gap between onset & presentation at hospital, which was collected on a proforma specially designed for this study. Information regarding past illnesses including medical disorders, ocular diseases, drug history, sexual history, history of blood transfusions was obtained. They have undergone a complete physical, dermatologic & ophthalmologic examination. Systemic examination was also done to rule out the predisposing factors. Laboratory investigations like haemoglobin, total and differential count, ESR, random blood sugar and ELISA for HIV (with pre-test counselling & informed consent) was done. The dermatological examination included the evaluation of the rash with relevance to its 1) distribution (frontal, nasociliary and/or lacrimal), 2) Severity, 3) type whether it is Classic or Haemorrhagic, 4) whether secondarily infected, 5) whether it is disseminated or multidermatomal. The diagnosis of acute HZO was made based on the presence of primary vesiculo-macular and characteristic skin rash within the ophthalmic dermatome.

The ophthalmological examination included assessment of Best-corrected visual acuity (BCVA), which was recorded using Snellen's acuity chart. Acquired visual loss scores at 1^{st}, 2^{nd}, 4^{th}, 6^{th} weeks and 3 months was evaluated. Intraocular pressure was measured with Non-Contact Tonometer (NCT). Anterior segment examination was done using slit lamp bio-microscopy and fundus examination with the direct & indirect ophthalmoscope. Ductions and versions of extra-ocular muscles were evaluated in all the cardinal positions of gaze. Any 3^{rd}, 4^{th} or 6^{th} palsy, when noted, documented and followed up at each visit. Direct and consensual pupillary reactions were assessed in all patients. The swinging flash light test was done to rule out a relative afferent pupillary defect (RAPD). Herpetic pain was recorded at each visit based on ratings on a 4-point verbal scale [11] and included at the initial visit and then 1^{st}, 2^{nd}, 4^{th}, 6^{th} week & 3^{rd} month. Post-herpetic neuralgia is the chronic pain that persisted one month after the rash onset.

Follow-up visits:

Patients were recalled for a complete ophthalmic and general physical examination at 1^{st}, 2^{nd}, 4^{th}, 6^{th} week intervals, and then at 3 months. At each visit the ophthalmological examination was done which included condition of skin lesion, best-corrected visual acuity (BCVA), corneal sensitivity, slit lamp examination, ocular motility testing and fundus examination.

Data analysis:

All data were recorded in the proforma designed specifically for this study. On completion of the study, data were entered into Microsoft excel spreadsheet for analysis. Data were recorded, entered and analysed with computer using SPSS version 15.0 and Epi-info-version-7. Descriptive statistics and other statistical tests like Chi square test; binary logistic regression analysis were used as per applicability. P value of less than 0.05 was considered as statistically significant.

Ethical considerations:

Informed written consent was obtained from each and every participant as per modified ICMR template. Confidentiality was ensured while collecting and analysing the data and was used for research purpose only.

III. RESULT

Patients who presented to the Department of Ophthalmology within 3 weeks of onset of active herpes zoster vesicle were included in the study. Forty-eight (48) patients fulfilled the inclusion criteria and were included in this study.

Table 1 shows the age distribution among these patients. The range of the age group was between 10-80 years, the median of which is 46.5 years. A peak incidence was seen in the age group, between 41-60 years.

Table No 1: Age distribution of patients of HZO.

AGE GROUPS (in years)	NUMBERS OF CASES	PERCENTAGE (%)
1-20 21-40 41-60 61-80	2 15 25 6	4.17 31.25 52.08 12.50
TOTAL	48	100.00

FIG – 1: Age distribution of patients of HZO

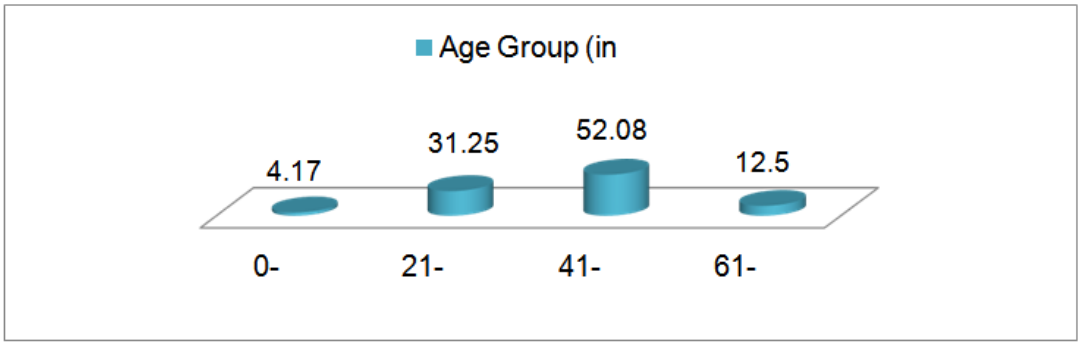


Table 2 shows there was almost equal incidence between male and female patients of HZO.

Table – 2: Sex distribution of patients of HZO

Sex	Numbers of cases	Percentage (%)	Ratio (male: female)
Male Female	25 23	52.08 47.92	1.09:1
Total	48	100.00	

Fig - 2: Sex Distribution in Patients with HZO

Table – 3 shows HIV infection was the most common predisposing factor seen among the patients.

Factors	Numbers of Cases	Percentage (%)
Diabetes Mellitus Tuberculosis HIV	8 4 10	16.67 8.33 20.83

Fig – 3: Predisposing Factors in the Study Group

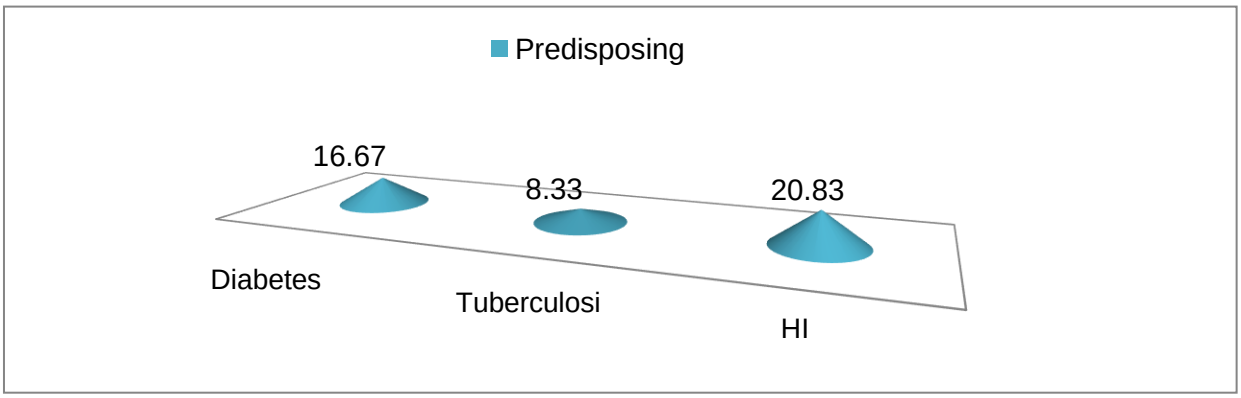


Table – 4 showsthe frontal nerve was the most commonly involved branch seen in this study. The most common dermatomal presentation seen was that of the classic variety which involved the frontal, nasal and lacrimal branches together.

Branches of ophthalmic nerve	Numbers of Cases	Percentage (%)
Lacrimal Nerve Nasociliary Nerve Frontal Nerve	17 32 41	35.42 66.67 85.42

Fig – 4: Branches of the Ophthalmic Nerve

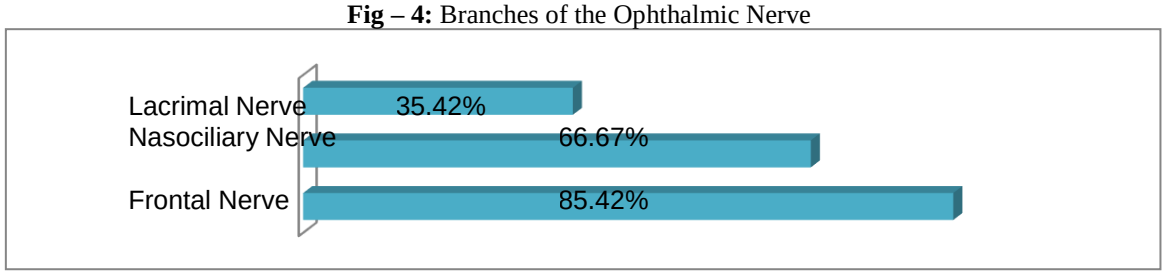


Table – 5shows Conjunctivitis and acute herpetic pain was the most common presentation in this study.

Ocular Presentation	Numbers of Cases	Percentage (%)
Conjunctivitis Sensory Loss Superficial Keratitis Stromal Keratitis Uveitis Acute Herpetic Pain Post Herpetic Neuralgia	42 16 36 16 26 41 16	87.50 33.33 75.00 33.33 54.17 85.42 33.33

Fig – 5: Ocular Presentation of HZO Patients

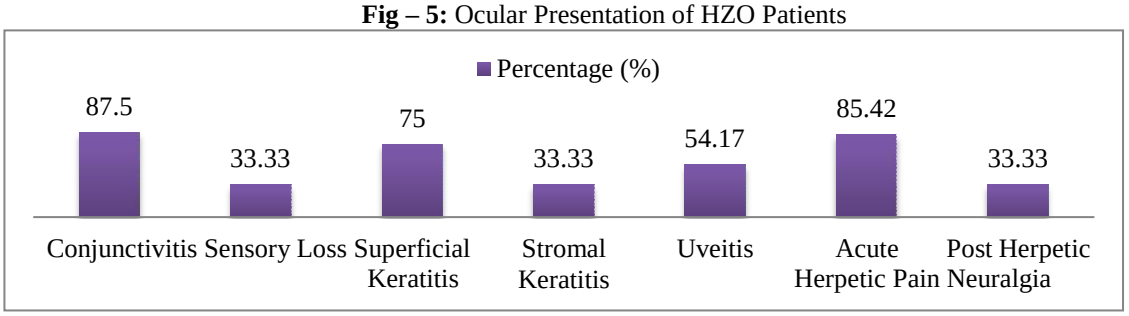


Table – 6 shows the visual outcome in most of the patients was good with 47.9% of the patients having no visual loss. 37.5% of the patients had mild/moderate visual loss at 3 months follow up and only 14.6% had severe visual loss. There were only 7 patients who had severe visual loss.

Table 6: Visual Outcomes in this Study Group

Visual Loss	Visual Outcome			
	At 0 Day	At 7 Day	At 4 Weeks	At 3 Months
None	8	13	18	23
Mild/Moderate	31	26	22	18
Severe	9	9	8	7

Fig – 6: Visual Loss in this Study Group

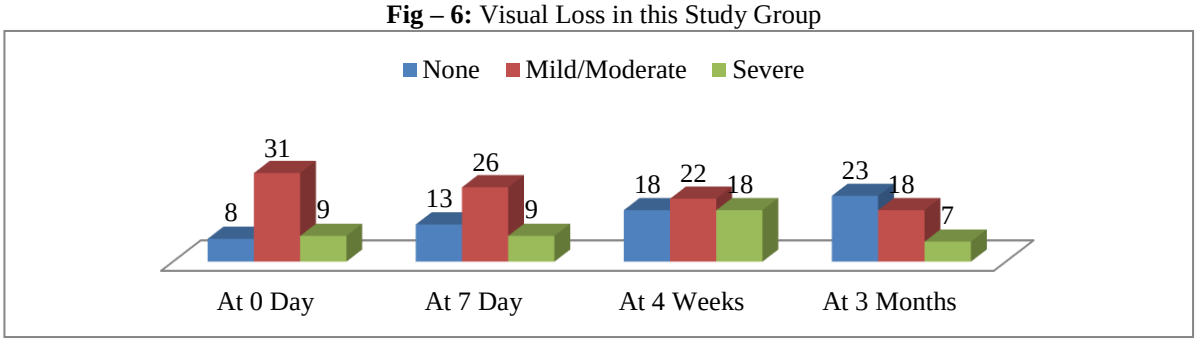
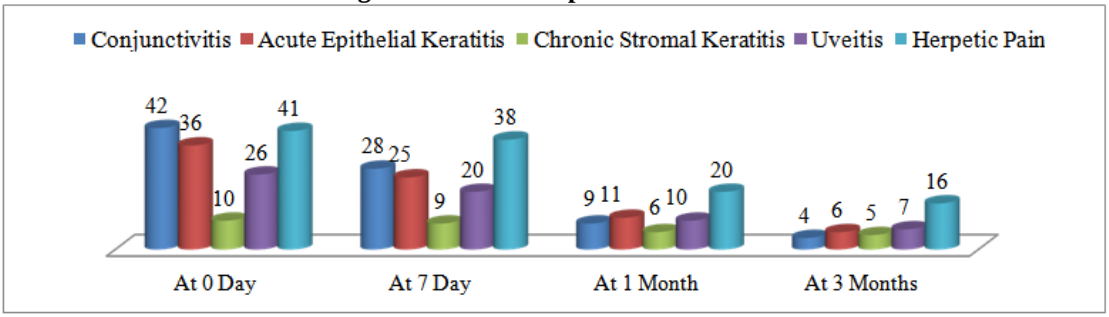


Table – 7showing ocular Complications of HZO, where conjunctival hyperaemia was seen in 87.5%. Punctate keratitis was seen in 75% patients at the initial visits; it subsided by 4 weeks in most of the patients. Acute iridocyclitis was seen at mostly the first and second follow-up. 41 patients had severe acute herpetic pain at the onset, and this persisted in the first week. Post herpetic neuralgia was also found to be higher in the older patients with a mean of 49.31 years.

Table 7: Ocular complication of HZO

Ocular Presentation	**Time of Presentation**			
	At 0 Day	At 7 Day	At 1 Month	At 3 Months
Conjunctivitis	42	28	9	4
Acute Epithelial Keratitis	36	25	11	6
Chronic Stromal Keratitis	10	9	6	5
Uveitis	26	20	10	7
Herpetic Pain	41	38	20	16

Fig – 7: Ocular Complications of HZO



IV. DISCUSSION

The involvement of the nasociliary nerve, lacrimal nerve and the Hutchinson's sign being positive was associated with an increased incidence of ocular complications, including stromal keratitis and uveitis. The association of lacrimal nerve involvement and increased incidence of serious ocular complications has not been reported earlier. This association should be corroborated by other studies. Corneal sensitivity was reduced in majority of the patients in this series, suggesting permanent nerve damage. The ocular morbidity is related to the consequences of this nerve damage and scarring. Thus, these patients must be treated promptly and more aggressively to prevent these complications as they can be prolonged and are frequently associated with loss of vision.

The inflammatory and immune mediated lesions of HZO respond well to topical steroids. The drug has a definitive role in the treatment of corneal, sclera or uveal inflammation. The non-administration or inadequate use of steroids in the presence of inflammatory complications may lead to permanent visual loss in these patients. Thus, it must be used appropriately, monitored closely and tapered carefully. Even in HIV positive patients there is contraindication for its use in the presence of ocular inflammation. Increasing age is the most common predisposing factor for developing HZO. With the increasing incidence of HIV infection, HZO is increasingly presenting at a younger age, as seen in our series. Thus, all young patients with HZO need serological testing for HIV.

Visual loss was associated with the presence of decreased corneal sensation. Visual acuity was also found to be decreased in patients with acute corneal lesions like punctate and dendriform keratitis, uveitis and in severe post herpetic pain. Association of visual loss with PHN has not been reported earlier and is an important factor to be considered while treating patients with HZO. Close monitoring of these patients for at least one month to detect these complications and the institution of early treatment is mandatory. The results of this study demonstrate that serious visual loss could be prevented in most patients suffering from acute ophthalmic herpes zoster disease if vigorous acyclovir treatment is instituted early. These results may help to justify the cost and routine use of systemic antiviral medications in acute HZO. PHN was most likely to occur in the older age group. The presence of nasociliary nerve involvement and visual loss were more likely to be associated with PHN, an observation not reported earlier. Early treatment with tricyclic antidepressants will help in early resolution of this distressing complication of HZO.

V. CONCLUSION

- ✓ With the increasing incidence of HIV infection, HZO is increasingly presenting at a younger age.
- ✓ The presence of nasociliary, lacrimal nerve and Hutchinson's sign are good indicator of ocular complications, which require frequent monitoring and treatment.
- ✓ Post-herpetic neuralgia was severe in elderly patients and in those with involvement of the nasociliary nerve.
- ✓ Visual acuity was found to be decreased in patients with decreased corneal sensation, acute corneal lesions like punctate and dendriform keratitis, uveitis and in severe post herpetic pain.
- ✓ An important finding in this study was that serious visual loss could be prevented in most patients suffering from acute ophthalmic zoster disease if vigorous acyclovir treatment is instituted early.

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