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A CLINICAL STUDY OF OCULAR MANIFESTATIONS AND VISUAL OUTCOMES IN HERPES ZOSTER OPHTHALMICUS

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ABSTRACT **Methods:** An observational prospective study was conducted on 30 clinically diagnosed Tzanck smear positive cases HZO to observe the occurrence and frequency of different ocular manifestation and their visual outcome in 10-month period with 2monthly follow up. Full ophthalmological examination using slit lamp, non-contact tonometry, applanation tonometry, direct and indirect ophthalmoscope were performed. **Results:** Out of 30 patients of HZO,16 had one or more type of ocular manifestation starting from lid skin involvement to conjunctivitis, keratitis, uveitis, increased intraocular pressure (IOP) and optic neuritis but no retinal manifestation. More number of HZO cases and ocular manifestation were found with advancement of ages. Young HZO patients were more associated with human immunodeficiency virus (HIV) infection and HIV infected people with HZO infection had more ocular manifestation. Male to female ratio was 2:1 among HZO cases but ocular manifestation occurred more among males. Female with advanced age were involved more. Lid involvement (3.33%), conjunctivitis 26.66%, and keratitis (20%) were most common ocular manifestation followed by anterior uveitis (6.66%) Ocular hypertension (3.33%) was associated with almost every ocular manifestation. Among the cases of more than 45 years of age5 % patients acquired 6/6 vision compared to 80 % patients at and below 45 years of age after 8wk offollow up. **Conclusion:** The visual outcomes are poor in HZO with advanced age group. Visual outcome of the affected eyes is poor than unaffected eyes. The loss of vision is mainly due to keratitis, anterior uveitis, posterior uveitis and optic neuritis.

KEYWORDS : herpes zoster ophthalmicus; conjunctivitis; keratitis; uveitis; optic neuritis; Hutchinson sign

INTRODUCTION

Infection with varicella-zoster virus (VZV), a neurodermotropic virus causes varicella(chicken pox), a disease that manifests as a disseminated vesicular body rash after virus remains latent in sensory ganglia for decades & reactivated later causes new symptoms herpes zoster (shingles).Herpes zoster ophthalmicus (HZO) is caused by activated double stranded VZV (type 3). The virus reactivated in dorsal root ganglion and retrograde migration to the sensory axon of the skin to form the painful vesicular eruption, crusting and heals within 2-6wk.It typically affects dermatome supplied by ophthalmic division of trigeminal nerve (5th cranial nerve) and unilateral in nature.

It may be bilateral only in disseminated zoster seen in severely immune compromised patient. Deficient immune status of the host is a primary factor for virus reactivation.

Most of immune compromised patients including human immunodeficiency virus (HIV) positive patients are at riskDevelop HZO

It usually develops in elderly patients due to depressed cellular immunity In HZO the reactivated virus descends from the trigeminal root ganglion (gasserian ganglion) though the ophthalmic nerve, which *via* different branches supplies the skin of forehead, the lids, the nose and the eyeball supra orbital and supra trochlear branches are nearly always involved, nasal branch are very frequently involved rarely infra orbital branch.Ocular manifestation is very common with HZO such as row of vesicular skin rash and scars in the forehead lids & conjunctivitis,episcleritis and scleritis, keratitis, decreased corneal sensation, iridocyclitis, secondary glaucoma, retinal involvement,multiple ocular nerve involvement & marked visual impairment in various proportions. HZO associated uveitis is usually associated with high intraocular pressure

The manifestations of herpes zoster skin lesions at the dermatomes of both nasociliary branches were invariably associated with the development of ocular inflammation. Zoster comes from characteristic belt-like dermatomal rash.Many patients are referred from skin OPD to eye OPD for checking of ocular manifestations.So the main objective of the study was to find out magnitude of different ocular manifestations of HZO cases and to measure the visual outcome of the patients after two months and to find out the lacunae of different studies on the HZO casesand to determine the percentage of vision threatening ocular manifestation of HZO cases.

Aim And Objectives :

To estimate the magnitude of different ocular manifestation in clinically established herpes zoster ophthalmicus (HZO) patients and assessment of the visual outcome after two months of initial examination.

MATERIALS & METHODS

An observational prospective study was conducted on 30 clinically diagnosed cases of Herpes zoster ophthalmicus was conducted in the Department of Ophthalmology at Government general hospital,Guntur over period of 6mnths (January 2023 – June 2023) after taking approval from Ethics commity

Following Ophthalmologic Examination Are Done

- External inspection, visual acuity, visual fields, Extra ocular movements,
- pupillary response, fundoscopy, IOP, Anterior chamber slit lamp examination,
- slit lamp bio microscopy details examination of eye lid lashes, eye lid margins and adnexal area, states of conjunctiva, cornea including its epithelial integrity by fluorescent straining, corneal ulceration, status of anterior chamber, iris, pupillary shape size and reaction to light, lens condition.
- Non-contact tonometry (NCT), applanation tonometry (AT).
- AT were done, if corneal epithelium is intact or there is no significant corneal oedema or blepharospasm
- NCT was used where AT was not possible.
- Fundus examination
- Direct ophthalmoscope/ Indirect ophthalmoscopy

Inclusion Criteria:

- All diagnosed cases of Herpes zoster infection with an age group (20 -60 years)
- Patients with Immune compromised status like HIV ,Diabetics

Exclusion Criteria

- AGE <10 Years
- Patient who are not willing for participation
- Patient with other corneal lesions like Abrasions,Dystrophies Degenerations.

SUBJECTS AND METHODS

An observational prospectional study design of data collection was conducted in the Department of Ophthalmology ain Government general hospital ,Guntur over a period of 6mnths . Permission from Institutional Ethics Committee was obtained. Consent and detail history were taken in every patient. All clinically diagnosed cases of HZO from the OPD of ophthalmology were included in the study. All HZO cases are Tzanck smear positive. Physical examination was included a thorough ophthalmologic exam including external inspection, visual acuity, visual fields, extra ocular movements, pupillary response, fundoscopy, IOP, anterior chamber slit lamp examination, and corneal examination with and without staining amongst others.

All patients were planned for full ophthalmological examination. This was carried out using slit lamp biomicroscopy details examination of eye lid lashes, eye lidmargins and adnexal area, states of conjunctiva, cornea including its epithelial integrity by fluorescent straining,corneal ulceration, status of anterior chamber, iris, pupillary shape size and reaction to light, lens condition. Non-contact tonometry (NCT), Applanation tonometry (AT). AT were done, if corneal epithelium is intact or there is no significant corneal oedema or blepharospasm. NCT was used where AT was not possible. Following that dilatation of pupil bilaterally with tropicamide eye drop and fundus examination were done primarily by direct ophthalmoscope then 78/90 D Volk lens in slit lamp biomicroscope for examination of central fundus which includes optic disc macula including fovea and finally the peripheral fundus up to ora serreta check-up were done by indirect ophthalmoscopy. After initial visit ('0' date) every patient was examined after 3d, and at the end of 1st week from the first date of visit. Subsequent visits were conducted at the end of 2nd, 4th, 6th, and 8th week respectively.After collection and compilation of data, it was subsequently analysed by using Graph Pad Software Inc., San Diego, CA, USA; 2007, Microsoft Word and Excel software.

RESULTS

Among the 30 cases of HZO, 16(53%) were males and 14 (46.66%) were females. Among the total cases, majority of the patients belonged to the age group of 56 to 60y (21.42%). The younger age group (21-25y) was minimum (3.33%). As the age of the male patients was 24-65y and female patient was 37-70y, 45y was selected for "cut of age" between younger and older. It was also observed that the ocular manifestation became eminent with a class interval of 5y. Figure 1 note the Hutchingson sign in an HZO case.

Out of 30 cases of HZO, only 6 cases were 45y or less and 10 cases were above 45y But among the cases of above the age group of 45y, males were 10and females were 10 So, in lower age group gender distribution of HZO cases were male predominant in this study. The distribution of study population according to gender and age is depicted inTable 1.

Table 1 Age And Gender Distribution Of Hzo Cases *N*=30 (%)

Age	Male	Female	Total
21-30 yrs	1 (3.33)	0	1 (3.33)
31-40 yrs	2 (6.66)	1 (3.33)	3 (30)
41-50 yrs	3 (30)	3 (30)	6 (20)
51-60 yrs	7 (23.33)	7 (23)	14(46.66)
61-70yrs	3 (30)	3 (30)	6 (20)
Total	16 (53%)	14 (46.66%)	30 (100%)

Out of total 30 cases HZO, conjunctivitis was noted among most of the patient 8 (26.66%). It was followed by keratitis overall 6 (20%), epithelial keratitis 4 (13.33%), stromal keratitis 2(6.66%), nummular keratitis 2 (6.66%), anterior uveitis 2 (6.66%)Ocular hypertension is associated with 1(3.33%)case of HZO

Table 2 Distribution of various ocular manifestations among the HZO cases

Ocular manifestations	n (30 %)
Conjunctivitis	8 (26.66 %)
Keratitis overall	6 (20%)
Epithelial keratitis	4 (13.33%)
Stromal keratitis	2 (6.66%)
Nummular keratitis	2 (6.66%)
Disciform keratitis	1 (3.33%)
Anterior uveitis	2 (6.66%)
Posterior uveitis	1 (3.33%)
Episcleritis	1 (3.33%)
Optic neuritis	1 (3.33%)
Lid involvment	1 (3.33%)
Raised IOP	1 (3.33%)

Distribution of various ocular manifestations according to the age group were showed in Tables 4-5.

Age	Conjunctivitis	Epithelial keratitis	Stromal keratitis	Nummular keratitis	Disciform keratitis	Episcleritis	Anterior uveitis	Posterior uveitis	Optic neuritis
21-25	-	-	-	-	0	0	-	0	0
26-30		-	-	-	0	0	-	-	-
31-35				-	0	0	-	-	-
36-40			1	1	0	0	-	-	-
41-45	2 (25%)			-	0		2	-	-
46-50	1(12.5%)			-	0	0		1	-
51-55	2(25%)		1		1	1			1
56-60	1(12.5%)						-		
61-65	1(12.5%)				0	0	-	-	-
66-70	1(12.5%)			0	0	0	-	-	-

In the present study it was seen that under 45y group vision 6/6 after 8wk was lower (7.14%) in comparison to over 45y (9.52%). Vision 6/9 was almost same (7.14%) as over 45y (7.14%). Visual outcome of affected and non-affected eyes at the end of 8wk were showed in Table 6.

Groups	BCVA						
	6/6	6/9	6/12	6/18	6/24	6/36	<6/60
Affected eyes							
<45 Yrs	7(70%)	3(30%)	-	-	-	-	
>45 yrs	1(5%)	3 (15%)	-	10 (50%)		1 (5 %)	5 (25%)
Non affected eyes						-	-
<45 yrs	6 (60 %)	4 (40%)					
>45 yrs	7 (43.75%)		5 (31.25%)		4 (25 %)		
	-						

DISCUSSION

In this study found the mean age of herpes zoster is to be 48 yrs . Herpes zoster usually occurs in advancing of age due to lowering of the immunity power reactivating the long-term harbouring the varicella virus in the sensory ganglion. In our study it is revealed that ocular manifestation of HZO is more with advancing age and female involvement also more with advancement of age, but male have more ocular manifestation irrespective of age group. Out of 30 pts oculars manifested under and equal to 45y, 4 cases (66.67%) were HIV positive and out of 27 ocular manifested HZO cases over 45y only 2 cases (7.40%) were HIV positive. According to thestudy of Sandor *et al*[13] HZO occurred with frequent ocular complications in a subgroup of adults distinguishable by their young age. Over the study duration, 21% (three of 14) of the AIDS-risk subgroup patients have developed AIDS with a 14% (two of 14) mortality.

The present study reported that the HZO cases occurred more in advanced of age group (73.80% patients were above 45 years of age). The 78.57% patients of HZO had ocular manifestations. Ocular manifestations of HZO cases were also common above 45y (87.09% cases). Young patients were affected more with associated HIV infection (45.45%) and at the same time the HIV positive HZO cases also suffered more with ocular manifestations (85.71%). HZO cases were twice common among males (66.67%). Ocular manifestations were observed more in males (72.72%) & also All female patients were over 45 years of age. Ocular hypertension was associated with almost every type of ocular manifestations and IOP raised in % patients with ocular manifestations. IOP was also more in elderly patients (45.16%). Ocular manifestations were lid involvement (%), conjunctivitis (26.66%), keratitis anterior uveitis (6.66%), posterior uveitis (3.33%). Four types of keratitis were found in the study: keratitis (20 %), stromal keratitis (6.66%), nummular keratitis (6.66%), and disciform keratitis (3.33%).

Retinal involvements were not found in this study. Visual outcome was poor in the affected eye of elderly patient (>45y) and was associated with keratitis, anterior uveitis, posterioruveitis and optic neuritis primarily.

The present study depicts the scenario o of HZO cases and its ocular manifestation in a tertiary hospital in Eastern India. It also helps to generate a clear conception regarding the type of ocular manifestations and magnitude of ocular manifestations in HZO patients of Eastern India. The causes of vision threatening consequences of HZO patients, type and magnitude of keratitis associated with HZO, relation between raised IOP and HZO, relation with HIV positive cases are also revealed. This study can help the clinician and ophthalmologist in their judgement and presumptive assessment of the HZO cases in OPD. After resolution of HZO, 58.7% of patients had a visual acuity of 6/12 or worse. Epithelial keratitis and stromal keratitis were independent risk factors for visual loss after resolution of HZO. Another study conducted by Nithyanandam *et al*[21] where overall visual outcome was good, with 36/64 (56.3%).

The mild, moderate, and severe visual loss occurred in 22/64 (34.3%), 3/64 (4.7%), and 3/64 (4.7%) respectively. Moderate to severe visual loss was due to severe uveitis, neurotrophic keratitis, and cataract. Increasing age was significantly associated with visual loss. Uveitis was found to be the best predictor of visual loss in HZO on multivariate analysis. Viral retinitis was a rapidly progressive condition that may involvet he entire retina and lead to severe loss of vision.

The aetiological agents include cytomegalovirus (CMV), VZV, HSV, and rarely Epstein-Barr virus (EBV). ARN mayoccur in immune-competent individuals and is characterised by confluent, peripheral, necrotising retinitis, peripheral occlusive arteritis and moderate-to-severe vitritis. Progressive outer retinal necrosis usually occurs in immune compromised patients and can lead to the rapid involvement of the peripheral and central retina by full thickness necrosis with severe loss of vision from retinal detachment and optic neuropathy. In our study we did not found a single case of retinal involvement. Forster *et al*[22] reported two patients, both seropositive for the HIV, developed rapidly progressive retinal necrosis associated with a systemic herpes zoster infection.

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