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ORIGINAL RESEARCH

Pattern of viral keratitis in healthy young individual at a tertiary eye centre in Northern India

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ABSTRACT

Background: Viral keratitis is one of the leading causes of corneal scarring and subsequent visual disability. An improved understanding of burden of viral keratitis and its clinical pattern can have a significant effect on prevention and treatment.**Materials & Methods:** Our study was a descriptive, cross sectional, observational, hospital-based study conducted over a period of 3 year. All patients with viral keratitis presenting to eye OPD during the 3 year period, were included in the study. History was taken with emphasis on symptoms, precipitating factors, and any drug instillation. All patients underwent detailed ocular examination. Diagnosis of viral keratitis was made on basis of clinical presentation and slit lamp examination. Patients seen on 1st day were followed up on 3rd day, 7th day and 14th day.**Results:** Total patients of viral keratitis in our study were 96 out of 46,923 patients (0.2%). There were 45 cases (46.87%) of HSV keratitis, 15 cases (15.62%) of Adenoviral keratitis,36 cases(37.50%) of HZO keratitis. Commonest clinical presentation was epithelial keratitis (43.04%), followed by sub epithelial infiltration (35.22%) and stromal keratitis without ulceration (16.52% cases). Visual Acuity at presentation was 6/12-6/36 (64.77% of patients), while final visual acuity at two weeks follow up was 6/6-6/12(81.30% of patients).**Conclusion:** Productive age group are most commonly affected with viral keratitis. HSV keratitis may lead to significant scarring and severe visual impairment and blindness. Early diagnosis of viral keratitis is beneficial for disease management and response to treatment. Very few epidemiological data is available on viral keratitis in developing countries so a long-term study is required to estimate the burden of disease in young healthy population.

Key Words: Viral, Herpes Simplex, Keratitis

INTRODUCTION

Viral keratitis (VK) is one of the most prevalent forms of infectious keratitis [1,2] Of the different viruses which have been reported to cause keratitis, the alpha-herpesvirus herpes simplex virus (HSV) is the dominant cause[3-7]. Other common agents of viral keratitis include the beta-herpesvirus cytomegalovirus (CMV), the alpha-herpesvirus varicella-zoster virus (VZV), and the gamma-herpesvirus Epstein-Barr virus (EBV).

The incidence of viral keratitis in India has shown a steep rise due to improved socioeconomic changes and indiscriminate widespread use of antibiotics and corticosteroids. The episodes of recurrent herpes simplex viral (HSV) keratitis although occurring all year, tend to be more frequent in winter.[8]

Varicella zoster virus can persist in a latent form. Hutchinson's sign is much more predictive (50-85%) of ocular involvement and is strongly prognostic for ocular inflammation and corneal sensory denervation.[9]

Adenovirus subtypes 1, 3, 7 and 14 produce pharyngoconjunctival fever of which about 30% cases develop corneal lesions which are mild and self-limiting.[10]

An improved understanding of burden of viral keratitis and its clinical pattern can have a significant effect on prevention and its early treatment.

MATERIALS AND METHODS

Our study was a descriptive, cross sectional, observational, hospital-based study conducted over a period of 3 years from Feb 2022 to Jan 2025. Written

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informed consent was obtained from each patient. Ethical approval was obtained from Institutional Ethical Committee and the study was conducted adhering to principles of Declaration of Helsinki. All patients with viral keratitis presenting to Eye Out Patient Department of Ophthalmology, zonal hospital, during three-year period, were included in the study.

Clinically diagnosed viral keratitis cases with typical characteristic were included.Any other corneal pathology is causing visual impairment, Viral keratitis with superadded bacterial, fungal, or other infections, Old cases of viral keratitis with no signs of activity like congestion or ulceration, Recurrent cases were also excluded. Patients with history of any ocular surgery within past one year were excluded.

Diagnosis of viral keratitis was made based on clinical presentation, slit lamp examination with decreased or absent corneal sensations. Diagnosis of epithelial keratitis was made if the lesion had dendritic ulcers (lesions with branching, linear pattern with terminal bulbs) [7], or geographic ulcers (broad ulcers with swollen, scalloped, or geographic epithelial borders). Sub epithelial infiltration appeared as small nummular lesions just below the epithelium. Stromal lesions were divided into two categories; stromal keratitis without ulceration and stromal keratitis with ulceration (necrotizing keratitis). Stromal Keratitis without ulceration can manifest as focal, multiple, or diffuse opacities often accompanied by corneal oedema. Endothilitis included cases of disciform keratitis, which had stromal oedema in a disc pattern with underlying keratic precipitates. In cases of kerato-uveitis, uveitis predominated with mutton fat keratic precipitates. Diagnosis of adenoviral keratitis was made if there was bilateral presentation with sub epithelial corneal infiltrates associated with fever and upper respiratory tract infection and preauricular lymphadenopathy. Diagnosis of Herpes Zoster Ophthalmicus was made if there were pustular, vesicular rashes involving tip of the nose (Hutchinson sign) with corneal involvement as pseudo dendrites [8] with negative fluorescein stain, stromal keratitis, nummular keratitis or disciform keratitis. Fluorescein and Rose Bengal staining was done for each patient. In dendritic lesions, centre of the lesion was stained with fluorescein stain and the borders were stained with Rose Bengal stain. Geographic lesions edges too showed some dendritic pattern. Neurotrophic keratitis showed rolled up, smooth grey edges and stained only at the centre with fluorescein stain. In the pseudodendrites of HZO, fluorescein collected at the edges of epithelium, rather than staining the defect. Patients were treated according to disease presentation with topical antiviral and cycloplegics. Topical steroid and oral antivirals were used in stromal keratitis, subepithelial keratitis and endothelitis.

Patients seen on 1st day were followed up on 3rd day, 7th day and 14th day. Pre-treatment visual acuity and post treatment visual acuity was recorded at each follow up. In cases with bilateral disease, eye with worse best corrected visual acuity (BCVA) was recorded.

RESULTS

Out of 46923 patients, who visited eye OPD in the study period, 96(0.2%%) had viral keratitis. Out of 96 patients, majority of cases were in the age group 21-40 years (79.53%), the mean age being 28.61years. There were 45 cases (46.87%) of HSV keratitis, 15 cases (15.16%) of Adenoviral keratitis,36 cases (37.50%) of HZO keratitis. (Table 1). Adenoviral cases were maximum in the months July- September with peak in August. Adenoviral keratitis had bilateral presentation.

Most common clinical presentation was epithelial keratitis (43.04%), followed by sub epithelial infiltration (35.22%) and stromal keratitis without ulceration (16.52% cases) (Table 2). Overall, redness (83.04%) was most common presenting symptom in all types of viral keratitis. But foreign body sensation (91.35%) was seen commonly in epithelial keratitis. Diminution of vision was main complaint in stromal keratitis without ulceration (80%), sub epithelial keratitis (83%) and endothelitis (90%). Diminution of vision (79.30%) with pain (81.01%) and watering (77.92%) were chief complaints in case of stromal keratitis with ulceration. Fever was the commonest precipitating cause in 12 patients (37.5%) followed by Upper Respiratory Tract Infection (URTI) in 06 patients (18.7%). Visual Acuity at presentation fell maximum in the range 6/12-6/36 (64.77%), while final visual acuity at two weeks follow up, fell in the range 6/6-6/12(81.30%).

Table 1: Type of viral keratitis

Sl No	Type of keratitis	Number of patients	percentage
1	HSV Keratitis	45	46.87
2	HZO Keratitis	36	37.50
3	Adenoviral Keratitis	15	15.63
	Total	96	100

Table 2:Clinical presentation

Sl No	Clinical presentation	Number of patients	Percentage
1	Epithelial Keratitis	42	43.75
2	Subepithelial infiltration	32	33.33
3	Stromal keratitis without Ulceration	16	16.66
4	Endothelitis	4	04.16

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5	Neurotrophic ulcer	2	02.08
	Total	96	100

DISCUSSION

In our study majority of patients were in the age group 21-40 years with the mean age being 28.61years. Saini et al [11] also had maximum patients in the age group 31 to 50years (52.5%). Liesegang et al [12]found the mean age to be 37.4years. Most of the HZO patients were above 50 years of age. A study by Tran et al [13] also show peak incidence between ages 50-79 years with a skew towards older individuals. In our study Adenoviral keratitis was more common in 11-40 years of age group while mean age in a study by Lee et al [14] was 33.58 ± 17.74 years.

Among the recruited cases maximum frequency of occurrence was of HSV Keratitis (53.48%). Liesegang et al [12] reported prevalence of ocular HSV as 149 per100,000 population. Adenoviral cases were maximum in July to September which corresponds with the study by Lee et al [14]. In a study by Das et al [15], the peak prevalence was noted in the month of April.

Major precipitating factor in our study was fever (22.6%). Saini et al 11 reported fever in 15% of patients, while history of minor trauma in 20% of patients.

A study at Aravind Eye hospital in India found that at least 2% had visual acuity worse than 20/1200 and 62% improved to better than 20/40. [16] A Moor fields Eye Hospital study found that 152 patients with epithelial keratitis; only 3% had final visual acuity less than 20/200.[17] A study by Shah et al [18]11.9% patients had visual acuity less than 3/60. Our study found that visual acuity finally improved to 6/6-6/12 in 81.30% patients. Only 2.60% patients had final visual acuity less than 6/60. This may be because we have excluded keratouveitis patients, patients with increased intraocular pressure and recurrent cases. In the Rochester study only 4 eyes had visual acuity less than 20/100.[19] This again can be because of less of stromal disease in their study.

CONCLUSION

Viral corneal ulcer is a very common and serious ocular disease. The incidence of viral keratitis in India has shown a steep rise due to improved socioeconomic changes and indiscriminate widespread use of antibiotics and corticosteroids. In this study, we found that HSV keratitis was more common in younger age group and HZO in the elderly age group. Recurrence is quite frequent in patients with HSV keratitis with fever and common cold being the most common precipitating factors for recurrence. To conclude Awareness needs to be created among people for discontinuing use of unprescribed drugs and sharing of common vials by all family members. There is need to train the community eye workers and pharmacists regarding injudicious use of steroid drops and emphasis should be laid on counselling of patients regarding usage of drop vials.

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