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Clinical Spectrum and Recurrence Pattern of Herpetic Keratitis in Eye Care Settings

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Abstract

Background: Herpes simplex virus (HSV) keratitis is a recurrent corneal disease that remains a significant cause of ocular morbidity due to its variable clinical presentation and potential for progressive corneal damage. Understanding the clinical spectrum and recurrence patterns of HSV keratitis is essential for effective long-term management, particularly in tertiary eye care settings. ***Methods:*** This retrospective study was conducted at the National Institute of Ophthalmology and Hospital, Dhaka, Bangladesh, from April 2012 to March 2013. A total of 40 patients with recurrent HSV corneal infections were included, with disease duration ranging from 1 to 22 years. Only patients with more than one documented recurrence were enrolled. Patients with incomplete records, uncertain diagnosis, or stromal keratitis at initial presentation were excluded. Clinical data were analyzed to assess age distribution, initial disease pattern and recurrence behavior. ***Results:*** The majority of patients were middle-aged, with 52.5% between 31 and 50 years and the highest prevalence in the 41–50 age group (27.5%). Disciform keratitis was the most common initial presentation (62.5%), followed by epithelial keratitis (27.5%) and uveitis (10%). Among patients initially presenting with disciform keratitis, 84% experienced recurrence with the same pattern, while 8% developed neurotrophic keratitis. Patients initially presenting with epithelial keratitis predominantly showed epithelial recurrences (72.7%), though 27.3% progressed to disciform keratitis. ***Conclusion:*** Recurrent HSV keratitis predominantly affects middle-aged adults and most commonly presents as disciform keratitis in tertiary care settings. Recurrences tend to follow the initial disease pattern, although progression from epithelial to stromal involvement occurs in a notable proportion of cases, emphasizing the need for long-term follow-up.

Keywords: Herpes simplex keratitis; Disciform keratitis; Recurrence pattern; Corneal disease.

INTRODUCTION

Herpes simplex virus (HSV) keratitis is one of the most common infectious causes of corneal disease and remains an important cause of visual morbidity worldwide [1]. The disease is usually caused by herpes simplex virus type 1 and is characterized by a recurrent course due to the ability of the virus to establish latency in the trigeminal ganglion following primary infection [2]. Reactivation of the virus leads to repeated episodes of corneal inflammation, which may result in progressive corneal damage and visual impairment [3].

The clinical manifestations of HSV keratitis are varied and may involve different layers of the cornea. Epithelial keratitis, presenting as dendritic or geographic ulcers, is the most frequent and readily recognizable form [4]. Stromal involvement, including disciform keratitis and necrotizing stromal keratitis, is generally immune mediated and is associated with greater risk of corneal scarring and permanent visual loss [5]. Endotheliitis and keratouveitis represent deeper inflammatory involvement and may be accompanied by anterior chamber reaction and secondary elevation of

intraocular pressure. Repeated episodes of HSV infection may also lead to neurotrophic changes of the cornea, resulting in persistent epithelial defects and impaired corneal healing [6].

Recurrence is a hallmark of HSV keratitis and poses a major challenge in its long-term management [7]. The pattern and severity of recurrent disease may vary between individuals and recurrences may present with the same or different clinical manifestations compared with the initial episode [8]. Several factors have been implicated in triggering reactivation, including febrile illness, psychological stress, ocular trauma, menstruation and the use of topical or systemic corticosteroids [9]. Understanding recurrence patterns is important, as repeated stromal involvement is associated with poorer visual outcomes and increased risk of complications such as corneal scarring and secondary glaucoma [10].

Although antiviral therapy has significantly improved the management of HSV keratitis, recurrent disease continues to be commonly encountered in routine ophthalmic practice, particularly in tertiary eye care centers [11]. Data regarding the clinical spectrum and recurrence patterns of herpetic keratitis from developing countries are relatively limited. Moreover, variations in patient presentation, disease behavior and access to treatment may influence outcomes [12].

The present retrospective study was undertaken to analyze the clinical spectrum of recurrent herpes simplex keratitis and to evaluate recurrence patterns following different initial clinical presentations in patients attending a tertiary eye care hospital. The findings aim to enhance understanding of disease behavior and assist in the effective clinical management of recurrent HSV keratitis.

METHODOLOGY & MATERIALS

This retrospective study was conducted at the National Institute of Ophthalmology and Hospital, Dhaka, Bangladesh from April 2012 to March 2013, reviewing patient records spanning a follow-up period of 6.9 years. A total of 40 patients diagnosed with recurrent herpes simplex virus (HSV) corneal infections were included, with disease duration ranging from 1 to 22 years. Inclusion was restricted to patients who experienced more than one documented recurrence following their initial presentation. Patients with incomplete medical records, uncertain diagnosis, or stromal keratitis at the time of first presentation were excluded from statistical analysis due to the limited sample size.

Patients were categorized according to their clinical presentation at each episode. Epithelial keratitis was identified by the presence of dendritic (branching linear) or geographic (broad, irregular) epithelial ulcers. Disciform keratitis was diagnosed based on central corneal stromal edema, with or without associated keratic precipitates. Stromal keratitis was defined by diffuse infiltration of the deep corneal layers accompanied by reduced corneal sensation in the absence of other identifiable causes. Endotheliitis and keratouveitis were grouped together for analytical purposes because of overlapping clinical features, including stromal edema, aqueous flare and signs of anterior uveitis. Neurotrophic ulcer was identified as a persistent central epithelial defect with thickened gray margins occurring after a previous HSV infection.

At each recurrence, data were collected on patient demographics (age and sex), laterality of involvement and disease-free intervals between episodes. Potential precipitating factors—such as fever, ocular trauma, psychological stress, menstruation and exposure to topical or systemic corticosteroids—were also documented. The life table method was used to calculate the cumulative incidence of recurrences over the study period.

A uniform treatment protocol was applied throughout the study. Epithelial disease was managed with topical 3% acyclovir ophthalmic ointment along with cycloplegic agents. Disciform keratitis and endotheliitis were treated using topical 3% acyclovir ointment in combination with corticosteroid eye drops (dexamethasone), provided that the corneal epithelium remained intact. Complications such as secondary glaucoma were managed with 0.5% timolol maleate eye drops, while oral acyclovir therapy was reserved for patients with steroid-dependent or chronic recurrent disease.

RESULTS

Table I: Age Distribution

Age group (years)	No. of patients (n = 40)	Percentage (%)
≤10	0	0
11-20	2	5
21-30	5	12.5
31-40	10	25
41-50	11	27.5
51-60	6	15
61-70	4	10

≥70	2	5
Total	**40**	**100**

Table I showed the age distribution of the 40 patients recruited for this study on ocular herpes simplex disease shows a clear concentration in middle-aged individuals, with the highest prevalence of 27.5% (11 patients) occurring in the 41–50 age group. This is closely followed by the 31–40 age bracket, which is 25% of the sample, meaning that more than half of all participants (52.5%) were between the ages of 31 and 50. No cases were recorded in children aged 10 or younger and the incidence appears to rise progressively from the 11–20 age group (5%) before tapering off after age 60, with the 61–70 and ≥70 groups representing 10% and 5% of the total, respectively.

Table II: Disease pattern at initial presentation

Disease Type	Number of Patients (n=40)	Percentage (%)
Epithelial	11	27.5
Disciform	25	62.5
Uveitis	4	10
Total	**40**	**100**

Table II of herpes simplex virus corneal disease patterns at initial presentation identifies Disciform keratitis as the most common manifestation, occurring in 62.5% (25 patients) of the sample. Epithelial disease is the next most frequent pattern at 27.5% (11 patients), while Uveitis is the least common, representing only 10% (4 patients) of the total cases.

Table III: Recurrence pattern following initial disciform disease

Recurrence Type	Number of Patients (n=25)	Percentage (%)
Disciform	21	84
Epithelial	1	4
Disciform + Epithelial	1	4
Neurotropic	2	8
Total	**25**	**100**

Among the 25 patients who initially presented with disciform disease, the recurrence pattern shows a high level of clinical consistency, with 84% (21 patients) experiencing a repeat of the disciform pattern. Neurotropic keratitis was observed in 8% (2 patients) of this group, while epithelial recurrences and mixed disciform-plus-epithelial patterns were the least frequent, each accounting for only 4% (1 patient) of cases (Table III).

Table IV: Recurrence pattern following initial epithelial disease

Recurrence Type	Number of Patients (n=11)	Percentage (%)
Disciform	3	27.3
Epithelial	8	72.7
Total	**11**	**100**

For the 11 patients who were initially presented with epithelial disease, the recurrence pattern shows a primary tendency to repeat the same manifestation, with 72.7% (8 patients) recurring with epithelial keratitis. A significant minority of 27.3% (3 patients) transitioned to a disciform recurrence following their initial epithelial episode (Table IV).

DISCUSSION

Herpes simplex virus keratitis is a recurrent corneal disease with diverse clinical manifestations and remains a significant cause of ocular morbidity. In the present retrospective study, the clinical spectrum and recurrence patterns of HSV keratitis were evaluated in patients attending a tertiary eye care hospital, providing insight into disease behavior within routine ophthalmic practice.

The age distribution in this study demonstrated a clear predominance among middle-aged individuals, with more than half of the patients (52.5%) falling between 31 and 50 years of age and the highest prevalence observed in the 41–50 year group (27.5%). This finding is consistent with the natural history of HSV infection, in which primary exposure occurs early in life, while recurrent symptomatic disease becomes more apparent in adulthood due to viral latency and periodic reactivation. Al-Dujaili et al., highlighted the complex relationship between latency, host immunity and recurrent disease, explaining why clinically significant HSV keratitis is more frequently observed in adults rather than children [13]. The absence of cases in

children aged ≤10 years in the present study may reflect underreporting, milder disease, or delayed referral patterns, which are commonly encountered in developing eye care settings.

Regarding the pattern of disease at initial presentation, disciform keratitis was the most common manifestation, accounting for 62.5% of cases, followed by epithelial keratitis (27.5%) and uveitis (10%). This predominance of stromal involvement contrasts with community-based observations where epithelial disease is often more frequent, but it is comparable to findings from tertiary referral centers where patients tend to present with more severe or recurrent disease. Cronau et al. and Mueller and McStay emphasized that immune-mediated stromal disease often results in greater visual symptoms, prompting referral to specialized care [14, 15]. Additionally, Hillenaar et al. described stromal inflammation as a key contributor to recurrent disease and long-term corneal damage, supporting the high proportion of disciform keratitis observed in this cohort [16].

A notable finding of this study is the strong tendency for recurrence to follow the same clinical pattern as the initial presentation. Among patients who initially presented with disciform keratitis, 84% experienced recurrence with the same disciform pattern. This observation supports the concept that host immune response and viral-host interaction play a central role in determining disease phenotype, as discussed by Al-Dujaili et al. and Duan et al [13, 17]. The presence of neurotrophic keratitis in 8% of these patients further highlights the cumulative effect of repeated HSV reactivation on corneal innervation, a complication well documented in chronic herpetic disease.

Similarly, patients who initially presented with epithelial keratitis predominantly experienced epithelial recurrences (72.7%), while 27.3% progressed to disciform keratitis during subsequent episodes. This progression is clinically important, as stromal involvement carries a higher risk of scarring and visual impairment. Bartlett et al. and Autry have emphasized the need for careful long-term follow-up in patients with recurrent epithelial HSV keratitis, as repeated episodes may predispose to deeper corneal involvement, particularly in the presence of triggering factors such as steroid exposure or systemic stress [18, 19].

Although this study focused specifically on HSV keratitis, its findings align with broader observations in infectious and inflammatory ocular diseases. Karsten et al. and Ramenaden and Raiji noted that recurrent corneal and scleral infections often demonstrate pattern consistency and progressive tissue damage over time [20, 21]. Furthermore, the documentation of potential triggers such as fever, stress and steroid use in the present study corresponds with established literature on HSV reactivation mechanisms.

Limitations of the study

The limitations of this study include its retrospective design, small sample size and exclusion of patients with stromal keratitis at initial presentation from statistical analysis. Nevertheless, the consistent recurrence patterns and clear clinical trends observed strengthen the validity of the findings.

CONCLUSION

In conclusion, this study demonstrates that recurrent HSV keratitis most commonly affects middle-aged individuals, with disciform keratitis being the predominant clinical presentation in a tertiary eye care setting. Recurrences tend to mirror the initial disease pattern, although progression from epithelial to stromal involvement occurs in a significant minority. These findings underscore the importance of early recognition, appropriate management and long-term follow-up to minimize complications and preserve visual function in patients with recurrent HSV keratitis.

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