Section: Ophthalmology

Original Research Article

A PROSPECTIVE CASE SERIES ON THE CLINICO-ETIOLOGICAL PROFILE AND MANAGEMENT OF PERIPHERAL ULCERATIVE KERATITIS IN A REGIONAL EYE INSTITUTE IN TELANGANA

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ABSTRACT

Peripheral ulcerative keratitis (PUK) is a crescentic, juxtalimbal corneal disease marked by epithelial breakdown, subepithelial infiltration, and progressive stromal melting. Roughly half of all cases trace back to an underlying collagen vascular disorder, which makes the condition as much a systemic warning sign as an ophthalmic emergency. This prospective case series examined 22 eyes of 12 patients presenting with PUK at a tertiary eye care centre in Telangana, recording demographic patterns, clinical presentation, etiology, treatment, and three-month outcomes. Two-thirds of patients were male, and the mean age was 70 years — nearly two decades older than the North Indian cohort most frequently cited for comparison. Bilateral involvement dominated (83%), a reversal of the pattern typically reported. Watering (91%), diminution of vision (86%), and pain (82%) were the leading complaints, and the inferonasal quadrant was affected most often, consistent with tear pooling in that region. Mooren's ulcer accounted for 42% of cases, the single largest etiological category, followed by rheumatoid arthritis-associated disease. Management ranged from topical steroids and lubrication in milder cases to conjunctival resection, tissue adhesive with bandage contact lens, and corneal patch grafting in eyes with impending or actual perforation. At three months, 45% of eyes retained vision of 6/36 or better, while 8% had failed to heal and 13% had recurred. The findings reinforce that PUK, particularly in elderly, rural population with delayed presentation, demands a coordinated ocular and systemic work-up, and that outcomes hinge on how promptly the underlying cause is identified and treated.

Keywords: Peripheral ulcerative keratitis, Mooren's ulcer, collagen vascular disease, corneal melt, conjunctival resection, rheumatoid arthritis.

INTRODUCTION

Peripheral ulcerative keratitis is an inflammatory process confined to the juxtalimbal cornea. It presents as a crescent-shaped epithelial defect with an adjacent zone of subepithelial infiltrate and stromal thinning, and it stains readily with fluorescein along the margin of the ulcer. Left unchecked, the stromal loss can progress to descemetocele formation and perforation within days.[1,2,3]

Approximately 50% of PUK cases are associated with systemic collagen vascular diseases, particularly rheumatoid arthritis, while the remaining 50% are due to local causes or are idiopathic.[4] In the absence of systemic disease, infection, or scleritis, the condition is diagnosed as Mooren's ulcer, a diagnosis of exclusion.[5] Immune complex deposition at the limbus triggers inflammatory cell recruitment and release of collagenases, proteases, and matrix metalloproteinases, resulting in stromal lysis, predominantly in the vascularized peripheral cornea.[5]

Since PUK may be the initial manifestation of a life-threatening systemic disease and delayed treatment

worsens outcomes, early recognition is essential. Owing to limited data from rural South India, this study evaluated the demographic profile, clinical characteristics, etiology, management, and outcomes of PUK at a tertiary eye care center in Telangana.

MATERIALS AND METHODS

A prospective case series conducted at a tertiary eye care hospital in Telangana, during January 2024 to July 2024 in 12 patients who were included consecutively based on selection criteria where 22 eyes have PKU.

Inclusion and Exclusion Criteria

Inclusion: Patients with crescent-shaped peripheral corneal inflammation within 2 mm of the limbus, with a clear margin, raised edge, epithelial defect, stromal lysis, and those who consented for participation.

Exclusion: Patients who declined consent, had posterior segment disease, or had PUK mimics such as neurotrophic ulcer, lagophthalmos, or marginal keratitis.

Clinical Assessment

Best-corrected visual acuity was assessed using the Snellen chart. Slit-lamp examination evaluated the quadrant involved, corneal thinning, inflammation, anterior chamber reaction, and fundus when visible. Clinical photographs documented disease progression. Fluorescein staining identified epithelial defects, while Schirmer's I test and applanation tonometry assessed dry eye and intraocular pressure, respectively.

Laboratory Work-up

Each patient underwent a standardized panel to identify systemic or infectious associations: complete blood count, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), rheumatoid factor, antinuclear antibody (ANA), anti-neutrophil cytoplasmic antibody (ANCA), Mantoux test, chest radiograph, and serology for HIV, hepatitis B surface antigen, and hepatitis C. Corneal scraping was performed to rule out infectious keratitis, and B-scan ultrasonography was used where the fundus could not be visualized directly. Patients with suspected systemic disease were referred for an immunology or rheumatology consult, and all were followed up longitudinally.

Management Protocol

Treatment was individualized according to disease severity. Topical corticosteroids were started only after excluding infection and perforation, while systemic disease was treated with oral prednisone (1 mg/kg/day) or intravenous methylprednisolone (1 g/day for 3 days) in severe cases. Cycloplegics, antiglaucoma drugs, lubricants, topical antibiotics, and steroid-sparing immunosuppressants were used as indicated. Surgery was reserved for impending or actual perforation, failed medical therapy, or visual rehabilitation. Conjunctival resection, cyanoacrylate tissue adhesive with bandage contact lens (TABCL) for perforations <2 mm, corneal patch graft, and penetrating keratoplasty were performed based on clinical indication.[3]

Statistical analysis: Data was entered in Microsoft excel 2019. Continouous data represented as mean and SD whereas categorical as frequency and percentages.

RESULTS

The study analyzed 22 eyes of 12 patients presenting with PUK. Eight patients (67%) were male and four (33%) were female. The mean age at presentation was 70 years, and the majority of patients resided in rural areas.

Bilateral disease was far more common than unilateral disease in this cohort: 10 patients (83%) had PUK in both eyes, while 2 (17%) had involvement in only one eye. Of the 22 eyes examined, 18 (82%) were phakic and 4 (18%) were pseudophakic. [Table 1, figure 2 and 3]

Table 1: Distribution by patient characteristics

Variable	Category	Frequency (n)	Percentage (%)
Gender (n = 12 patients)	Male	8	66.7
	Female	4	33.3
Age (n = 12 patients)	Mean age at presentation (years)	70.0	—
Laterality of PUK (n = 12 patients)	Bilateral	10	83.3
	Unilateral	2	16.7
Lens Status (n = 22 eyes)	Phakic	18	81.8
	Pseudophakic	4	18.2

Watering was the most frequent complaint, reported in 20 of 22 eyes (91%), followed closely by diminution of vision in 19 eyes (86%) and pain in 18 eyes (82%). Photophobia was noted in 15 eyes (68%), and redness in 10 eyes (45%). The interval between symptom onset and hospital presentation tracked with disease severity — patients who delayed longer tended to present with more advanced thinning and inflammation. (Shown in table 2)

Table 2: Distribution by presenting complaints

Presenting Symptoms	Frequency (n)	Percentage (%)
Watering	20	90.9
Diminution of vision	19	86.4
Pain	18	81.8

Photophobia	15	68.2
Redness	10	45.5

The inferonasal quadrant showed the highest rate of involvement bilaterally, an observation that aligns with the tendency of the tear film to pool in that region.

Mooren's ulcer was the single most common diagnosis, identified in 5 of 12 patients (42%). Rheumatoid factor was positive in 3 patients (25%), and ANA was positive in 2. Corneal scraping was negative in every case, arguing against an infectious driver in this cohort.

ESR was elevated in 6 patients and CRP was raised in 4. Mean intraocular pressure by applanation tonometry was 18 mmHg, and mean Schirmer's I reading was 23 mm. One patient's chest radiograph was suggestive of pulmonary tuberculosis.

Topical antibiotics and lubricants were used in 20/22 eyes, topical 1% prednisolone acetate in 19 eyes, and 2% homatropine bromide in 4 eyes. Hot fomentation with oral doxycycline was given for meibomitis when indicated. Oral steroids were administered to 5 patients (45%), intravenous methylprednisolone to 3 (14%) before corneal patch grafting, and 3 patients with rheumatoid arthritis received weekly methotrexate (7.5 mg). Surgical treatment was required in 15/22 eyes: cyanoacrylate glue with bandage contact lens (5, 33%), conjunctival resection with TABCL (7, 47%), and corneal patch grafting (3, 20%). [Figure 4, 5]

Outcome

At 3 months, recurrence occurred in 3 eyes (13%), while 4 eyes (18%) showed non-healing despite treatment. Best-corrected visual acuity was ≥6/36 in 10 eyes (45%), 6/36–6/60 in 7 eyes (32%), and <6/60 in 5 eyes (23%).

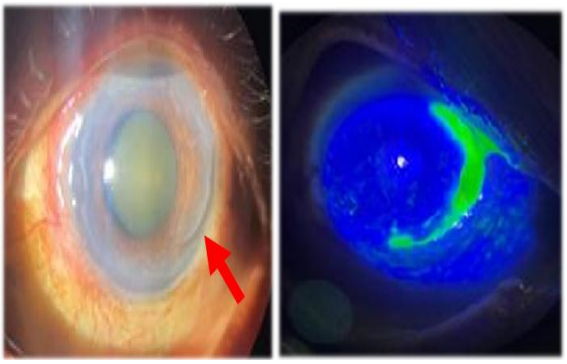

Figure 1: Fluorescein staining showing PKU

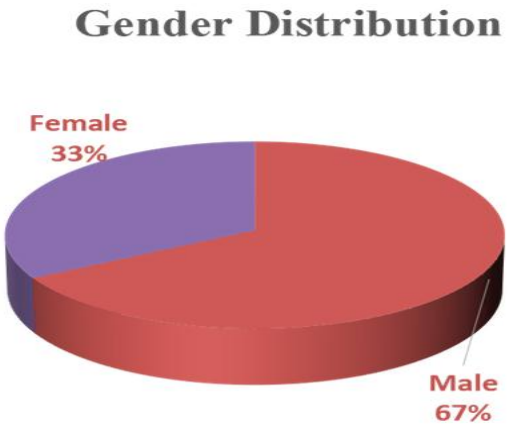

Figure 2: Distribution by Gender

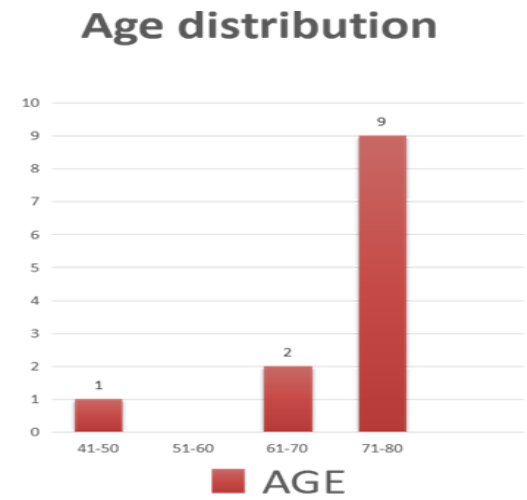

Figure 3: Distribution by age

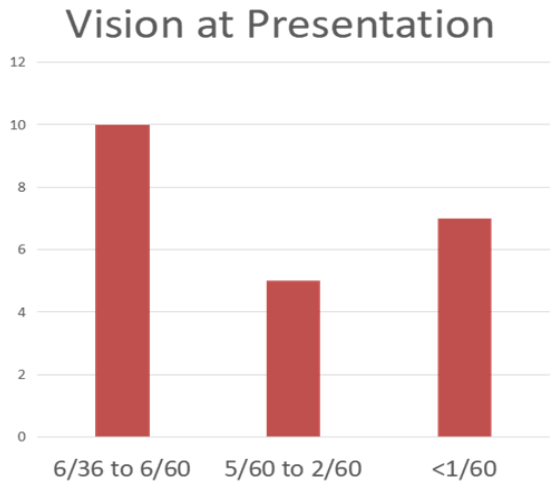

Figure 4: Vision at presentation

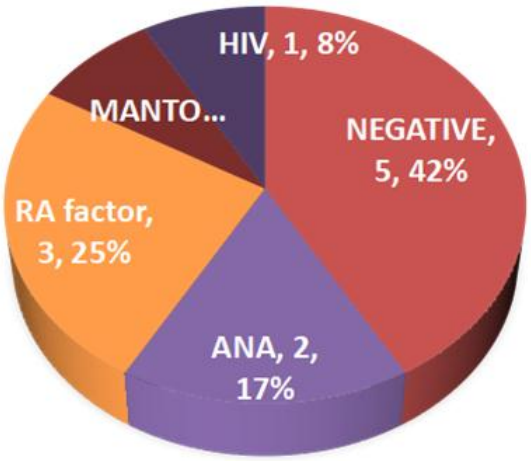

Figure 5: Investigations done

DISCUSSION

The demographic profile in this series diverges from the largest comparable Indian study, Sharma et al. (2015), which followed 76 eyes of 65 patients in North India. The male-to-female ratio here (67:33) skewed somewhat further toward men than in that cohort (60:40). The age difference is more striking: only 32% of the North Indian patients were over 60, whereas the mean age in this series was 70 — suggesting either a genuinely older population or a pattern of delayed presentation that pushed diagnosis later in life. Laterality told a different story too. Sharma's cohort was predominantly unilateral (84% versus 16% bilateral); this series showed the opposite, with 83% bilateral and 17% unilateral involvement, which may reflect the higher proportion of systemic, bilaterally-acting disease in this group.[6] Etiologically, Mooren's ulcer and collagen vascular disease together accounted for 85% of cases here (43% and 42%, respectively), against 31.5% and 19.7% in the North Indian series, and notably, no infectious cause was identified in this cohort compared with 19.7% previously reported.[6,7] These proportions are broadly consistent with the etiological spread reported by Kochhar et al,[8] who likewise found Mooren's ulcer and collagen vascular disease to be the dominant categories, with infectious keratitis a minor contributor. Meibomitis was more common in this group (39% versus 22.3%),[6] which may relate to the older average age and associated tear film instability. Disease severity distribution and perforation rates were broadly comparable between the two series, though patch grafting was performed somewhat more often here (14% versus roughly 9 of 65 patients across moderate and severe disease in the comparator study).[6,7]

Delay in presentation emerged as a consistent theme, and it tracked directly with severity at the time of diagnosis, a relationship also emphasized by Kochhar et al.[8] In a rural, elderly population with limited access to specialized eye care, this delay is plausibly a major driver of the more advanced disease and higher surgical intervention rate observed here relative to other series.[6,7] The predominance of Mooren's ulcer as a single etiology, alongside the substantial rheumatoid arthritis-associated subset, underscores that a systemic work-up is not optional in these patients — it is central to management, since missing an underlying collagen vascular disease has consequences well beyond the eye.[2,8,9]

CONCLUSION

PUK requires comprehensive ocular and systemic evaluation to identify the underlying cause and guide treatment. In this study, Mooren's ulcer and rheumatoid arthritis were the commonest etiologies, with no infectious cause detected. Delayed presentation was associated with more severe disease, highlighting the need for early referral, especially in rural populations. Management should be individualized according to disease severity, with surgery reserved for advanced cases. Close postoperative follow-up and multidisciplinary care with rheumatology are essential to reduce recurrence and preserve vision.

Limitations

The sample size was small — 22 eyes from 12 patients — which limits the precision of the etiological and outcome estimates and makes subgroup comparisons unreliable. Follow-up duration was also limited to three months, which is insufficient to capture later recurrences, graft outcomes, or the long-term course of associated systemic disease.

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