Natural history of immune stromal microspodial keratoconjunctivitis: A case report.

Brenda Walaba[1], Merle Fernandes[2], Mariya B Doctor [3*]

[1]Department of Ophthalmology, *Academy of Eye Care Education, LV Prasad Eye Institute, Visakhapatnam, India*

[2]Department of Ophthalmology, *Shantilal Sanghvi Cornea and Anterior Segment Services, LV Prasad Eye Institute, Hyderabad, India*

[3]Department of Ophthalmology, *Shantilal Sanghvi Cornea and Anterior Segment Services, LV Prasad Eye Institute, Visakhapatnam, India*

Abstract

Microsporidia infection of the cornea commonly presents as epithelial keratoconjunctivitis. Various known sequalae include sub-epithelial infiltrate, endothelitis, and uveitis. Epithelial keratoconjunctivitis is a distinct entity from stromal keratitis. Microsporidia induced immune stromal keratitis is rarely reported and its natural history remains unknown. We bridge this gap about how microsporidial epithelial keratoconjunctivitis can evolve into immune stromal keratitis with this case report. In our case, a confirmatory microbiological diagnosis of microsporidia was ascertained which helped in differentiating it from HSV interstitial keratitis. The condition resolved on medical therapy leaving a residual nebular grade corneal scar.

Keywords: Microsporidial keratoconjunctivitis, Immune stromal keratitis, Interstitial keratitis.

Introduction

Microsporidial infection of cornea manifests predominantly in two forms, the more common epithelial keratoconjunctivitis (MKC), and less common the stromal keratitis (MSK). MKC presents as multifocal superficial raised, coarse, punctate corneal lesions, having a characteristic 'stuck on' appearance, which usually resolves without scarring. On the contrary, infective Microsporidial Stromal Keratitis (MSK), runs a chronic indolent course, and presents as suppurative mid-stromal multifocal infiltrates. Usually diagnosed by corneal biopsy, infective microsporidial stromal keratitis is less amenable to medical therapy, and may necessitate penetrating keratoplasty. Microsporidia as an etiology of interstitial keratitis has been reported previously in literature which spontaneously resolves with topical steroids. However, there is a current gap in knowledge, whether an immune stromal keratitis develops *de novo* or as a sequela to the epithelial keratoconjunctivitis. We report a case of microsporidial epithelial keratoconjunctivitis which progressed to immune stromal keratitis. This report helps add onto the current knowledge about the natural progression of both, microsporidial epithelial keratoconjunctivitis and microsporidial interstitial stromal keratitis. It can mimic any other ring ulcer, and can unnecessarily be subjected to antibacterial therapy, or therapeutic keratoplasty, hence awareness about this rare natural sequel is essential [1,2].

Case Presentation

A forty-two-year-old lady presented to our hospital with the history of pain, redness and watering of the right eye for the past three weeks. She had history of trauma to the same eye with a grass blade prior to the onset of symptoms. She had sought treatment elsewhere where she was prescribed eye drops Moxifloxacin 0.3% four times a day for five days, with no resolution in her symptoms [3].

On presentation, her visual acuity was 20/60 and 20/20 in the right and left eye respectively. Right eye showed diffuse conjunctival injection, multiple coarse, elevated, superficial punctate lesions, having a 'stuck-on' appearance, with no underlying cellularity, quiet anterior chamber, clear lens, and normal fundus (Figure 1A, B). Her left eye anterior and posterior segment examination findings were within normal limits. Corneal scraping showed significant microsporidia spores (Figure 1C), hence a diagnosis of right eye microsporidia keratoconjunctivitis was made. The patient was started on two hourly carboxy methyl cellulose 0.5% and combination of Chloramphenicol 1 mg-Polymixin B 5000 IU eye drops four times a day in the right eye (antibiotic was

[*]**Correspondence to:** Mariya B Doctor, Department of Ophthalmology, Shantilal Sanghvi Cornea and Anterior Segment Services, LV Prasad Eye Institute, Visakhapatnam, India; E-mail: mariyadoc93@gmail.com

***Received**: 15-Jan-2025, Manuscript No. OER-25-158557; **Editor assigned:** 17-Jan-2024, OER-25-158557 (PQ); **Reviewed:** 31-Jan-2025, QC No. OER-25-158557; **Revised:** 06-May-2026, Manuscript No. OER-25-158557 (R); **Published:** 13-May-2026, DOI: 10.35841/oer-10.3.301*

***Citation:** Walaba B, Fernandes M, Doctor MB. Natural history of immune stromal microspodial keratoconjunctivitis: A case report. Ophthalmol Case Rep 2026;10(3):301*

added since corneal scrapings were performed which created a corneal epithelial defect) [4].

At one-week review, the right eye visual acuity was unchanged (20/60), the stuck-on raised corneal lesions had resolved, however, she had developed a 7 mm, mid-stromal, ring-shaped corneal cellularity, with underlying keratic precipitates (Figure 1D). At this point we suspected immune stromal keratitis. However, since it is extremely rare, we wanted to be sure it was not an evolving infective stromal keratitis. Hence we continued the patient on lubricants, and started the patient on homatropine 2% twice a day, and eye ointment tacrolimus 0.03% at bedtime. On subsequent review one weeks later (Figure 1E), she was symptomatically better, her right eye visual acuity had improved to 20/40. There was a minimum reduction in both corneal cellularity and conjunctival congestion. Corneal sensations were normal. Since it did not appear infective even after one week, we started her on topical prednisolone acetate 1% four times per day, in weekly tapering dose.

There was gradual reduction of corneal cellularity during the follow-ups. At the last visit 1 month later, her visual acuity improved to 20/20, with resolution of the conjunctival congestion, and persistence of a mid-stromal nebular corneal scar (Figure 1F). Left eye vision remained 20/20 with normal clinical findings [5-7].

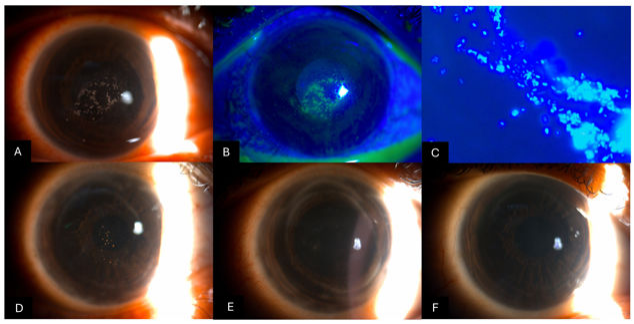


Figure 1. *Slit lamp photo images.*

Note: A) Sclerotic scatter image of the right eye on day of presentation showing confluent superficial punctate lesions over the cornea at presentation. Rest of the cornea appears clear. B) Right eye fluorescent stained image seen in cobalt blue filter on slit lamp on the day of presentation showing fluorescein positive pinpoint elevated lesions on the cornea giving a characteristic stuck on appearance. C) 10% KOH with Calcofluor white image of the smear seen under fluorescence microscope showing fluorescent oval shaped microsporidia spores which confirmed the diagnosis of microsporidial keratoconjunctivitis. Patient was started on two hourly topical lubricants. D) Slit lamp sclerotic scatter photograph of the right eye at one week showing resolution of the stuck-on corneal lesions. However, she had developed a 7 mm, mid-stromal, ring-shaped corneal cellularity, with keratic precipitates. We started the patient on eye ointment tacliment and topical cycloplegics eye drops. E) Sclerotic scatter image of the right eye taken at week two of presentation showing reduction of the keratic precipitates, but persistence of immune stromal ring. We started tapering dose of topical steroids eye drops at this visit. F) Sclerotic scatter slit lamp image of the right eye at the last follow up showing persistence of faint nebular grade corneal scar, no keratic precipitates and a quiet anterior chamber.

Discussion

Microsporidia are obligate intracellular spore forming parasitic fungi, which primarily causes gastrointestinal, ocular, musculoskeletal and cerebral infections. They account for 0.4% cases of microbial keratitis. Risk factors associated with ocular microsporidiosis include trauma, exposure to dirty water, systemic immunosuppression, contact lens wear, and ocular surgery. Microsporidia can be diagnosed on light microscopy by detection of round to oval spores in Gram's stain, potassium hydroxide and calcofluor white stain (KOH+CFW), Kinyoun and Giemsa stain. Ocular infection with microsporidia can manifest as either epithelial (keratoconjunctivitis), stromal (infective stromal keratitis, immune stromal keratitis), uveitis (iritis, anterior uveitis) and endophthalmitis. Microsporidial Keratoconjunctivitis (MKC) is the most common ocular presentation, having the characteristic features of unilateral, multifocal, superficial, coarse, punctate corneal lesions which have a classic stuck-on appearance. Microsporidial Stromal Keratitis (MSK) on the other hand, presents with non-purulent conjunctivitis with diffuse multifocal stromal infiltrates, and mainly requires surgical intervention. MKC is self-limiting and responds well with topical lubricants. Various known sequalae of MKC include sub-epithelial infiltrate, endotheliti and uveitis. The sub-epithelial infiltrates can be 1-1.5 mm in size, coin shaped stromal lesions, with cellularity, and resolve with topical steroids or corticosteroid sparing agents like cyclosporine and tacrolimus. Microsporidia related interstitial immune stromal keratitis has also been reported in literature, with characteristic features, such as a relatively short history spanning from a week to 3 months, rapid response to topical steroids, presence of larger nummular lesions >2 mm, disciform or ring like lesions in the stroma, absence of vascularisation, anterior chamber reaction or raised IOP. It is hypothesized to be an exaggerated immune or inflammatory reaction to pathogenic microsporidial antigens in the corneal stroma which responds to topical immunosuppressants. We noted the development of a large immune ring with cellularity and keratic precipitates after resolution of the coarse superficial punctate keratitis, which responded to topical steroids, suggesting an underlying immune pathogenesis [8,9].

A very close differential for this condition can be herpetic Immune Stromal Keratitis (HSV ISK) or disciform endothelitis, which needs to be ruled out. Clinically both have stromal cellularity and keratic precipitate without an overlying epithelial defect. In addition, the history of recurrent episodes, long-standing course of disease, presence of footprint scars, deep stromal vascularisation, ghost vessels, and reduced corneal sensations point towards herpetic etiology. Though both have many overlapping features, a diagnosis of HSV keratitis should be made with extreme caution considering its

Citation: *Walaba B, Fernandes M, Doctor MB. Natural history of immune stromal microspodial keratoconjunctivitis: A case report. Ophthalmol Case Rep 2026;10(3):301*

lifelong implications on visual morbidity and need for prolonged therapy. A microbiological analysis helps confirmation of the diagnosis.

Conclusion

With this report, we describe a rare, natural sequela of microsporidial keratoconjunctivitis. This report adds to our existing knowledge about microsporidial induced ocular infection, the natural progression of the corneal epithelial disease into a stromal component, and complete resolution with topical steroids. Unlike MKC which resolves without leaving any scar, microsporidial interstitial keratitis would likely heal with a residual ring shaped corneal stromal scar.

Authorship Statement

All authors designated as authors qualify for authorship. Each author has participated sufficiently in the work to take public responsibility for appropriate portions of the content. The patients were managed by MD and MF. The manuscript was conceptualized by MD and drafted by MD, BW and MF. The article was edited and finalized by MD, and MF

Conflict of Interest

None.

References

1. Didier ES, Stovall ME, Green LC, et al. Epidemiology of microsporidiosis: sources and modes of transmission. Vet Parasitol. 2004;126(1–2):145–66.
2. Joseph J, Sridhar MS, Murthy S, et al. Clinical and microbiological profile of microsporidial keratoconjunctivitis in southern India. Ophthalmology. 2006;113(4):531–7.
3. Mohanty A, Sahu SK, Sharma S, et al. Past, present, and prospects in microsporidial keratoconjunctivitis: a review. Ocul Surf. 2023;28:364–77.
4. Mohanty A, Behera HS, Barik MR, et al. Microsporidia-induced stromal keratitis: a new cause of presumed immune stromal (interstitial) keratitis. Br J Ophthalmol. 2023;107(5):607–13.
5. Mohanty A, Mitra S, Mallick A, et al. Sequelae of microsporidial keratoconjunctivitis and its management. Indian J Ophthalmol. 2021;69(6):1537–43.
6. Moshirfar M, Somani SN, Shmunes KM, et al. A narrative review of microsporidial infections of the cornea. Ophthalmol Ther. 2020;9(2):265–78.
7. Schwartz GS, Harrison AR, Holland EJ. Etiology of immune stromal (interstitial) keratitis. Cornea. 1998;17(3): 278–81.
8. Doctor MB, Walaba BP, Fernandes M. Atypical progression of microsporidial keratoconjunctivitis to immune ring keratitis: a case report. Int J Ophthalmol. 2025;18(12):2390.
9. Mohanty A, Mitra S, Das S, et al. Clinical profile of bilateral microsporidial keratoconjunctivitis in healthy individuals-a case series with long-term follow-up. Cornea. 2020;39(7):902-8.

Citation: *Walaba B, Fernandes M, Doctor MB. Natural history of immune stromal microspodial keratoconjunctivitis: A case report. Ophthalmol Case Rep 2026;10(3):301*