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Aspergillus keratitis in vernal shield ulcer—a case report and review

Vandana Jain · Kanupriya Mhatre · Akshay G. Nair · Debraj Shome · Sundaram Natarajan

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Abstract An unusual case of vernal shield ulcer with superadded fungal keratitis caused by *Aspergillus fumigates* is reported. A 26-year-old man, a known case of vernal keratoconjunctivitis (VKC) presented with the complaint of diminution of vision in the right eye. Patient was on topical steroids and anti-allergic treatment for the past two months. In the right eye, a shield ulcer with an elevated plaque was seen. Scrapings from the right cornea revealed fungal filaments on a wet KOH mount and culture revealed growth of *Aspergillus fumigatus*. The patient was diagnosed as VKC with shield ulcer with secondary fungal keratitis. The patient was treated with topical cyclosporine, topical moxifloxacin, topical natamycin, and topical amphotericin eye drops. The patient responded well and finally recovered to a best spectacle-corrected visual acuity of 20/20 at the end of nine months. The chronic ocular surface changes and induced inflammation in VKC, and the instillation of topical steroids for therapy, may create an environmental milieu favorable for fungal keratitis. Microbiological evaluation should be considered, even in cases of suspected sterile keratitis, to prevent possible worsening of an associated infective corneal condition. This warrants patient education, periodic reviews and a very cautious approach to indiscriminate use of topical corticosteroids in cases of VKC with shield ulcer. In the event of any secondary fungal infection, use of steroid sparing topical agent, for example cyclosporine may be considered.

Keywords Fungal keratitis · VKC · Shield ulcer

V. Jain (✉) · K. Mhatre · A. G. Nair
Department of Cornea and External Diseases, Aditya Jyot Eye Hospital Pvt Ltd, Plot No-153, Road No-9, Major Parmeshwaran Road, Wadala, Mumbai 400031, India
e-mail: docvandanajain@rediffmail.com

D. Shome
Department of Ophthalmic and Facial Plastic Surgery, Orbital Diseases, and Ocular Oncology, Aditya Jyot Eye Hospital Pvt Ltd, Plot No-153, Road No-9, Major Parmeshwaran Road, Wadala, Mumbai 400031, India

S. Natarajan
Department of Retina, Aditya Jyot Eye Hospital Pvt Ltd, Plot No-153, Road No-9, Major Parmeshwaran Road, Wadala, Mumbai 400031, India

Introduction

Corneal manifestations usually occur in severe forms of vernal keratoconjunctivitis. Superficial epithelial keratitis, consisting of punctate dull gray opacities, occurs in the upper half of the cornea. The points occasionally break to form a macroerosion with raised margins. The compacted layer of collected cellular debris and mucus may form a vernal plaque over the shield ulcer [1–4]. These surface changes in

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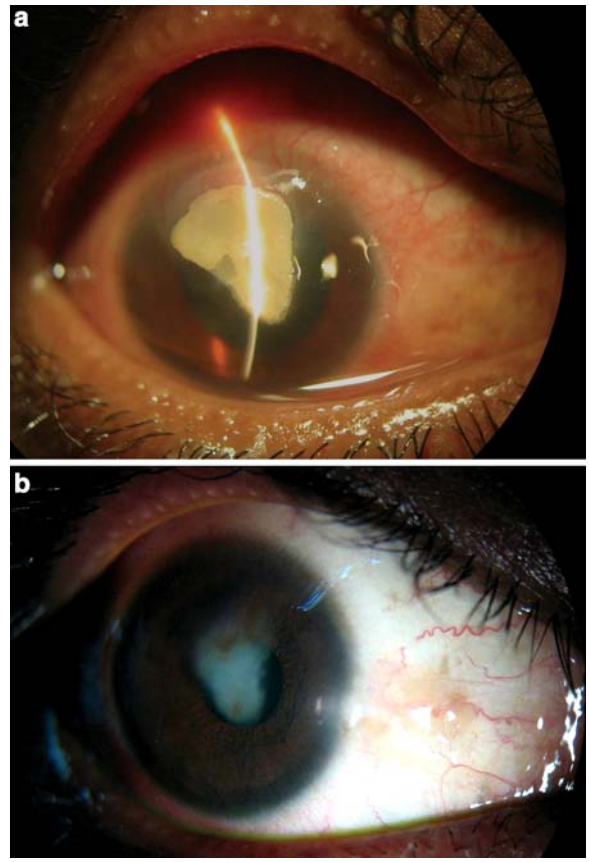

Fig. 1 **a** Clinical photograph showing grade III shield ulcer in the superior paracentral zone. **b** Clinical picture showing complete resolution of the infection with the residual corneal scar at the end of three months

turn may create an environmental milieu favorable for fungal infection, especially in endemic areas like India. Through this communication we want to report superadded fungal keratitis in a case of shield ulcer and to re-emphasize that microbiological evaluation should be considered, even in cases of suspected sterile keratitis, before treatment with topical steroids, to prevent the possible worsening of an associated infective condition.

Case report

A 26-year-old male presented with a two month history of pain and redness in both the eyes, and diminution of vision in the right eye. He had been diagnosed as a case of vernal keratoconjunctivitis two years previously and was using topical steroid eye drops intermittently. His symptoms had increased two months previously and the prednisolone acetate 1% eye drops were increased from 2 to 3 times/day by the local ophthalmologist. However no improvement was perceived by the patient. The patient denied any history of trauma or contact lens use. There was no other significant medical history.

At presentation, ophthalmic examination revealed a visual acuity of 20/200 in the right eye and 20/20 in the left eye. Upper palpebral conjunctiva revealed active papillae and mild sub conjunctival scarring in both eyes. The cornea in the right eye showed diffuse confluent superficial punctuate keratopathy and an irregular, grade III shield ulcer in the superior paracentral zone encroaching upon the pupillary area (Fig. 1a). The anterior chamber in the right eye was quiet. The cornea of the left eye was normal. The patient was subsequently diagnosed with vernal keratoconjunctivitis in both the eyes and a grade III shield ulcer in the right eye.

Upon removal of the plaque over the shield ulcer, dirty white stromal infiltration was noticed. Corneal scraping and the debrided plaque were sent for microbiological assessment. The wet mount KOH smear revealed fungal filaments and Gram's staining showed no specific organisms. Culture later revealed

growth of *Aspergillus fumigates* in both the plaque and the scraping from the underlying stroma. A treatment regimen consisting of topical amphotericin B (0.15%) eye drops hourly, natamycin (5%) eye drops hourly, moxifloxicin (0.3%) eye drops six times daily, atropine (1%) eye drops three times/day, and topical cyclosporine A 0.05% (®Restasis; Allergan, Irvine CA, USA) twice daily was instituted in the right eye. In the left eye topical cyclosporine 0.5% eye drops twice daily were prescribed. The patient was reviewed at periodic intervals of three days. Debridement was performed every visit for the first month, at the slit lamp using a 15 number surgical blade. Repeat microbiological evaluation of the debrided material was not performed. Over the next two months, the corneal stromal infiltrate showed slow but progressive resolution. The topical drops were tapered and finally, at the end of three months, a resolved keratitis scar was seen (Fig. 1b). The patient was maintained on topical lubricating eye drops and topical cyclosporine eye drops in both eyes. The part of the cornea on the visual axis was spared from the scar and the patient developed an astigmatism of 2.0 D in the right eye. This probably explained the best spectacle corrected visual acuity of 20/20 at the end of nine months despite a dense stromal scar.

Discussion

Vernal keratoconjunctivitis (VKC) is a common ocular allergic disease affecting children and young adults living in warm humid climates [1–4]. Punctate keratitis, plaques, sterile corneal ulcers, sub epithelial scarring, and pseudogerontoxon are all forms of corneal damage associated with VKC. Bonini et al. [2] reported that corneal shield ulcers were seen in 9.6% of VKC patients. Shield ulcers form when superficial punctate keratitis associated with giant papillae progresses to a macroerosion, leading to breaks in the epithelium. Inflammatory mediators and cellular infiltration also may play a role in the development of shield ulcers [1–4].

Shield ulcer is a serious vision-threatening complication of vernal keratoconjunctivitis. In addition to causing increased scarring and vascularization because of delayed healing, patients with shield ulcers are at increased risk of superadded microbial keratitis [5–11]. Kerr and coauthors concluded that abnormalities of ocular immune mechanisms found in patients with vernal keratoconjunctivitis may predispose them to bacterial keratitis [8].

Sridhar et al. [10] reported a case of fungal keratitis associated with a shield ulcer, similar to that in this study. However their case presented with stromal infiltration and frank hypopyon, quite suggestive of microbial pathology. Culture revealed a significant growth of *Aspergillus flavus*, which they concluded to be a superinfection. Chronic use of topical steroids and epithelial defect in the form of shield ulcer was attributed for the development and worsening of fungal keratitis. The patient in our study presented with a relatively unsuspected shield ulcer with an overlying plaque with normal surrounding cornea and a quite anterior chamber. The debrided plaque and the corneal scrapings were sent for microbiological assessment in accordance with routine procedures at our institute. Patient was then started on topical antifungals and cyclosporine, to combat the inflammation as we withdrew topical corticosteroids. Details of all cases of fungal keratitis in shield ulcer including our case are presented in Table 1.

Arora et al. [11] have also reported fungal superinfection in vernal shield ulcer by an otherwise innocuous Penicillium, even in the absence of steroid usage. This re-emphasized the fact that ocular surface infection in VKC, even in the absence of steroid usage, may increase the risk of corneal infection even by innocuous organisms especially in the set up of endemic conditions prevailing in India.

Treatment of fungal keratitis in such situations is a therapeutic dilemma. Topical steroids reduce the inflammation of the eye but can also potentially create conditions suitable for fungal growth, not only exogenous fungi but also the ocular commensals. Bell et al. [12] have shown that in vitro, topical cyclosporine A has a significant suppressive effect on the growth of some fungi especially *Fumigatus* spp. Studies conducted by Perry et al. [13] have further shown topical cyclosporine A eye drops to be useful in suppressing inflammation in patients who underwent therapeutic keratoplasty after fungal keratitis. The patient in this study also showed sustained improvement with topical cyclosporine and antifungal therapy.

To conclude, though topical steroids are indispensable for management of VKC, subsequent fungal

Table 1 Details of cases of fungal keratitis in vernal shield ulcers

	Sridhar et al. [10]	Arora et al. [11]	Our case
Age/sex	22/M	12/M	26/M
History of trauma	No	No	No
History of steroid use	Yes	No	Yes
Anterior chamber	Hypopyon	Quiet	Quiet
Organism involved	*Aspergillus flavus*	*Penicillium* spp	*Aspergillus fumigatus*
Initial treatment for VKC prior to diagnosis of fungal lesion	Prednisolone, ciprofloxacin, sodium cromoglycate drops	Nil	Topical steroids
Treatment following diagnosis of fungal lesion	Topical natamycin, oral ketoconazole	Topical amphotericin B, natamycin, sodium cromoglycate	Topical natamycin, amphotericin B, moxifloxacin, cyclosporine A
Presence of super added bacterial infection	No	No	No
Immunocompromised	No	No	No

superinfection continues to be a major risk and a diagnostic dilemma. Patients of VKC on longstanding topical steroids need to be made aware of the risk of infection involved and should be asked to consult an ophthalmologist at the earliest recognition of symptoms, apart from periodic reviews. The debridement of plaques in these patients and their microbiological assessment should be mandatory. Should fungal superinfection be detected, use of a steroid-sparing topical agent, for example cyclosporine may be considered.

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References

1. Leonardi A, Busca F, Motterle L et al (2006) Case series of 406 vernal keratoconjunctivitis patients: a demographic and epidemiological study. Acta Ophthalmol Scand 84:406–410
2. Bonini S, Bonini S, Lambiase A et al (2000) Vernal keratoconjunctivitis revisited: a case series of 195 patients with long-term follow up. Ophthalmology 107:1157–1163
3. Cameron JA (1995) Shield ulcers and plaques of the cornea in vernal keratoconjunctivitis. Ophthalmology 102:985–993
4. Hodges MG, Keane-Myers AM (2007) Classification of ocular allergy. Curr Opin Allergy Clin Immunol 7:424–428
5. Gedik S, Akova YA, Gur S (2006) Secondary bacterial keratitis associated with shield ulcer caused by vernal conjunctivitis. Cornea 25:974–976
6. Vajpayee RB, Gupta SK, Beraja U et al (1990) Ocular atopy and mycotic keratitis. Ann Ophthalmol 22:369–372
7. Rosa RH, Miller D, Alfonso EC (1994) The changing spectrum of fungal keratitis in south California. Ophthalmology 101:1005–1013
8. Kerr N, Stern GA (1992) Bacterial keratitis associated with vernal keratoconjunctivitis. Cornea 11:355–359
9. Gupta A, Sharma A, Mohan K et al (1999) Mycotic keratitis in non-steroid exposed vernal keratoconjunctivitis. Acta Ophthalmol Scand 77:229–231
10. Sridhar MS, Gopinathan U, Rao GN (2003) Fungal keratitis associated with vernal keratoconjunctivitis. Cornea 22:80–81
11. Arora R, Gupta S, Raina UK et al (2002) Penicillium keratitis in vernal keratoconjunctivitis. Indian J Ophthalmol 50:215–216
12. Bell NP, Karp CL, Alfonso EC et al (1999) Effects of methylprednisolone and cyclosporine A on fungal growth in vitro. Cornea 18:306–313
13. Perry HD, Doshi SJ, Donnenfeld ED et al (2002) Topical cyclosporine A in the management of therapeutic keratoplasty for mycotic keratitis. Cornea 21:161–163