

Perforated Shield Ulcer with Secondary Bacterial Superinfection in a Case of Severe Vernal Keratoconjunctivitis

Shashidhar Banigallapati, Akhil Bevara, Nadim Khatib, Sudhakar Potti
Sankara Eye Hospital, Guntur, Andhra Pradesh, India

Summary

Secondary bacterial keratitis may rarely be associated with a shield ulcer in a case of Vernal Keratoconjunctivitis. A perforated ulcer in such a case should be promptly investigated and surgically treated immediately to prevent permanent vision loss and other complications. We report such a case of perforated shield ulcer with secondary *Pseudomonas keratitis* following a supratarsal injection of Triamcinolone acetonide in a case of Vernal Keratoconjunctivitis.

Delhi J Ophthalmol 2019;29;127-129; Doi <http://dx.doi.org/10.7869/djo.468>

Keywords: Vernal keratoconjunctivitis, Shield ulcer, Bacterial superinfection, *Pseudomonas*, Therapeutic penetrating keratoplasty

Introduction

Vernal Keratoconjunctivitis (VKC) is a chronic, bilateral, allergic disease affecting the ocular surface. The most common symptoms of the disease are itching, burning, redness, photophobia and a ropy discharge.¹ Keratitis associated with VKC usually consists of punctate epithelial erosions, which in severe cases, may coalesce to form a shield ulcer.² The longer the shield ulcer persists, the greater the likelihood of bacterial keratitis and sight threatening complications.^{2,3} We report a case of perforated vernal shield ulcer with secondary *Pseudomonas keratitis* in a child.

Case Report

A 12-year-old boy who was previously diagnosed with VKC came with complaints of redness, itching and ropy discharge in both eyes. On examination, the upper tarsal conjunctiva of the left eye revealed giant papillae with cobble-stone appearance (Figure 1A). A grade 2 shield ulcer measuring 5 × 4 mm was seen in the superior half of the cornea (Figure 1B). The patient was diagnosed as severe VKC in the left eye and given a supratarsal injection of 20 mg Triamcinolone acetonide (0.5 ml). He was prescribed 0.5% Moxifloxacin drops six times per day in the left eye.

The patient came back five days later with complaints of sudden, painful, gross diminution of vision and discharge in the left eye. The only positive history given by the mother was fall of dust in the left eye followed by rigorous rubbing three days back. On examination the visual acuity in the left eye was perception of light with accurate projection of rays. On slit lamp examination, the cornea of the left eye showed a perforation and a deep stromal infiltrate measuring 7 × 8 mm (Figure 2). The anterior chamber was collapsed and exudates were present. Corneal scrapings were taken and sent for microbiological analysis under general anaesthesia. Grams staining (Figure 3A) and culture (Figure 3B, 3C) revealed *Pseudomonas* colonization.

An immediate Therapeutic Penetrating Keratoplasty was performed in the left eye. The patient was prescribed fortified Tobramycin 1.4% eye drops six times per day, Homatropine bromide 2 % eye drops thrice per day, Ofloxacin 0.3% eye ointment at night, Prednisolone acetate 1% eye drops six

times per day and lubricants hourly. The graft remained clear in the subsequent visits (Figure 4) with a best corrected visual acuity of 6/6 at 3 months. Prednisolone acetate 1% eye drops were tapered accordingly in the subsequent visits. There was no recurrence of either the shield ulcer or bacterial keratitis in the graft.

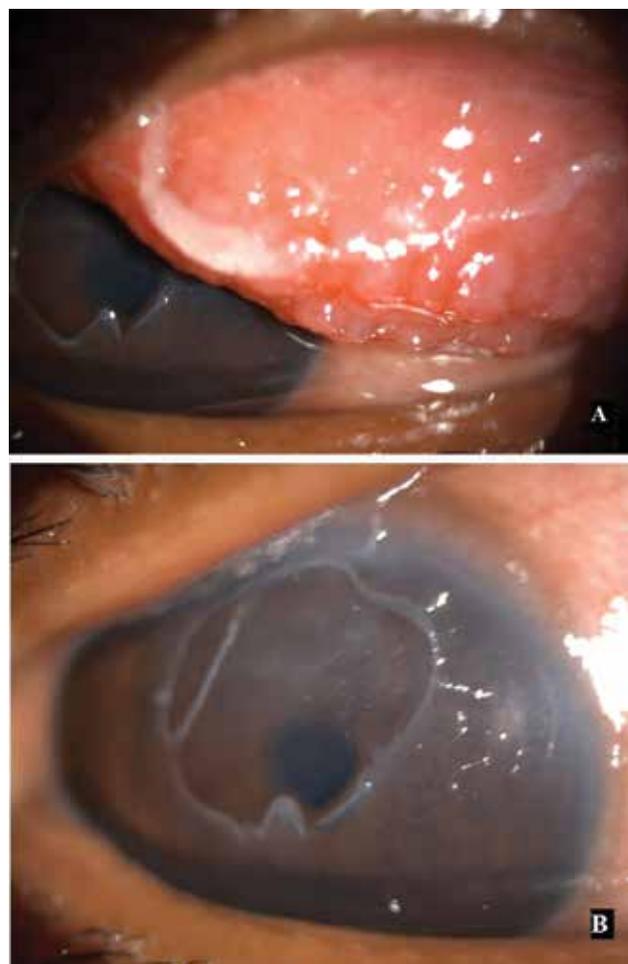


Figure 1: (A) Upper tarsal conjunctiva of the left eye showing giant papillae with a cobble-stone appearance. (B) Cornea of the left eye showing a 5 × 4 mm grade 2 shield ulcer

Discussion

The incidence of shield ulcers in VKC ranges from 3-20%.^{4,5} Two hypotheses have been proposed for the formation of shield ulcer. The mechanical hypothesis states that the formation of shield ulcer is due to the abrading effect on the cornea by giant papillae present on the upper tarsal conjunctiva, which explains the superior location of shield ulcers.⁶ The toxin hypothesis states that the inflammatory mediators released from eosinophils cause corneal epithelial damage.⁷ Cameron et al³ classified the shield ulcers in VKC based on clinical characteristics into three grades. Grade 1 is ulcer with transparent ulcer base, Grade 2 is ulcer with translucent ulcer base or ulcer with opaque white or yellow deposits and grade 3 is an elevated plaque above the level of the adjacent normal epithelium. In our case, we found a Grade 2 shield ulcer in the left eye.

Advanced VKC with large cobblestone papillae or shield ulcers are visually threatening and difficult to treat in the paediatric population. In such cases, topical corticosteroids and antihistamines are minimally effective. Therefore, other treatment modalities like supratarsal steroid injection is necessary. Holsclaw et al⁸ reported universal clinical resolution of cobblestone papillae and shield ulcers following supratarsal steroid injection in VKC. Saini et al⁹ also found dramatic symptomatic improvement following supratarsal injection of steroids. The steroids commonly used are short acting dexamethasone or intermediate acting Triamcinolone acetonide. Saini et al and Holsclaw et al found that both agents were equally effective. In our case, we preferred to give supratarsal Triamcinolone.

Shield ulcers may sometimes be complicated by microbial keratitis, corneal scarring, amblyopia, strabismus.^{3,10-13} Jain et al¹⁴, Arora et al¹⁵, and Sridhar et al¹⁶ reported cases of fungal superinfection in a shield ulcer. In a series of 66 shield ulcers in 41 patients, Cameron et al³ reported five cases of secondary bacterial keratitis. The causative organisms were Staphylococcus and Streptococcus (Table 1). Gedik et al¹³ reported a case of Staphylococcus aureus superinfection in a shield ulcer (Table 1), which resolved completely with topical antibiotics. Kerr and Stern² reported four eyes of two patients with bacterial keratitis associated with VKC (Table 1). The causative organism was Staphylococcus aureus and three of the four infections were polymicrobial. All cases completely resolved with topical antibiotics. In our case, on microbiological examination of corneal scrapings, we found Pseudomonas colonization.

To the best of our knowledge, this is the first report of a Pseudomonas superinfection in a shield ulcer. Also, none of the previous reports of secondary infections in shield ulcers showed a corneal perforation. Another unique feature of our case was the rapid progression to corneal perforation, which is a possibility in Pseudomonas keratitis.

We conclude that all cases of grade 2 and 3 shield ulcers must be carefully examined for signs of secondary superinfection. Regular follow up and strict ocular hygiene is necessary. Secondary superinfection, if it occurs, should be aggressively treated with topical antimicrobials and if a perforation occurs, immediate surgical intervention is necessary to prevent severe sight threatening complications.



Figure 2: Cornea of the left eye showing a 7 × 8 mm deep stromal infiltrate with a perforation. Anterior chamber is collapsed with exudates

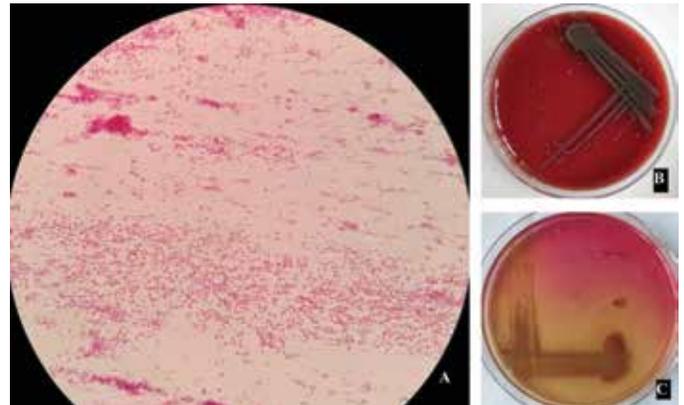


Figure 3: (A) Gram stain of corneal scrapings showing gram negative rods. (B) Blood agar culture plate showing Pseudomonas colonies. (C) MacConkey Agar culture plate showing Pseudomonas colonies

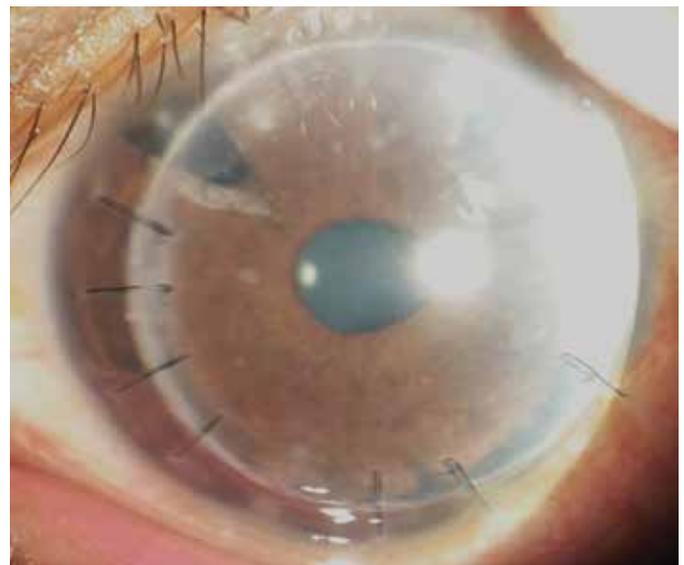


Figure 4: Post Therapeutic Penetrating Keratoplasty at three months showing a clear graft in the left eye

Table 1: Details of cases of secondary bacterial keratitis in Vernal shield ulcers

	Cameron et al	Gedik et al	Kerr et al	Our case
Number of cases	5	1	4	1
Age	5-19 years	12 years	12-13 years	12 years
History of steroid usage	Yes	Yes	Yes	Yes
History of trauma	No	No	No	No
Immunocompromised	No	No	No	No
Corneal perforation	No	No	No	Yes
Anterior chamber	Quiet	Hypopyon	2 cases- Hypopyon 2 cases- quiet	Collapsed, Exudates present
Organisms involved	Staphylococcus, Streptococcus	Staphylococcus aureus	Staphylococcus aureus	Pseudomonas
Initial treatment for VKC prior to diagnosis of bacterial keratitis	Topical steroids	Topical Prednisolone acetate	Topical Dexamethasone	Supratarsal injection of 20 mg Triamcinolone acetonide (0.5 cc)
Management following diagnosis of bacterial superinfection	Topical antibiotics	Topical Cefazolin, Tobramycin	Topical Cefazolin, Gentamycin, Tobramycin	Immediate Therapeutic Penetrating Keratoplasty

References

1. Jun J, Bielory L, Raizman MB. Vernal Conjunctivitis. *Immunol Allergy Clin N Am* 2008; 28:59-82.
2. Kerr N, Stern GA. Bacterial keratitis associated with vernal keratoconjunctivitis. *Cornea* 1992; 11:355-9.
3. Cameron JA. Shield Ulcers and Plaques of the Keratoconjunctivitis. *Ophthalmology* 1995; 102:985-93.
4. Buckley RJ. Vernal keratopathy and its management. *Trans Ophthalmol Soc UK* 1981; 101:234-238.
5. Neumann E, Gutmann MJ, Blumenkrantz N, Michaelson IC. A review of four hundred cases of vernal conjunctivitis. *Am J Ophthalmol* 1959; 47:166-172.
6. Jones BR. Vernal keratitis. *Trans Ophthalmol Soc UK* 1981; 81:215-228.
7. Udell IJ, Gleich GJ, Allansmith MR, Ackerman SJ, Abelson MB. Eosinophil granule major basic protein and Charcot-Leyden crystal protein in human tears. *Am J Ophthalmol* 1981; 92:824-8.
8. Wong IRAG, Margolis TP. Supratarsal Injection of Corticosteroid in the Treatment of Refractory Vernal Keratoconjunctivitis. *Am J Ophthalmol* 1996; 121:243-9.
9. Saini JS, Gupta A, Pandey SK, Gupta V, Gupta P. Efficacy of supratarsal dexamethasone versus triamcinolone injection in recalcitrant vernal keratoconjunctivitis. *Acta Ophthalmol Scand* 1999; 77:515-8.
10. Cameron JA, Mullaney PB. Amblyopia resulting from shield ulcers and plaques of the cornea in vernal keratoconjunctivitis. *J Pediatr Ophthalmol Strabismus* 1997; 34:261-2.
11. Buckley RJ. Vernal keratopathy and its management. *Trans Ophthalmol Soc UK* 1981; 101:234-8.
12. Bonini S, Bonini S, Lambiase A, Marchi S, Pasqualetti P, Zuccaro O, et al. Vernal keratoconjunctivitis revisited: a case series of 195 patients with long-term follow-up. *Ophthalmology* 2000; 107:1157-63.
13. Gedik S, Akova YA, Gur S. Secondary Bacterial Keratitis Associated With Shield Ulcer Caused by Vernal Conjunctivitis. *Cornea* 2006; 25:974-6.
14. Jain V, Mhatre K, Nair AG, Shome D, Natarajan S. Aspergillus keratitis in vernal shield ulcer — a case report and review. *Int Ophthalmol* 2010; 641-4.
15. Arora R, Gupta S, Raina UK, Mehta DK, Taneja M. Penicillium keratitis in vernal Keratoconjunctivitis. *Indian J Ophthalmol* 2002; 50:215-6.
16. Sridhar MS, Gopinathan U, Rao GN. Fungal Keratitis Associated With Vernal Keratoconjunctivitis. *Cornea* 2003; 22:80-1.

Cite This Article as: Banigallapati S, Bevara A, Khatib N, Potti S. Perforated Shield Ulcer with Secondary Bacterial Superinfection in a Case of Severe Vernal Keratoconjunctivitis.

Acknowledgments: Nil

Conflict of interest: None declared

Source of Funding: None

Date of Submission: 21 January 2019
Date of Acceptance: 09 February 2019

Address for correspondence

Shashidhar Banigallapati MBBS, MS
Sankara Eye Hospital,
Vijayawada - Guntur Expressway, Pedakakani,
Guntur, Andhra Pradesh, India
Email id: drshashib@yahoo.com



Quick Response Code