Alcohol-assisted epithelial debridement for treatment of recurrent corneal erosion: a case series

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Abstract

Purpose: Recurrent corneal erosion is characterized by recurrent episodes of spontaneous breakdown of the corneal epithelium. Alcohol delamination of the corneal epithelium has a high success rate, but the procedure requires the use of an operating microscope in an operating theater. We present a case series of alcohol-assisted epithelial debridement in the clinic setting.

Methods: Records of eight consecutive patients aged >18 years who presented to a private ophthalmology practice clinic in Hong Kong between October 2012 and March 2018 with recurrent corneal erosion that did not respond well to conservative or surgical management with persistent symptoms of >3 months were retrospectively reviewed. 75% alcohol was applied directly to the site of abnormal epithelium under slit lamp, followed by debridement of the epithelium using a surgical sponge. A bandage contact lens was then inserted. Patients were followed up until complete healing of the epithelial defect.

Results: All eight patients achieved complete healing of the epithelial defect within 2 weeks with no major complication or recurrence.

Conclusion: Alcohol-assisted epithelial debridement is simple, safe, and effective for the treatment of recurrent corneal erosion. It can be performed in a clinic setting under slit lamp.

Key words: Alcohols; Corneal ulcer; Epithelium, corneal

Introduction

Recurrent corneal erosion (RCE) is characterized by the failure of epithelial cells to re-adhere tightly to the underlying stroma following injury,¹ owing to a combination of hemidesmosome weakness, pathological changes to the basement membrane, and excessive activity of matrix metalloproteinases.^{2,3} To achieve proper adhesion between the epithelium and stroma, first-line options include intensive lubrication, padding, punctal plugs, bandage contact lens, and antibiotic ointment.⁴ For those who do not respond well to conservative treatments, surgical options may be considered, including anterior stromal puncture, diamond burr superficial keratectomy, and phototherapeutic keratectomy (PTK).^{5,6}

In 2006, Dua et al⁷ reported a case series of 12 patients who underwent alcohol delamination for RCE, the area of affected

Table. Clinical characteristics and outcomes of patients undergoing alcohol-assisted epithelial debridement treatment for recurrent corneal erosion

Sex/age, y	Etiology	Duration of conservative management, mo	Time to complete healing, d	Follow-up, mo	Best corrected visual acuity		
					Before treatment	3-4 weeks after treatment	8 weeks after treatment
M/58	Idiopathic	7	8	39	0.8	0.6	0.8
M/36	Map dot fingerprint dystrophy	3	9	45	0.5	0.7	0.9
M/32	Traumatic	6*	8	14	1.0	0.7	1.0
F/27	Traumatic	12	14	7	0.9	0.9	0.9
M/58	Traumatic	5	8	45	1.0	1.0	1.0
F/35	Traumatic	4	7	0.25	1.0	0.7	1.0
M/37	Idiopathic	4	14	0.5	1.0	0.7	1.0
M/49	Traumatic	11	7	67	1.0	1.0	1.0

* Also underwent phototherapeutic keratectomy

corneal epithelium was demarcated by an optical zone marker under an operating microscope and then delaminated using alcohol. Of those 12 patients, 11 had relief of symptoms over the follow-up period with no residual effects from the application of alcohol. Although alcohol delamination is effective and safe, it requires an operating theatre and an optical zone marker that may not be readily available in clinical practice. We propose a simpler and more convenient alcohol-assisted epithelial debridement method for the treatment of RCE in a private general ophthalmology clinic setting.

Methods

Records of eight eyes in eight consecutive patients aged >18 years who presented to a private ophthalmology practice clinic in Hong Kong between October 2012 and March 2018 with RCE that did not respond well to conservative or surgical management with persistent symptoms of >3 months were retrospectively reviewed (Table). Patients were excluded if they had concomitant keratitis or neutrophic ulcer.

The area to be treated was identified with fluorescein staining, and its size was measured using a slit lamp. Under the slit lamp, 75% rubbing alcohol (One Stop Medical Limited, Hong Kong) was applied to the affected area for 10 seconds using a surgical sponge tip. The abnormal epithelium was then peeled or scraped off, followed by rubbing of the debrided stromal bed with a dry sponge. A bandage contact lens was inserted and kept for 5 days. The affected eye was applied with topical levofloxacin, lubricant eyedrops, and nepafenac four times a day. Patients were followed up until complete healing of the epithelial defect.

Results

Two women and six men aged 27 to 58 years were diagnosed with RCE secondary to trauma (n=5), idiopathic RCE (n=2), and map dot fingerprint dystrophy (n=1). The duration of symptoms prior to alcohol-assisted epithelial debridement ranged from 3 to 12 months (mean, 6.5 months). The time to complete healing of the epithelial defect after debridement ranged from 7 to 14 days (mean, 9.38 days). The mean

follow-up period was 27.2 months.

Seven of the patients failed conservative management; all had complete resolution of symptoms after alcohol-assisted epithelial debridement. One patient underwent PTK but had three recurrences within 4 months; had no recurrence 14 months after alcohol-assisted epithelial debridement. At week 8, all patients had either static or improved best corrected visual acuity. No patient had adverse effects, except that one developed a contact-lens related corneal abrasion 15 months later, which responded well to bandage contact lens and other conservative measures.

Discussion

A study by Singh et al⁸ reported that 66% to 83% of patients were symptom-free after intervention and 91% to 100% of patients had decreased pain score. An electron microscope study showed that alcohol delamination of the corneal epithelium spares the Bowman's layer with well-preserved hemidesmosomes on the basal surface of the basal cell layer, and this may contribute to the high success rate of alcohol delamination.⁹ In a randomized controlled trial by Chan et al¹⁰ comparing 17 eyes treated with alcohol delamination with 16 eyes treated with PTK, the two techniques were comparable in terms of pain score and percentage of partial to complete resolution of RCE symptoms (65% vs 63%). A clinical audit reported that alcohol delamination meets the typical safety and efficacy standards.¹¹

In our case series, alcohol-assisted epithelial debridement was effective and safe in the treatment of RCE. All our patients had complete resolution within 2 weeks and had no recurrence after a mean follow-up period of 27 months. However, a lack of a control group may be a limitation of this study. Further study is required to better evaluate the clinical efficacy of alcohol-assisted epithelial debridement, such as a prospective trial comparing this treatment with classical alcohol delamination, or other techniques such as PTK.

Declaration

The authors have no conflicts of interest to disclose.

References

1. Ramamurthi S, Rahman MQ, Dutton GN, Ramaesh K. Pathogenesis, clinical features and management of recurrent corneal erosions. *Eye (Lond)* 2006;20:635-44. [Crossref](#)
2. Goldman JN, Dohlman CH, Kravitt BA. The basement membrane of the human cornea in recurrent epithelial erosion syndrome. *Trans Am Acad Ophthalmol Otolaryngol* 1969;73:471-81.
3. Wong TT, Sethi C, Daniels JT, Limb GA, Murphy G, Khaw PT. Matrix metalloproteinases in disease and repair processes in the anterior segment. *Surv Ophthalmol* 2002;47:239-56. [Crossref](#)
4. Reidy JJ, Paulus MP, Gona S. Recurrent erosions of the cornea: epidemiology and treatment. *Cornea* 2000;19:767-71. [Crossref](#)
5. Watson SL, Lee MH, Barker NH. Interventions for recurrent corneal erosions. *Cochrane Database Syst Rev* 2012;9:CD001861. [Crossref](#)
6. Sridhar MS, Rapuano CJ, Cosar CB, Cohen EJ, Laibson PR. Phototherapeutic keratectomy versus diamond burr polishing of Bowman's membrane in the treatment of recurrent corneal erosions associated with anterior basement membrane dystrophy. *Ophthalmology* 2002;109:674-9. [Crossref](#)
7. Dua HS, Lagnado R, Raj D, Singh R, Mantry S, Gray T, Lowe J. Alcohol delamination of the corneal epithelium: an alternative in the management of recurrent corneal erosions. *Ophthalmology* 2006;113:404-11. [Crossref](#)
8. Singh RP, Raj D, Pherwani A, Lagnado R, Abedin A, Eatamadi H, et al. Alcohol delamination of the corneal epithelium for recalcitrant recurrent corneal erosion syndrome: a prospective study of efficacy and safety. *Br J Ophthalmol* 2007;91:908-11. [Crossref](#)
9. Mencucci R, Paladini I, Brahimi B, Menchini U, Dua HS, Romagnoli P. Alcohol delamination in the treatment of recurrent corneal erosion: an electron microscopic study. *Br J Ophthalmol* 2010;94:933-9. [Crossref](#)
10. Chan E, Jhanji V, Constantinou M, Amiel H, Snibson GR, Vajpayee RB. A randomised controlled trial of alcohol delamination and phototherapeutic keratectomy for the treatment of recurrent corneal erosion syndrome. *Br J Ophthalmol* 2014;98:166-71. [Crossref](#)
11. Ní Mhéalóid A, Lukasik T, Power W, Murphy CC. Alcohol delamination of the corneal epithelium for recurrent corneal erosion syndrome. *Int J Ophthalmol* 2018;11:1129-31. [Crossref](#)