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RESEARCH ARTICLE

Corneal and Tear Film Changes after Trachomatous Upper Lid Entropion Surgery

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Abstract

Purpose: to evaluate the effect of entropion surgery on corneal surface epithelium, tear film stability and cornea curvatures.
Methods: 100 eyes of 76 patients were included in this study and who had cicatricial entropion trichiasis due to trachomatus scar. These cases were surgically treated according to severity. Complete ophthalmic examination, Fluorescein stain of cornea, schirmer 1 test, tear film break up time & keratometry were done in all eyes preoperatively & 6 weeks postoperatively.
Results: the area of corneal staining by fluorescein stain reduced significantly to less than half of the cornea in 1 day after surgery, whereas complete resolution of staining was seen in 6 weeks in 80% of cases ($P = 0.0012$). Tear film break up time (BUT) increased significantly in both genders ($P < 0.03$), while Schirmer 1 test decreased significantly in male, not in female ($P = 0.041$, 0.057 respectively). However the effect of surgery on cornea curvature was negligible (P value 1.00).
Conclusion: Surgical correction of upper lid trachomatous entropion regardless of the surgical approach used, produces solid improvement in health state of the cornea and the tear film.

INTRODUCTION

Trachoma is the most common infectious cause of blindness worldwide. It afflicts some of the poorest regions of the globe, predominantly in Africa and Asia. The disease is initiated in early childhood by repeated infection of the ocular surface by Chlamydia trachomatis. This triggers recurrent chronic inflammatory episodes attacking conjunctival epithelium, reducing both aqueous and mucin secretion, resulting in an unstable tear film and leading to the development of conjunctival scarring (Burton,2007) ,(Aksunger et al ,1997). This scar tissue contracts, distorting the eyelids (entropion) causing contact between the eyelashes and the surface of the eye (trichiasis) (World Health Organization, 2006). This compromises the cornea and blinding opacification often ensues (Burton et al, 2005).
Different studies (Reacher et al, 1992), (Monga et al, 2008) have been reported some improvement in corneal opacification and vision after surgical correction of trichiasis or entropion, but what about tear film?! Other studies (Holck et al, 1998), (Yang et al, 2001), (Kumar et al .2005) reported change in corneal curvature after correction of epiblepharon, congenital entropion, and ptosis, but not surgical correction of trachomatus entropion.
In this study we aim to evaluate the effect of surgical correction of entropion on corneal surface epithelium, tear film stability and cornea curvatures.

Methods and patients

Prospective, nonrandomized, case control study, included 100 eyes of 76 patients attended in, Ophthalmology clinic during the period between March 2013 till January 2014 after informed consent and Institutional Ethical Committee clearance. All these cases had different degrees of entropion trichiasis due to trachoma which diagnosed according

to WHO. Patients who received lubricant eye drops before surgery or did previous ocular or lid surgeries were excluded from study.

Patient examination:

Complete ophthalmic examination with corneal fluorescein staining was carried out and the area of staining recorded diagrammatically by the same observer (R.H.) in all cases and photographed digitally (Panasonic DMC-FZ60). Schirmer 1 test, break up time test, and keratometery were done for all cases preoperatively & 6weeks postoperatively.

Surgical Technique:

All cases were subjected to one of three surgical procedures used to correct trachomatous upper eyelid entropion namely, terminal tarsal rotation after transverse tarsotomy, anterior lamellar repositioning with lid margin split, and posterior lamella advancement based on the severity of disease. The eye was bandaged for 24h after application of ciprofloxacin 0.3%eye ointment.

Statistical analysis:

Statistical analysis was performed using SPSS for Windows (version 17.0.1, SPSS, Inc.). Chi-Square test was used to compare the change in corneal staining preoperatively and 6wks postoperatively assessed by digital photography with the same camera (programme IA with aperture value 4) and the same surgeon with the same position. The paired t test was used to compare the mean values of BUT preoperatively & 6wks postoperatively. Statistical tests were performed at the 95% confidence interval.

Results

Forty-six male and thirty female patients, with age ranged from 45-72 years with mean age 57.4 years $\pm$ 8.83, had entropion varied from 1 year to 10 years duration. Table one shows patient demographics in both groups with no statistically difference between them.

Based on the severity of entropion: anterior lamellar advancement was performed in 47 cases (47%) with mild entropion, posterior lamellar advancemed was performed to 34 cases (34%) with moderate enrtopion while tarsal fracture with marginal rotation was performed in 19 cases (19%) with severe entropion as shown in (fig: 1)(p 0.303) (Collin ,2006).

The area of corneal staining reduced significantly to less than half of the cornea in the 1st day after surgery, whereas complete resolution was seen at 6weeks postoperatively in 80% of cases (p.0012), as shown in tablet.1

Preoperative tear film break up time test (BUT) ranged from 4 to 13 sec. the mean tear film BUT increased significantly in both female (p.0.024) and male (P 0.036). Schirmer 1 test varied from 14 to 35 mm in 5 minutes preoperatively with significant reduction in male (p0.41) but not in female. This reduction in Schirmer 1 test was most probably due to a decline in reflex tearing. Corneal curvature did not change significantly after surgery as shown in table 2, (fig: 2).

Eye lid edema was universal findings in all cases which resolved after one weak. The recurrence of entropion had occurred in 6 cases (7.14%)(4 patients from anterior lamella and 2 patients from posterior lamella operation) at 6 weeks. 4 cases was treated with posterior lamella while remaining 2 cases was treated by posterior lamella with mucus graft.

Tables

	Preoperative (n =100)	1 day Post-operative (n =100)	6 weeks Post-operative (n =100)
No corneal staining, No.(%)	0 (0)	30(30)	80(80)
Corneal staining < 1/2 of cornea, No. (%)	70 (70)	70(70)	20(20)
Corneal staining > 1/2 of cornea, No. (%)	30 (30)	0	0
P value of chi square test		0.0012	

*Table 1: preoperative and postoperative cornea staining

		Preoperative (n =100)	6 weeks Post-operative (n =100)	P-value paired Student's t-test
BUT	Male, mean (SD), sec	7.00 (2.1)	10.67 (3.72)	0.04
	Female, mean (SD), sec	11.00 (2.44)	14.5 (2.08)	0.02
Schirmer test 1	Male, mean (SD), sec	26.17 (4.37)	19.75 (2.04)	0.04
	Female, mean (SD), sec	22.25 (5.61)	20.67 (3.52)	0.06
K readings, mean (SD), D		43.99 (0.75)	44 (0.81)	0.53

†Table 2: Change in tear film break up time, Schirmer I and keratometry values after surgical correction of trachomatous upper lid entropion.

Legends

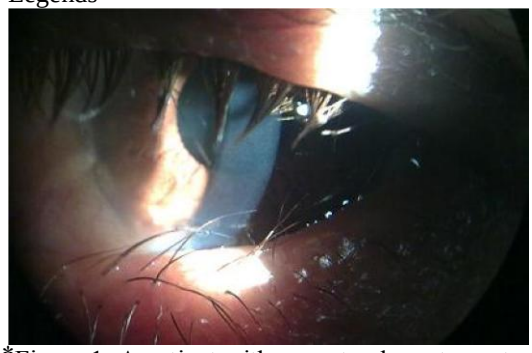
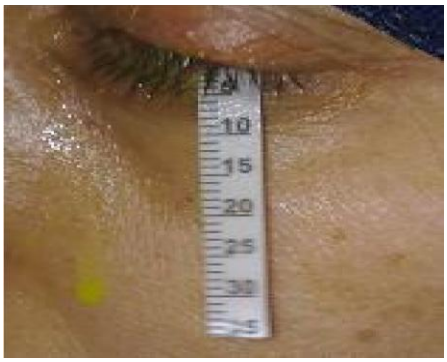


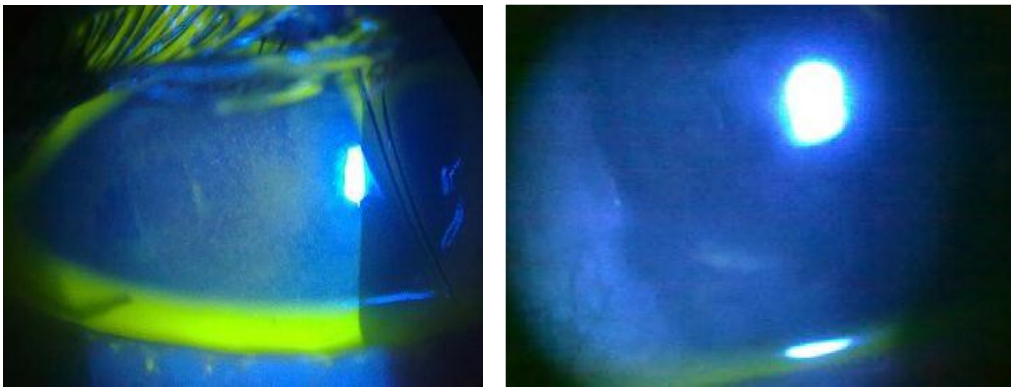
*Figure 1: A patient with sever trachomatus entropion.



Preoperative severe reflex lacrimation

Postoperative normalization of Schirmer 1 value

† Figure 2. Preoperative and postoperative Schirmer 1 test.



‡ Figure 3: Cornea staining with fluorescein pre and postoperative.

Discussion

Entropion and trichiasis due to trachoma are an important cause of corneal blindness worldwide (Resnikoff et al, 2002). Trichiatic eyelashes, rubbing on the cornea, produce numerous superficial punctate epithelial erosions. Grossly, these may be visible as a hazy cornea, but are clearly demarcated on staining with fluorescein stain (fig: 3).

In this study, these erosions resolved completely after correction of entropion regardless of age, gender, duration of entropion, area of staining, or surgical technique. This suggest that appropriate surgical correction of entropion is adequate to heal the epithelium in all cases and agrees with results of Monga's study (Monga, 2008) .The Final resolution of these erosions took never more than 6weeks as compared to 90 days by Monga's study (Monga, 2008) . This should kept in mind when planning any other procedure on the cornea after entropion surgery as intraocular surgeries, keratoplasty, or keratoreferactive procedures should be deferred for preferable 6 weeks after correction of entropion.

Tear film BUT reflects the quality and stability of the tear film. Corneal epithelial diseases may be accompanied by some tear film instability due to superficial epithelial abnormalities, even when the tears are otherwise normal (Norihiko et al, 1998). In this study, BUT values varied between 4 and 13 seconds, which were less than the values found in Monga's (Monga, 2008) but no patient had drying of conjunctiva or cornea; low BUT may have been compensated by greater than average Schirmer I values. No patient received lubricating eye drops after surgery. Thus, improvement in BUT after surgery is likely to be owing to improved corneal and conjunctival epithelial integrity, directly related to removal of aggravating factors (entropion or trichiasis). Good apposition of the realigned lid margin to the eyeball may have helped by ensuring that the tear film was spread evenly and efficiently.

These changes were more significant than the ones deduced by Monga's (Monga, 2008) where the reduction in Schirmer 1 values were not statistically significant. By surgical correction of entropion, the irritative component of the disease was eliminated, leading to decreased reflex lacrimation and lowering Schrimer 1 readings.

Corneal curvature didn't change significantly after surgery in our study, suggesting minimal or no effect of trachomatous upper lid entropion correction on corneal curvature. Similar results have been described after correction of entropion by Monga's (Monga, 2008) and the correction of epiblepharon ,using retrospective date on refractive errors by Yang et al (Yang et al ,2001) .However, some authors have used computerized corneal topography or videokeratoscopy to demonstrate change in corneal curvature in ptosis (Kim,2000) , meibomian cyst (Patel,1987) , and chalazion (Santa et al ,1997) , and after blepharoplasty or surgery for ptosis (. Kumar et al, 2005). Some suggest that changes in corneal curvature may be missed on manifest refraction or keratometry, but show up topography.

According to our study, surgery for entropion results in healing of superficial keratopathy, and improves tear film stability in patients with trachomatous upper lid entropion, which may contribute to improved vision in some cases. These changes take place over a period ranging from 1 to 45 days. Nevertheless, this time lag should be kept in mind when planning intraocular surgery, keratoplasty, or keratorefractive procedures after entropion correction.

One of the limitations of this study is that we did not evaluate the study patients for any additional ocular surgical interventions that they may have undergone after the study concluded.

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