ORIGINAL ARTICLE

ANTERIOR LAMELLAR MARGINAL Z-PLASTY WITH TRANSVERSE TARSOTOMY FOR MANAGEMENT OF TRICHIASIS WITH CICATRICIAL ENTROPION —A NEW SURGICAL APPROACH

Zulfiquar Ali, Danish Zaffar, Hassan Sajid Kazmi, Ashfaq Ali Shah
Department of Ophthalmology, Ayub Medical College Abbottabad

Background: Trichiasis is the main risk factor for corneal opacification. The primary treatment of trichiasis is surgical. Successful surgery is likely to halt the progression of corneal opacity. The aim of the study is to report the efficacy of the anterior lamellar marginal z-plasty combined with transverse tarsotomy in the management of severe trichiasis andcicatricial entropion of upper eyelid. **Methods:** A prospective study was carried out from January 2009 to June 2012, on 54 eyelids (44 patients) who underwent anterior lamellar marginal z-plasty with transverse tarsotomy for correction of trichiasis and cicatricial entropion involving upper eyelid with a minimum of 6 months' follow-up. Results were classified according to the presence and location of residual trichiasis and symptoms were assessed according to a three-level subjective scale (better, worse or no change). Failure was defined as recurrent trichiasis with one or more lashes touching any part of cornea in primary position. Secondary outcomes were visual acuity and corneal opacification. **Results:** At the end of six month period, none of patients had any trichiatic eye lash touching the cornea in primary position (100% success). Forty-eight (88.9%) of the operated eyelids were free of trichiasis, while residual trichiasis was noticed only in 6 (11.1%) operated lids. At the end of six months, there was a significant reduction of lash burden from median of 12 trichiatic lashes from the base line to the median of 2. All the patients reported significant reduction in symptoms of irritation. Significant improvement in visual acuity (p<0.000) and reduction in the density of corneal opacity (p<0.000) was notified from the base line. **Conclusion:** Anterior lamellar marginal z-plasty combined with transverse tarsotomy seems to have promising surgical outcome for the correction of trichiasis and cicatricial entropion secondary to cicatricial trachoma.

Keywords: Cicatricial ectropion, trichiasis, trachoma

INTRODUCTION

Upper lid entropion and trichiasis is nearly always a complication of trachoma.[1] Repeated infection from trachoma in early childhood causes subsequent scarring of tarsal plate and scarring around the eyelash roots causing them to lose their alignment and turn inward. The eyelashes rub against the cornea causing inflammation and ulceration, and this is made worse by damage to the conjunctiva and the tear film. The cornea becomes scarred and vascularised; this gradually progresses until the patient goes blind from corneal scarring. Trichiasis is the main risk factor for corneal opacification and should be treated as soon as possible. Successful surgery is likely to halt the progression of corneal opacity. Conversely, post-surgical recurrence confers a significantly increased risk of progressive corneal opacity.[2] In addition, alleviation of trichiasis reduces photophobia and epiphora and allows the corneal scar to fade in some patients.[2,3] In one study, visual acuity was shown to improve significantly by 0.12 logMAR units; (p<0.001) 6 months after surgery and by 0.14 units at 12 months in another (p<0.001).[3,4]

In many cases, removal of the affected eyelashes with forceps resolves the symptoms, although the problem often reoccurs in a few weeks when the eyelashes re-grow. Lubricants (such as artificial tears and ointments) and bandage contact lenses may decrease the irritant effect of eyelashes rubbing the cornea. The primary treatment of trichiasis is surgical. Standard treatment involves removal or destruction of the affected lash follicles with electrolysis, argon laser or surgery. Although electrolysis and argon laser may be suitable for few isolated trichiatic or meta-plastic eye lashes, more generalized disorder of lashes require some surgical procedure to rectify the abnormality.[5]

The WHO in 1993 supported a surgical procedure and published a manual advocating the bilamellar tarsal rotation procedure (BTR) as a standard procedure.[6] However, studies have shown that recurrence rates after surgery can be high.[7]

MATERIAL AND METHODS

This study was conducted in Department of Ophthalmology, Ayub Medical College, Abbottabad from January 2008 to June 2012. A total of 54 eyelids (44 patients) with generalised trichiasis and cicatricial entropion of upper lid were included in the study. Not included in the study were patients having only few focal trichiatic lashes (5 or less), or patients with localized bunch of trichiatic eyelashes. Also not included in the study were patients with psudotrichiasis secondary to spastic or senile entropion.

A Performa was designed to record history and examination of the patients. History included duration of symptoms such as epiphora, foreign body sensation, pain, photophobia and visual loss, history of any previous treatment such as epilation or laser, history of severe systemic illness associated with skin and/or mucous membrane involvement. Examination included recording the best corrected visual acuity, slit lamp examination paying particular attention to direction of cilia, lid margins, evidence of additional metaplastic eyelashes, sub tarsal scarring, conjunctival injection, conjunctival adhesions, corneal erosions, corneal vascularisation and corneal scarring and active corneal ulceration with and without secondary infection. Also included was height of marginal tear strip and stability of tear film.

Surgical technique: Incision was given in the grey line parallel to the lid margin, starting just temporal to the punctum and extending up to the lateral canthus. Anterior lamella (consisting of skin and orbicularis) was dissected free from posterior lamella (consisting of tarsal plate and conjunctiva) far about 4–5 mm from the lid margin. A second incision was given through the anterior lamella 4–5 mm parallel to lid margin but perpendicular to tarsal plate. In this way a nearly rectangular anterior lamellar flap of skin and orbicularis was lifted from tarsal plate. A third incision was given diagonally in the rectangular flap in such, a way that two triangular flaps, were created. One of the flaps was containing the trichiatic eye lashes at the lid margin and other free of eye lashes, lying proximal to lid crease. The two flaps, with base attached at the medial and temporal ends of lids were transposed in such a way that marginal flap containing the trichiatic lashes was moved more posteriorly toward the lid crease while the musculo-cutaneous flap, free from cilia come to occupy over the free end of tarsal plate forming the new anterior lamellar lid margin. The flaps were fixed using 7/0 vicryl suture.

Transverse tarsotomy was done about 3mm parallel to lid margin and wedge of thickened tarsal plate was excised to address inward rotation of lid margin. Tarsotomy was closed with 3–4 mattress 7/0 vicryl sutures. Antibiotic-steroid ointment was applied at the end of procedure. Pressure bandage was applied for 72 hours to further secure the flaps.

Bilateral surgery was performed only in cases having generalized trichiasis on both sides, while unilateral surgery was done in other cases. All patients were seen on the third post-operative day, two-week, three and six months postoperatively. The pre-operative and last post-operative visit record was analysed.

RESULTS

A total of 44 patients (54 eye lids), were included in the study, age range from 43–67 years, 10 patients had bilateral trichiasis and entropion of upper lid 26 (59%) of the patients were females and 18 (41%) were males. (Table-1).

Table-1: Demographic Characteristics and Spectrum of ocular involvement in 44 patients with diffuse trichiasis

Variables	No (%)
Gender	
Male	18 (41%)
Female	26 (59%)
Total No. of affected lids with diffuse trichiasis (n=54)	
Unilateral	34
Bilateral	10
Corneal involvement in 54 eyes with diffuse trichiasis	
Not involved	15
Involved	39
Co-existing lens opacities in 54 eyes with diffuse trichiasis	
Present	5
Absent	49

Irritative symptoms such as Epiphora (100%) foreign body sensation (100%) and recurrent photophobia were most common presenting features, followed by unilateral or bilateral visual impairment. WHO criteria[8] was adopted for recording the degree of visual impairment. Five out of 54 affected eyes were also having significant lens opacities and were excluded from the study only for the purpose of assessment of final visual acuity at the end of study period. All the patients also give the history of cutting of misdirected lashes or mechanical epilation of abnormal lashes with tweezers (self or assisted) lasting for more than 5 years.

All the patients developed postoperative oedema of the lid that subsided gradually within one week. Four eyelids developed infection (7.4%) which healed in few days after antibiotic therapy in the early postoperative period.

At the end of the study period, the postoperative evaluation revealed that 48 (88.9%) eyelids were free from trichiasis, whereas residual trichiasis was observed in 6 (11.1%) eyelids. In these cases, trichiasis was medial to the central portion of the lid. In primary position, no eye lash was seen touching the cornea (100% success). Only 3 patients reported that the surgery did not completely alleviate the irritative symptoms. All the remaining 41 patients reported that the symptoms resolved after surgery.

In 34 patients (91.7%) cosmesis was not the primary concern. In10 patients, primarily withunilateral involvement, there was a slight dissatisfaction due to little higher postoperative position of lash line (22.7%).Thickening of the lid margin was observed in 7(25.9%) eyelids due to granulation. Some improvement was noticed from preoperative visual acuity and density of corneal opacity at the end of study period. Two out of 11 patients with initial visual acuity ranging between 6/60 to 6/24 showed improvement to 6/18 or better (p<0.000 chi square test). Similarly when compared for degree of corneal clarity from the base

line, 2 out of 11 patient with mild corneal opacity C-1, showed improvement (p<0.000 Chi-square test). However for severe visual loss (6/60 or worse) or for more severe degrees of corneal opacification, no improvement was seen at the end of study period. Complications such as defective closure or eyelid or notching were not observed in any of the case. (Table-2).

Table-2: Clinical characteristics of patients at each point of time

Visual Acuity (n=49)	Base line on enrolment	After six month of surgery
6/18 or better	17 (34.7%)	19 (38.77%)
6/ 60 to 6/24	11 (22.45%)	9 (18.36%)
Less than 6/60	21 (42.85%)	21 (42.85%)
Trichiasis (n=54)		
Any trichiasis	54 (100%)	6 (11.1%)
Touching cornea	54 (100%)	0 (0%)
Mean lashes	15.62	2.6
Median lashes	12	2
Number of lashes touching eye (n=54)		
0	0 (0%)	48 (88.9%)
1–4	5 (9%)	4 (7.4%)
5–9	7 (12%)	2 (3.7%)
10–19	12 (23%)	0 (0%)
≥20	30 (56%)	0 (0%)
Corneal opacity (n=54)		
C0	15 (27.8%)	17 (31, 48%)
C1	11 (20.37%)	9 (16.66%)
C2	12 (22.22%)	12 (22.22%)
C3	16 (29.63%)	16 (29.63%)

C0=no corneal opacity; C1=central corneal opacity but iris details visible; C2=central corneal opacity with iris details masked; C3=opaque cornea with iris not visible

DISCUSSION

Trachoma is the second commonest cause of world blindness after cataract. The prevalence of blindness from trachoma appears to be falling gradually worldwide as public health is slowly improving. However there are still a huge number of patients needing entropion and trichiasis surgery in endemic areas. The World Health Organization (WHO) estimates that there are currently 40 million people with active trachoma and 8.2 million people with trachomatous trichiasis (TT) that has not been treated surgically.[9]

Other causes of trichiasis and cicatricial entropion are chronic blephro-conjunctivitis, chemical burns, autoimmune disorders such as Steven Johnson's syndrome and ocular cicatricial pemphigoid.[5,10]

Various surgical techniques have been advocated for the treatment of cicatricial ectropion and trichiasis with variable success rates. Failure after surgery can be due to faulty surgical technique and recurrence due on going disease process. Early failure after surgery is primarily due to faulty surgical technique and late recurrence is due to ongoing disease process.[3,11,12] The WHO has recommended bilamellar tarsal rotation (Ballen procedure) procedure for cicatricial entropion and trichiasis.[6] Various studies have established higher recurrence rates with Ballen procedure.[7,11] In one of the tightly supervised study Saul N *et al*[13] has reported failure rate as high as 32% at six month, 40% at one year, while additional 1% recurrence (overall 41%) was recorded between 1 year and 4 years. The data from this study suggest that there are important aspects in the surgical technique and quality that should be addressed.

In the present study we were able to achieve 100% success rates at 6 month postoperatively, defined as absence of single eye lash touching the cornea in primary position. This high success rate might be due to combined approach, i.e., combining both the transverse tarsotomy addressing the cicatrisation of tarsal plate involving posterior lamella and shifting of anterior lid margin containing trichiatic and meta-plastic lashes away from the free end of tarsal plate involving anterior lamella. And finally third contributory factor might be due to splitting of anterior and posterior lamella, while performing the procedure; which is acting as a sort of relaxing incision.[14] Shalab SA[15] also showed that combined procedures are associated with higher success rates (100%).

The residual trichiasis was seen in 6 (11.1%) eyelids in our study. It was always present on the medial side, which was probably due to the fact that there was less distal shifting base of the flap attached medially as compared to the apex and central portion of flap which is shifted more distal from the free tarsal boarder after marginal rotation of anterior lamella.

For milder degree of visual loss (6/60 to 6/18) and mild corneal opacification (C1) significant difference (p<0.000) was noticed, in termsof improvement in the visual acuity and reduction in the density of corneal opacity at the end of six month in the present study. In some earlier studies, visual acuity was shown to improve significantly by 0.12 log MAR units; (p<0.001) 6 months after surgery and by 0.14 units at 12 months in another (p<0.001).[3,4] Even if the cornea is already scarred, the inflammation and scarring may gradually become less once the constant irritation from the eyelashes ceases.

On the subjective scale, all the patients (100%) did agreed at least to some extent that surgery resulted in a significant reduction in alleviating Irritative symptoms which was due to significant reduction in lash burden. Patients who have had successful surgery for trichiasis and entropion are one of the most grateful, and it is still worth operating even if the eye is blind. If the entropion is corrected when the patient can still see, there should be no further irritation and mechanical damage to the cornea and so no risk of the vision getting worse.

CONCLUSION

Anterior lamellar marginal z-plasty combined with transverse tarsotomy seems to have promising surgical outcome for the correction of trichiasis and cicatricial entropion secondary to cicatricial trachoma in short

term. However, long term prospective study is needed to assess the success rate.

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Address for Correspondence

Dr. Zulfiquar Ali, Department of Ophthalmology, Ayub Medical College, Abbottabad, Pakistan. **Cell:** +92-300-9154099
Email: drzulfiquarali@gmail.com