Original Article

A 5-year Retrospective Review of Asian Ectropion: How Does It Compare to Ectropion Amongst Non-Asians?

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Abstract

Introduction: This study reviews the differences in demographics and surgical outcomes between ectropion in Asian and non-Asian eyes. Materials and Methods: Medical records of surgically corrected ectropion cases from January 2002 to December 2006 were reviewed. Pre- and postoperative lid-globe apposition was graded: grade 0 with normal lid-globe apposition, grade 1 with punctal ectropion, grade 2 with partial lid eversion and scleral show, grade 3 with conjunctival hyperemia and thickening and grade 4 as for grade 3 with exposure keratitis. Results: Sixty-nine eyes in 50 patients underwent surgical correction of lower lid ectropion, making up 3.3% of all lid procedures performed. Eighty-four percent of patients were above 50 years of age, 72% were males and 88% were Chinese. Involutional change was the commonest aetiology, accounting for the majority of bilateral cases. The mean duration to surgery was 10.0 ± 16.0 months. The most frequent preoperative severity grade was 2. Lateral tarsal strip (LTS) was the commonest procedure performed, comprising 91.3% of eyes. The mean duration of postoperative review was 19.4 ± 19.2 months (range, 1 to 74 months). Postoperative improvement of at least one grade was observed in 98% while normal lid-globe apposition was achieved in 76% of eyes. Conclusions: Involutional change is the most common cause of ectropion amongst both Asians and non-Asians. Ectropion is less prevalent amongst Asians as a result of anatomical differences and possibly reduced sun exposure. The LTS procedure is the most commonly performed surgical procedure for the successful correction of ectropion in both Asians and non-Asians.

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Introduction

Ectropion is defined as the outward rotation of the eyelid margin, commonly affecting the lower lids and to a much lesser extent, the upper lids. The prevalence of lower lid ectropion has been shown to increase with age in the Blue Mountain Eye Study,[1] with up to 16.7% amongst subjects above 80 years of age.

The physiological stability of the lower eyelid[2] is determined by the integrity of the posterior lamella (conjunctiva and tarsus), anterior lamella (skin and preseptal and pretarsal components of orbicularis oculi), inferior retractor – capsulopalpebral fascial complex and the lateral and medial canthal ligaments. Both lateral and medial ligaments must be taut as they insert into the Whitnall's tubercle laterally and the lacrimal crests and frontal process of maxilla medially, effecting a sling support. Any loss of structural or functional integrity coupled with gravity will result in malposition of the lower eyelid with time.

The causes of ectropion can be broadly classified into categories such as involutional,[1] congenital,[3-6] paralytic,[7] mechanical[8] and cicatricial.[9-11] The pathologic mechanisms[12] responsible include horizontal lid laxity, medical canthal tendon laxity, vertical lid tightness due to anterior lamellar deficiency, orbicularis paresis and inferior retractor disinsertion. Involutional ectropion is, by far, the most common cause,[1] often affecting both eyes albeit asymmetrically. Histopathological studies[13-15] have demonstrated age-related changes in the tarsal plate, inferior retractors, orbicularis oculi and lateral canthal tendon in these lids. It is not uncommon for involutional changes to coexist with a secondary cause such as facial paralysis or cicatrization.[1,16,17] Various surgical options described in the literature[17-30] have shown that targeting the respective aetiological factors is crucial for achieving good lid-globe

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apposition and normal eyelid function.

To date, studies[1,7,16,31] have mostly reported the epidemiology and surgical outcome of ectropion correction amongst non-Asians, a condition far more common amongst non-Asians compared to their Asian counterparts.[16,32,33] This racial preponderance has been shown to be a result of anatomical and structural differences in the lower eyelid and anterior orbital fat.[16,34-36] Nonetheless, it is still important to understand the disease profile in Asian eyes. Our study aims to review the demographic features and surgical outcome of ectropion in Asian eyes and compare to that of the non-Asian counterparts.

Materials and Methods

This retrospective case review was conducted as part of a surgical audit at a hospital in Singapore under the approval of the Institutional Review Board. Sixty-nine ectropion corrective procedures in 50 patients were performed by the Oculoplastics Unit during the period from 1 January 2002 to 31 December 2006. Forty-nine patients had no prior history of ectropion correction while one had a failed ectropion correction surgery before the study period.

All hospital records of 50 patients were reviewed and information obtained included demographic data such as age, gender and race as well as aetiological factors, laterality, duration and type of symptoms (ocular surface discomfort and epiphora), visual acuity, clinical signs indicating severity of ectropion and duration prior to surgical treatment. The various categories of aetiological factors included involutional, cicatricial, paralytic, mechanical, congenital as well as other causes. Of those with non-involutional ectropic lids, the specific causes were studied. Clinical features that were analysed included the presence or absence of an abnormal punctal position, lagophthalmos and corneal exposure. The preoperative severity of ectropion was graded by clinical description in all cases according to the following classification by Rubin et al:[8] grade 1 — the lower punctum just pointing upwards away from globe (punctal ectropion); grade 2 — partial everted lower lid and visible scleral show (Fig. 1); grade 3 — the presence of conjunctival hyperemia and gross mucosal thickening (Fig. 2) and grade 4 — as for grade 3 with additional exposure keratitis (Fig. 3).

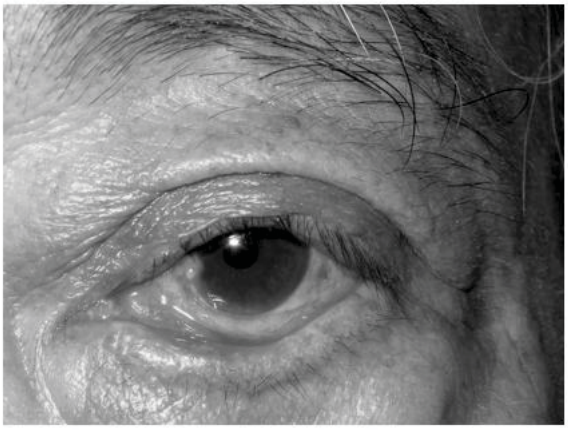


Fig. 1. This preoperative photograph was taken of a case with a grade 2 involutional ectropion as seen with an everted lower eyelid as well as a visible scleral show.

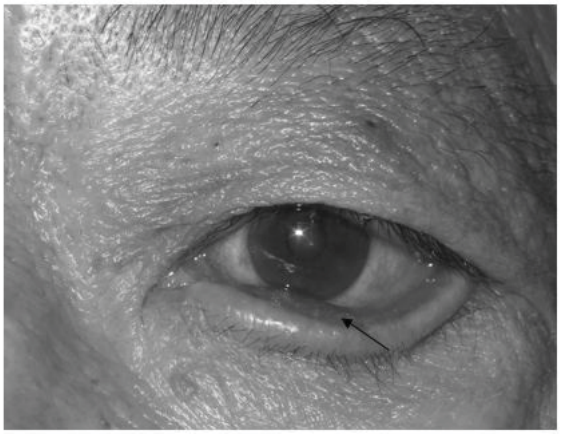
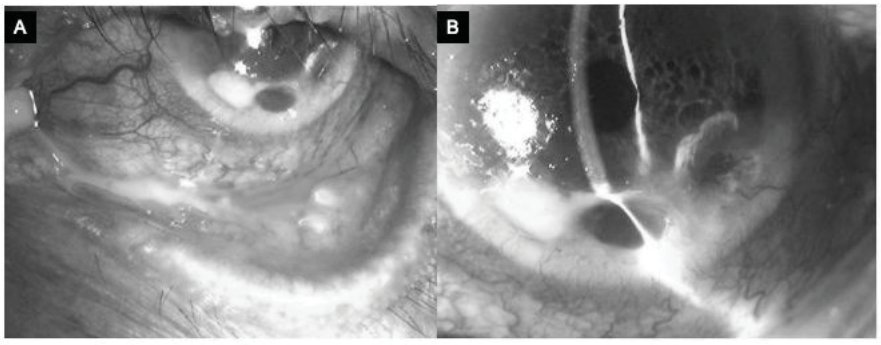


Fig. 2. In this case of a grade 3 involutional ectropion, significant conjunctival hyperemia and mucosal thickening was evident (black arrow) in addition to the everted lower eyelid and scleral show.



Figs. 3A and B. This was a case of a severe grade 4 traumatic paralytic ectropion. (A) showed extensive conjunctival hyperemia and mucosal keratinization in the presence of severe lower lid ectropion while (B) on higher magnification showed the presence of exposure keratitis, which was associated with significant thinning and peripheral vascularization of the inferior cornea. This patient achieved normal lid-globe apposition after 2 surgeries (lateral tarsal strip combined with medial tarsorrhaphy followed by a lateral tarsorrhaphy) to correct the residual ectropion.

The choice of ectropion surgery was based on the surgeon's discretion, depending on the aetiology, preoperative severity as well as underlying patho-aetiologic mechanism(s). The indications for surgery included patient's symptomatic intolerance, corneal exposure and poor cosmesis. Postoperatively, both surgical outcomes as well as complications were evaluated. The surgical outcome was evaluated using a similar classification system adopted preoperatively, with the inclusion of a grade 0, which denoted achievement of normal lid-globe apposition postoperatively. The ectropion surgery was considered a complete success when normal lid-globe apposition was achieved at the last follow-up (i.e. grade 0). A partial success would be considered if the postoperative grade was less than that preoperatively and any residual ectropion would be graded accordingly to its severity.

Results

Sixty-nine eyes of 50 patients underwent surgical correction of lower lid ectropion, making up 3.3% of all lid procedures performed during the review period. Of these 50 patients, 19 had bilateral involvements, while the remaining 31 had unilateral involvement. Of those with unilateral involvement, the right and left eye was involved in 13 and 18 patients, respectively. The demographic profile is shown in Table 1. Majority of patients (84%) were above 50 years of age, 72% were males and 88% were Chinese.

Table 1. Demographics of Patients who have Undergone Ectropion Surgery during the Period from 2002 to 2006

Demographics	Patients (n = 50)
Age groups (years)	
<10	0
10-19	1
20-29	1
30-39	4
40-49	2
50-59	7
60-69	12
70-79	20
80 and above	3
Gender	
Male	36
Female	14
Race	
Chinese	44
Malay	4
Indian	2
Others	0

The most common aetiology was due to an involutional change, comprising 45 eyes (65.2%). This was followed, in decreasing frequency, by cicatricial (8 eyes, 11.6%), paralytic (7 eyes, 10.2%), congenital (4 eyes, 5.8%) and mechanical (1 eye, 1.4%) causes. One patient had a combined involutional and cicatricial ectropion as a result of an old lower lid scar. Of the 8 eyes with cicatricial ectropion, actinic skin changes accounted for only 25% of eyes while the remaining 75% of eyes were due to post-traumatic and iatrogenic (e.g. post-blepharoplasty) cicatricial skin changes. The majority of patients with bilateral involvements (79%) had an involutional aetiology.

Forty (80%) patients were symptomatic: Of this group, 26 (65%) had ocular surface discomfort, 10 (25%) had persistent epiphora and 4 (10%) had both symptoms. Clinical features that were documented in order of decreasing frequency included abnormal punctal position (45.7%), lagophthalmos (20%) and corneal exposure (14.3%).

The mean duration to surgery was 10.0 ± 16.0 months. The most frequent preoperative severity grade was 2, comprising of 44.9% of eyes. The most frequent indication for surgical intervention was patient intolerance of symptoms, present in 71.4% of eyes. The other surgical indications included cosmesis (18.6%), exposure keratopathy (8.6%) and for histological diagnosis of eyelid mass (1.4%). Of the 69 eyes in our series, 66 (96%) eyes had predominant lateral canthal laxity preoperatively. The lateral tarsal strip (LTS) was the most commonly performed procedure, comprising 63 eyes (91.3%). In 16 of these 63 eyes, LTS was performed in conjunction with other procedures such as inferior retractor plication, skin graft procedure, Z-plasty skin transposition, medial spindle procedure, medial tarso-conjunctivoplasty, posterior lamellar graft procedure and medial tarsorrhaphy (Table 2). The other 8.7% of eyes underwent the following surgical procedures other than LTS: orbicularis sling with lateral canthoplasty (involutional), full thickness horizontal lid shortening (mechanical), lateral tarsorrhaphy (paralytic) and skin graft, medial canthoplasty and inferior retractor plication (cicatricial).

The mean duration of postoperative follow-up was 19.4 ± 19.2 months (range, 1 to 74 months). Surgical success was evaluated at the last follow-up and graded with the similar classification system used preoperatively: grade 0 — normal lid-globe apposition; grade 1 — the lower punctum just pointing upwards away from globe (punctal ectropion); grade 2 — partial everted lower lid and visible scleral show; grade 3 — the presence of conjunctival hyperemia and gross mucosal thickening and grade 4 — as for grade 3 with additional exposure keratitis. Fifty-two eyes with documented preoperative and postoperative gradings were included in the analysis of surgical success. The postoperative follow-up duration ranged from 1 to 74

Table 2. Types of Surgical Procedures Performed for Ectropion in Asian eyes (LTS: lateral tarsal strip)

Ectropion aetiology (Number of eyes)	Surgical procedures performed (Number of eyes)
Involutional (n = 45)	LTS (31)
	LTS + Inferior retractor plication (1)
	LTS + medial spindle operation / medial tarsoconjunctivoplasty (11)
	Orbicularis sling + lateral canthoplasty (2)
Involutional + cicatricial (n = 1)	LTS (1)
Paralytic (n = 7)	LTS (5)
	LTS + medial tarsorrhaphy and lateral tarsorrhaphy (1)*
	Lateral tarsorrhaphy (1)
Mechanical (n = 1)	Full thickness horizontal lid shortening (1)
Cicatricial (n = 8)	LTS (3)
	LTS + upper lid skin graft (1)
	Skin graft (upper lid) + Inferior retractor plication + medial canthoplasty (1)
	Retroauricular skin graft (1)
	LTS + buccal mucosal/hard palate graft (2)
Congenital (n = 4)	LTS (4)
Others (n = 3) such as atopy and iatrogenic	LTS (3)

*One eye with traumatic paralytic ectropion underwent 2 surgeries to achieve lid-globe apposition (LTS with medial tarsorrhaphy first followed by a lateral tarsorrhaphy).

months, of which 35 eyes had at least 6 months of follow-up. Postoperative improvement of at least 1 grade was observed in 98% (51 of 52 eyes) at the last follow-up. Of these 51 eyes, 76% (39 of 51 eyes) achieved complete success (ie. normal lid-globe apposition; grade 0). Of these 39 cases with complete success,[38] required a single surgery while 1 case of a traumatic paralytic ectropion required two surgeries to achieve normal lid-globe apposition (Table 3). One eye with involutional ectropion did not show any postoperative improvement and this was attributed to frequent rubbing of the eye during the early postoperative period, resulting in poor adhesion of the lateral tarsal strip to the lateral orbital wall periosteum. There was no complication observed in our series.

Discussion

Ectropion is known to be a common lid condition of the West but rare in Asia.[16,32,33] In our study, all patients are of Asian descent, with the Chinese making up the majority. Ectropion correction made up 3.3% of all Asian lid procedures performed during this 5-year review period. In a 10-year retrospective surgical review of involutional ectropion repairs by Carter et al,[32] ectropion repair comprised of about 1.5% of all lid procedures performed amongst Asians compared to 6.2% amongst the non-Asians. Based on the prevalence of ectropion surgery reviewed in both studies, ectropion surgery is not as commonly performed amongst Asian eyes as it is amongst the non-Asians. It may be inferred that ectropion is a less common disease entity amongst Asians compared to non-Asians. As both studies were retrospective surgical audits, the lower prevalence of ectropion corrective procedures amongst Asians could also suggest that this condition might be less severe in this population group compared to the non-Asians and hence might not require surgical correction as most cases remain asymptomatic.

Anatomical differences between the racial groups have been demonstrated in several histopathological[14,35,36] and imaging studies.[34] Asian lids are generally less likely to develop ectropion due to the lack of fusion between the capsulopalpebral fascia and orbital septum as well as the tendency for anterior orbital fat prolapse beyond the anterior orbital rim, which prevents the insertion of capsulopalpebral fascia to the subcutaneous tissue and hence minimal lid eversion. Anecdotally, we have also observed that Asian lower eyelids tend to have a relatively fuller pretarsal orbicularis, which could potentially limit the development of ectropion.

In our study, involutional ectropion was the commonest aetiology amongst those aged 60 years and above. In the Blue Mountain Eye Study,[1] an involutional cause was also shown to be more prevalent amongst the elderly, with up to 16.7% amongst those above 80 years of age. Apart from age, the other risk factors for involutional ectropion reported in the Blue Mountain Eye Study include active smoking and male gender. The greater male to female subject ratio in our study suggested that ectropion might be more prevalent in males, which supported the gender risk factor analysis in the Blue Mountain Eye Study.

While coexisting involutional and actinic cicatricial change is rare in our Asian population, this aetiologic entity is common amongst non-Asians with ectropion.[1,16] In our study, coexisting involutional and cicatricial ectropion was observed in only one patient as a result of iatrogenic scar formation of the anterior lamella. Cicatricial ectropion, in our series, was largely due to post-surgical and traumatic facial cicatriziation. In contrast, case series by O'Donnell et al[17] and Manku et al[30] showed that cicatricial ectropion in non-Asians was largely due to actinic skin damage. This observation may be accounted for by frequent sun exposure, with sunbathing being a common social practice

Table 3. Grading of Ectropion Severity before and after Surgery

Ectropion Aetiology	Preoperative Grade of Ectropion Severity	Postoperative Grade of Ectropion Severity	Number of Eyes
Involutional	1	1	1 #
		0	5
	2	0	16
		1	8
	3	0	5
		2	1
Involutional + Cicatricial	2	0	1
Paralytic	2	0	2
	3	0	1
		1	1
	4	1	1
			1*
Cicatricial	1	0	1
	2	0	2
	3	0	2
		1	1
Mechanical	2	0	1
Congenital	2	0	2

(Only 52 eyes had preoperative gradings for comparison of surgical success). Complete success (grade 0) was achieved in 39 eyes. Of these 39 eyes, one eye had a traumatic paralytic ectropion (*), which required 2 surgeries to achieve normal lid-globe apposition (a lateral tarsal strip and medial tarsorrhaphy procedure followed by a lateral tarsorrhaphy). Twelve eyes achieved partial success at the last follow-up. Only 1 eye did not show any improvement after surgery (#).

in the West. In a population telephone-survey of 2459 Caucasians conducted in the United States, about 60% reported sunbathing in the last year while 25% of them sunbathe frequently.[37] Increased actinic dermal elastosis as a result of sun exposure leads to shortening of the anterior lamella and hence an increased vertical everting force on the lower lid. In contrast, reduced sun exposure amongst the elderly Vietnamese migrants in Sydney was observed to have contributed to a marginal plasma vitamin D deficiency compared to the Caucasian counterparts, which was attributed to a cultural expectation of being fair-skinned.[38]

The lateral tarsal strip (LTS) procedure is the most commonly performed corrective surgery for ectropion in several studies.[7,18,19] This trend was also observed in our series as more than 95% of eyes had predominantly lateral canthal laxity preoperatively. The LTS was first described by Tenzel[39] and Anderson in 1979.[22,40] With laxity and lengthening of the lateral canthal tendon being invariably present in most ectropion cases,[41,42] the LTS not only addresses the lengthened tendon, but also compensates for the loss of tone of orbicularis oculi.[2] In our series, LTS were performed in 91.4% of cases. In 30 cases treated with LTS procedure alone, there was a median postoperative improvement of 2 grades.

However, LTS alone is insufficient to achieve normal lid-globe apposition in some cases and is generally not useful for the management of medial ectropion. In such cases, the specific pathological factors such as medial canthal laxity, inferior retractor dehiscence and vertical lid shortening must be addressed accordingly. Inferior retractor plication is a useful adjunct to correct any dehiscence of the inferior retractor in severe involutional[33] and cicatricial ectropion.[17] In our series, normal lid-globe apposition was achieved in an eye with involutional ectropion (preoperative grade 2) after adjunctive inferior retractor plication. Lamellar graft procedures are usually necessary to correct for vertical lid shortening in cicatricial ectropion. In our series, majority of the eyes with cicatricial ectropion had an improvement of at least 2 grades with lamellar reconstruction.

The retrospective nature of this study makes standardisation of preoperative questionnaires, assessment and choice of surgery techniques difficult. Other limitations of our study included a small sample size, particularly with the sub-groups according to aetiology. This makes it difficult for

us to comment on the efficacy of a surgical procedure in these respective groups objectively. Subjective improvement was also not evaluated in our study, which we felt should have been an important assessment of treatment efficacy since the majority of these patients were symptomatic prior to treatment.

In conclusion, involutional change is the most common cause of ectropion amongst both Asians and non-Asians. Ectropion is less prevalent amongst Asians compared to non-Asians and this is largely attributed to predisposed anatomical differences as well as increased actinic skin damage as a result of frequent sun exposure amongst the non-Asians. The LTS procedure is still the most commonly performed surgical procedure for the correction of both Asians and non-Asian ectropion. Adjunctive procedures necessary to correct other contributing pathological factors are also equally as efficacious in the management of ectropion in both racial groups.

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