Everting suture correction of lower lid involutional entropion

Mark Wright, Dugald Bell, Chris Scott, Brian Leatherbarrow

Abstract

Aims—To assess the long term efficacy of everting sutures in the correction of lower lid involutional entropion and to quantify the effect upon lower lid retractor function.

Methods—A prospective single armed clinical trial of 62 eyelids in 57 patients undergoing everting suture correction of involutional entropion. Patients were assessed preoperatively and at 6, 12, 24, and 48 months postoperatively. The main outcome variables were lower lid position and the change in lower lid retractor function.

Results—When compared with the non-entropic side, the entropic lid had a greater degree of horizontal laxity and poorer lower lid retractor function. These differences however, were not significant. At the conclusion of the study and after a mean follow up period of 31 months, the entropion had recurred in 15% of the patients. There were no treatment failures in the group of five patients with recurrent entropion. The improvement in lower lid retractor function after the insertion of lower lid evertors did not reach statistical significance. There was no significant difference between the treatment failure group and the group with a successful outcome with regard to: the degree of horizontal lid laxity or lower lid retractor function present preoperatively; patient age or sex; an earlier history of surgery for entropion. There was neither a demonstrable learning effect nor a significant intersurgeon difference in outcome. The overall 4 year mortality rate was 30%.

Conclusions—The use of evertors in the correction of primary or recurrent lower lid involutional entropion is a simple, successful, long lasting, and cost effective procedure.

Involutional entropion is one of the most commonly encountered eyelid malpositions. Several aetiological factors are thought to be important in the development of involutional entropion and these include: (a) horizontal lid laxity, caused by stretching of the canthal tendons and/or the tarsal plate; (b) vertical laxity, caused by stretching of the canthal entropion and these include: (a) horizontal lid laxity, caused by stretching of the canthal tendons and/or the tarsal plate; (b) vertical laxity, caused by stretching of the canthal entropion; (c) migration of the preseptal orbicularis muscle to override the pretarsal orbicularis muscle; and (d) appositional pressure of the lids during eyelid closure.

Every structure of the eyelid has been the object of surgery. Various medical treatments including skin patches, botulinum toxin, and tissue glue have been advocated. Everting sutures have been used for the correction of lower lid entropion since the time of Hippocrates and remain the most simple form of surgical treatment. Without exception, evertors have been considered to offer only a temporary cure for patients with entropion.

Despite a plethora of publications describing various surgical techniques, none has attempted to quantify the effects of surgery upon the eyelid variables thought to be important in the aetiology of involutional entropion. We attempted to measure the lower lid retractor function and the degree of horizontal lid laxity present, firstly, in order to quantify the effects of our intervention and, secondly, to attempt to identify those patients in whom evertor sutures are more likely to fail.

Patients and methods

After informed consent was obtained, 62 eyelids from 57 subjects were entered into a prospective single armed clinical trial of patients undergoing evertor suture correction of lower lid involutional entropion (Fig 1). Follow up was complete in 38 of 57 patients (17 patients died during the study, one patient was enucleated, and one patient was lost to follow up between the 24 and 48 month visits). The mean duration of follow up was 31 months (range 1–49).

After the conjunctiva was anaesthetised using topical 0.4% benoxinate, approximately 1 ml of 2% lignocaine containing 1 in 200 000 units of adrenaline was injected subcutaneously into the lower lid. The surgical technique is essentially the same as described by Feldstein. The distance between the punctum and the lateral canthus is divided into quarters with the junction between the most medial and adjacent quarters being the entry point for the first suture. The other two pairs of sutures are inserted at the junction of the remaining quarters. The double armed 4/0 plain catgut sutures (W 813, Ethicon, UK) are prepacked in alcohol which was not rinsed off before use. The sutures are passed in a horizontal mattress fashion, the first needle engages the lower lid retractors which are seen as a subconjunctival, infratarsal white band at the lowest point of the inferior conjunctival fornix. The skin of the lower lid is pulled downwards evertors the anterior lamella and the needle is advanced upwards to pierce the skin 3 mm below the lid margin. The other arm of the suture is passed...
Results
The mean age of the study group was 78 years (range 53–95), 32/57 (56%) of the patients were female, 5/57 (9%) had bilateral entropion, and 5/57 (9%) had recurrent entropion. The five patients with recurrent entropion had undergone a variety of surgical corrections, all of which had included a horizontal lid shortening procedure. All surgery was performed by MW or RWDB.

INTERLID COMPARISON IN UNILATERAL ENTROPION

The mean preoperative LLE of the entropic lid was 4.2 mm (SD 0.9, range 2–7), the mean preoperative LLE of the contralateral non-entropic lid was 4.6 mm (1.1, 2–7). There was no significant difference in the LLE when the entropic and non-entropic sides were compared $p=0.097$ (n=52).

The mean preoperative HLL of the entropic lid was 7.8 mm (2.2, 4–13), the mean preoperative HLL of the contralateral non-entropic lid was 7.6 mm (1.7, 5–12). There was no significant difference in the HLL when the entropic and non-entropic sides were compared $p=0.649$ (n=52).

POSTOPERATIVE CHANGE IN THE LLE AND HLL

The mean preoperative LLE of the entropic lid was 4.2 mm (1.0, 2–7), the mean (mean of 6,12, 24, and 48 month postoperative measurements) postoperative LLE was 4.3 mm (1.0, 2.7–7.0). There was no significant change in the LLE when the preoperative and postoperative values were compared $p=0.405$ (n=59; three deaths before the 6 month visit).

The mean preoperative HLL of the entropic lid was 7.8 mm (2.2, 4–13), the mean (mean of 6,12, 24, and 48 month postoperative measurements) postoperative HLL was 7.9 mm (1.6, 4.5–11.0). There was no significant change in the HLL when the preoperative and postoperative values were compared $p=0.602$ (n=59).

POSTOPERATIVE LID POSITION

At the conclusion of the study and after a mean follow up period of 31 months, the entropion had recurred in 9/61 (15%) eyelids. The cumulative failure rates were 4/62 (7%) at 6 months, 6/62 (10%) at 12 months, 7/62 (12%) at 24 months, and 9/61 (15%) at 48 months. There were no treatment failures in the group of five patients with recurrent entropion.

MORTALITY DATA
Cumulative mortality rates were 3/57 (5%) at 6 months, 8/57 (14%) at 12 months, 13/57 (23%) at 24 months, and 17/57 (30%) at 48 months.

For the comparison of the treatment success and failure groups see Table 1.

COMPlications
One patient developed an acute inflammatory reaction around each of the sutures which settled after a course of flucloxacillin. Two patients were noted to have a minimal degree of entropion at the 6 month visit which was
**Table 1** Comparison of the treatment success and failure groups

<table>
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<th>Success (no (%))</th>
<th>Failure (no)</th>
<th>p Value*</th>
</tr>
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<tr>
<td>Horizontal lid laxity (HLL)</td>
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<td>minimal (4–8 mm)</td>
<td>27 (82)</td>
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<td>Lower lid excursion (LLE)</td>
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<td>minimal (2–4 mm)</td>
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<tr>
<td>maximal (5–7 mm)</td>
<td>18 (78)</td>
<td>5</td>
<td></td>
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<tr>
<td>Patient age (years)</td>
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<tr>
<td>53–79</td>
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<td>80–95</td>
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<td>recurrent entropion</td>
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<tr>
<td>2nd half of study</td>
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<td>Surgeon</td>
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<tr>
<td>A</td>
<td>32 (89)</td>
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<tr>
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<td>21 (81)</td>
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*p* value determined using the *χ*² test.

Discussion

INTERLID COMPARISON IN UNILATERAL ENTROPION

This study did not demonstrate a significant difference in the function of the lower lid retractors or in the degree of horizontal laxity when the entropic and non-entropic lids were compared. Jones *et al.* described a loss of lower lid retraction movement accompanying down-gaze in involutional entropion and attributed this to an attenuation of the lower lid retractors. Both this study and that of Benger and Musch failed to demonstrate any such loss of retraction movement. The retention of normal vertical excursions by lower eyelids with involutional entropion parallels the retention of normal excursions by upper eyelids with involutional (aponeruognotic) ptosis. Benger and Musch demonstrated a significant increase in horizontal laxity in patients in whom the entropion was present for more than 6 weeks.

MECHANISM OF ACTION

Everting sutures plicate the attenuated lid retractors and transfer their pull to the anterior surface of the tarsal plate. They also create a horizontal barrier to the upward migration of the preseptal orbicularis. The permanence of the procedure depends on the creation of a fibrotic scar along the suture tracks. Seiff *et al.* demonstrated an aggressive fibrotic and inflammatory response in the tissues of the lower lid 2 weeks after the insertion of evertting sutures. We chose to leave the sutures unrinsed in order to heighten the inflammatory response and enhance the developing cicatrix.

POSTOPERATIVE CHANGE IN THE LOWER LID RETRACCTOR FUNCTION

Collin and Rathbun described a subjective increase in lower lid excursion after a Quick-ert’s entropion repair and interpreted this as evidence of an improvement in lower lid retractor function. As our quantitative method of assessing retractor function failed to distinguish the entropic from the non-entropic side it is perhaps not surprising that we failed to demonstrate any significant change in lower lid retractor function after the insertion of evertting sutures.

POSTOPERATIVE LID POSITION

At the conclusion of the study, the entropion had recurred in only nine of 61 (15%) lids with no treatment failures in the group of five patients with recurrent entropion. Recurrence of entropion following retractor tightening is almost exclusively associated with coexisting, uncorrected horizontal lid laxity. There was, however, no significant difference in the degree of horizontal lid laxity (or lower lid retractor function) present preoperatively when the treatment success and treatment failure groups were compared. Indeed, the treatment failure group demonstrated a smaller degree of horizontal lid laxity than the treatment success group (7.2 mm vs 8.1 mm). Neither the age nor the sex of the patients influenced the outcome.

CONCLUSION

Everting sutures can be inserted quickly, simply, safely, cheaply (the cost of each suture pack is £2.13) and often at the patient’s first appointment. As the overall mortality rate of 30% demonstrates, the vast majority of patients with entropion are elderly, often with many of the medical and social problems experienced by this group. In contrast with incisional lid surgery, anticoagulation therapy need not be omitted nor surgery delayed in the hypertensive patient.

There were no significant perioperative or postoperative complications. In the nine patients in whom the entropion recurred, no significant lid scarring was encountered during the repeat surgery (Quickert). The overall cosmesis was excellent, CMS was unable to detect which side had undergone the procedure in over 95% of cases examined (Fig 3). Our overall recurrence rate of 15% after 48 months of follow up is significantly higher than the frequently published recurrence rate of 0%26 29 30 following incisional surgery. These impressive results in part reflect the various authors’ oculoplastic interest and expertise.
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contrast, everting sutures can be quickly and correctly inserted by a practitioner with minimal surgical experience. There was no evidence of the presence of a learning curve nor a significant intersurgeon difference in outcome.

It is generally accepted that the long term likelihood of success of any entropion surgery (including everting sutures) is dependent upon the correction of the underlying impairment in lower lid retractor function. Benger and Musch demonstrated a significant increase in lower lid retractor function after the insertion of evert- ing sutures. Perhaps if we had chosen this method of measurement rather than the LLE we may have detected a quantifiable improvement in retractor function after the insertion of evert- ing sutures.

Based upon the results of this clinical trial, evert- ing sutures can be recommended in the management of lower lid involutional entropion, particularly for the group of patients mentioned above.

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