The Bulletin and Clinical Review of Burn Injuries

Official Publication of the International Society for Burn Injuries

TABLE OF CONTENTS Volume 11 Issue 3 July/August/September 1985

Published by INTERNATIONAL SOCIETY FOR BURN INJURIES
2005 Franklin Street; Building 2, #600, Denver, Colorado 80205 USA

Printing by EXPRESS PRESS, INC.
Denver, Colorado 80224

Cover Design & Typography by BEACH COMMUNICATIONS, INC.
Denver, Colorado 80209

Early Release and Autografting of Burn Wound Ectropion

Laurence A. Kirwan M.B., Ch.B., F.R.C.S. (Eng.)
Clinical Instructor in Hand Surgery, Department of Hand Surgery, University of Colorado Health Sciences Center, Denver, Colorado

Introduction

Partial and full thickness burns of the eyelids may contract and cause ectropion. In the early stages, ectropion may result from tethering of the lid by coagulum or adherent eschar. In the later stages, burn contracture, particularly of the upper eyelid, is the cause.

Ectropion prevents closure of the eye in repose (Fig. 1, a and b) causing exposure of the unprotected cornea. Ulceration, perforation, opthalmitis, blindness and loss of the eye may result if vigorous protective measures are not undertaken.[1]

Schofield reviewed 144 cases of eyelid burns and concluded that "corneal burning is extremely rare in flash burns and unusual in flame burns and that in nearly every case, ulceration of the cornea is the result of exposure and infection and is therefore preventable".[8]

Thermal injuries to the globe are almost invariably associated with full thickness skin loss of the eyelids. The globe is usually extensively damaged and ultimately destroyed.[6,7] In the case of flash burns, the globe may be burned before the eyelids have time to close. Full thickness skin, eyelid burns may occur with or without ocular injury (Fig. 2). Partial thickness burns are usually associated with an undamaged globe. In cases in which there is no thermal injury to the globe, ocular injury results from inadequate postburn care, not from the burn.

Two questions are significant in deciding on the relative merits of early or late release and autografting of burn wound ectropion.

1. Is early grafting associated with a recurrence of ectropion?
2. Do grafts fail in the presence of an unhealed, contaminated or infected burn?

To answer these questions, eight upper eyelids in four patients were grafted between 7 and 20 days postburn. All grafts survived. Three patients died from burn wound sepsis. In the one surviving patient, no evidence of recurrence of ectropion was seen after six months.

Surgical Technique

Release and autografting was performed between 7 and 20 days postburn. The indication for surgery was burn wound ectropion, uncorrectable by simple removal of eschar and coagulum, and exposure of the cornea with the eyelids in repose. Eight upper eyelids in four patients were treated. Grafting was performed according to the method of Falvey.[4] This entailed a generous release. In addition "fish tail" incisions were made at the medial and lateral edges to limit the width of the release. Autograft was inset into the resultant defect. The generous size of the graft allowed for the inevitable contracture that followed.

Falvey describes the use of full thickness skin. We prefer split thickness grafts since full thickness grafts appear too bulky for the upper eyelid. Wound contraction does not appear significantly different with either technique.

Case Report

A 27 year-old white male, injured by a gas explosion, sustained bilateral partial thickness burns to all four eyelids. The total burn was 95% Body Surface Area / 63% Full Thickness. Early bilateral ectropion resulted from inadequate upper lid closure. Initial debridement of eschar (post burn day 5) resulted in correction of the ectropion (Fig. 3a). The ectropion recurred. On post burn day 20, removal of the eschar failed to correct the ectropion and release and autografting of the upper eyelids was performed. There was complete take of the graft. A ptosis of the left eyelid was noted postoperatively which is improving slowly (Fig. 3b). There has been no recurrence of the ectropion and no corneal injury (Fig. 3c). The remaining burns are healed following excision and autografting.

Results

There was complete take of all eight autografts. Three patients died from burn wound sepsis. The surviving patient had no evidence of recurrence of this ectropion six months after surgery.

Complications

A single complication was noted, that of ptosis in the left eye of the patient described. This should correct as the scar matures. It has been noted that "levator release can safely be done over the tarsal plate, or even above it, through to the conjunctiva without fear of ptosis — because of the muscle's multiple attachments to the orbicularis, the skin and the orbital septum. The levator does not escape; functionally, it regains full attachment through the scar bed under the graft".[4]

Discussion

Thermal injuries to the glove are unusual. Ectropion is a common sequel of eyelid burns with risk of significant ocular damage secondary to corneal exposure. Prevention is the best cure. Current dogma states that correction (release and autografting) of burn wound ectropin be performed late in the post-burn period (six weeks or later). Both non-surgical and surgical remedies are recommended to protect the eye in the early post burn period. These are:

Nonsurgical: Methyl-cellulose eye drops by day and ocular lubricant by night; liquid plastic films, soft contact lenses and moist chambers such as an inverted watch glass over the eye.[6,7]

Surgical: Tarsorraphy.

Non-surgical methods are time-consuming and require prolonged and intensive nursing care. Frequent expert opthalmologic assessment and early recognition of corneal injury is essential.

Silverstein commented on the inability of tarsorraphy to prevent burn wound contracture and the banjo-string deformity that frequently results[9] (Fig. 3). Converse emphasized the damage that tarsorraphy may cause to the ciliary margins.[3]

Tarsorraphy creates a closed space in the presence of contaminated or infected burn. In addition, the conjunctival sac becomes inaccessible for the purpose of cleansing and instillation of medications. Leaving a central "porthole" is inadequate for this purpose.

Skin grafting, according to the method of Falvey, is a simple procedure allowing one to graft all four eyelids simultaneously, if indicated, without impairment of access to the conjunctival sac. Postoperatively, the patient is still able to see between his grafted eyelids and is not sensory deprived.

Mustarde recommends correction of the ectropion when the eyelids are well healed (6 weeks to 6 months post burn).[5,7] Huang comments that even after late release and grafting (6 to 8 months post burn) recurrence of the ectropion is common, necessitating rerelease and regrafting.[5] However, this may be a reflection of technique rather than timing.

Early grafting, as performed by the method of Falvey, prevents prolonged corneal exposure, corrects ectropion and has not been associated with recurrence of ectropion. If further correction is required, there is no evidence to indicate that results would be less satisfactory than those obtained from late release.

There was a one hundred percent take of all eight grafts in the presence of unhealed, contaminated or infected burn (Fig. 5). Burns made a similar observation i.e., that grafting eyelid burns is successful in the presence of burn wound sepsis.[2] Therefore:

1. Early grafting of burn wound ectropion appears to be effective. However it impossible to say from this small sample and short follow up, what percentage of cases will require further release and autografting. Three out of the four patients in the study subsequently died from their burns. Better selection of patients who are likely to survive their burn injury may improve these results. Since the outcome may not be predictable, there may always be patients who fail to survive, if an aggressive program of early release and autografting is to be followed.
2. Grafts take in the presence of unhealed burn.

Recommended Management

A complete initial ophthalmological evaluation is mandatory to rule out corneal injury and establish a baseline. The cornea can be examined despite edema of the eyelids, retracting them with the loop of a bent paperclip or an eyelid retractor.

In the early post burn period, edema of the eyelids and conjunctiva protects the cornea and gives the physician a false sense of security. During this period, the conjuctival sac should be irrigated with methyl-cellulose eyedrops q 2h, by day, and ocular lubricant ointment (boric acid) instilled at night. When the edema resolves (3-5 days post burn) the corneas are re-examined and the degree of ectropion assessed. Both should be followed on a daily basis. When the degree of ectropion is such that the cornea is exposed when the eyelids are in repose and this is not corrected by removal of eschar or coagulum at the bedside, surgical release and autografting should be performed within 48 hours.

Summary

Thermal injury to the glove is rare. Full and partial thickness skin loss eyelid burns are usually associated with an intact undamaged globe. Ocular injury may result from burn wound ectropion followed by exposure and neglect. It is preventable. Early conservative (non-operative) measures or tarsorraphy are often unsatisfactory. Recurrence of ectropion may follow late release, though this may be a result of technique rather than timing.

In the author's experience, early release and autografting corrects the ectropion and may not require revision. All autografts survived in the presence of unhealed, contaminated or infected burn.

References

[1]Asch MJ, Moylan JA, Bruck HM, Pruitt BA: Ocular complications associated with burns: review of a five year experience including 104 patients, J Trauma 11:857-861, 1971.

[2]Burns CL, Chylack LT Jr.: Thermal burns: the management of thermal burns of the lids and globes, Ann Opthalmol 11:1358-68, 1979.

[3]Converse JC: Ectropion, in Reconstruction and rehabilitation of the burned patient, Feller I, Grabb WC (eds) National Institute of Burn Medicine Ann Arbor, Michigan, 1979 pp. 142-149.

[4]Falvey MP, Brody GS: Secondary correction of the burned eyelid deformity, Plast Reconstr Surg 62: 564-570, 1978.
[5]Huang TT, Blackwell SJ, Lewis SR: Burn injuries of the eyelids, Clinics in Plastic Surgery 5: 571-581, 1978.
[6]Mustarde JC: Reconstruction of the eyelid, in Reconstruction and rehabilitation of the burned patient, Feller I, Grabb WC (eds) ibid. pp. 136-141.
[7]Mustarde JC: Full thickness loss of the eyelid, ibid. pp. 150-153.
[8]Schofieeld AL: A review of burns of the eyelids and their treatment, Brit J Plast Surg 7:67-91, 1954.
[9]Silverstein P, and Peterson HD: Treatment of eyelid deformities due to burns, Plast Reconstr Surg 51: 38-43, 1973.

Acknowledgements

I would like to thank Dr. John A. Boswick, Jr. for his advice and encouragement in preparing this paper.

Figure 1. Early burn wound ectropion caused by coagulum and eschar; preventing closure of the eye in repose.

a. eyes open

b. eyes closed

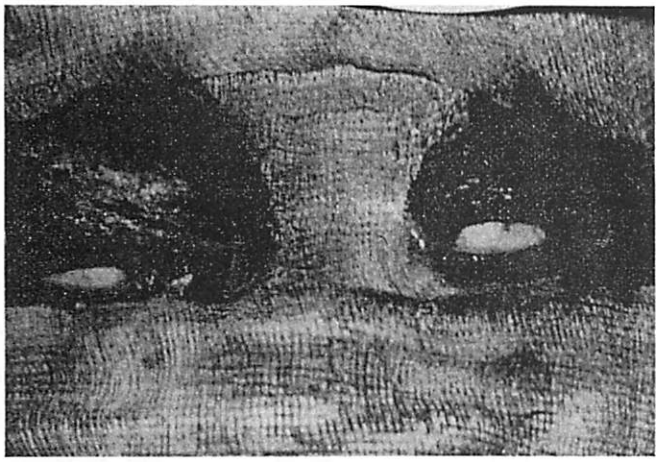
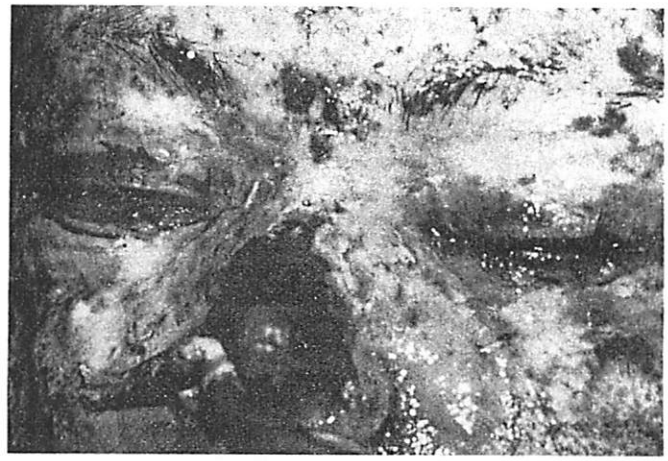


Figure 2.

a. full thickness burn of eyelids and adjacent skin.



b. intact undamaged globe despite full thickness burn of eyelid.

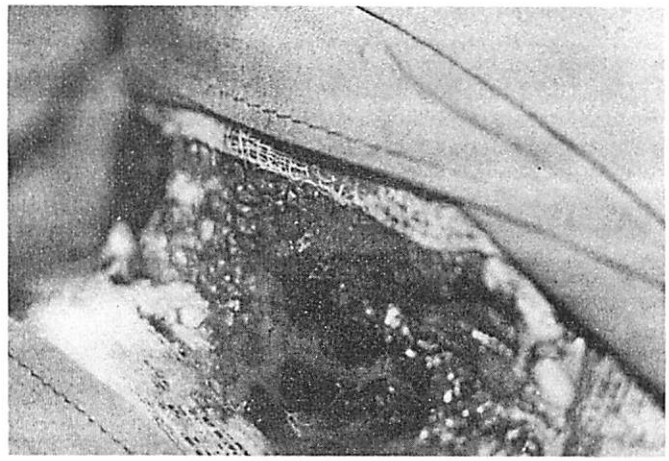


Figure 3.

a. Early debridement of eschar resulted in correction of ectropion.

Figure 3.

b. Results of 6 months after release and autografting: eyes open. Note ptosis on left side.

c. Eyes closed: no corneal exposure.

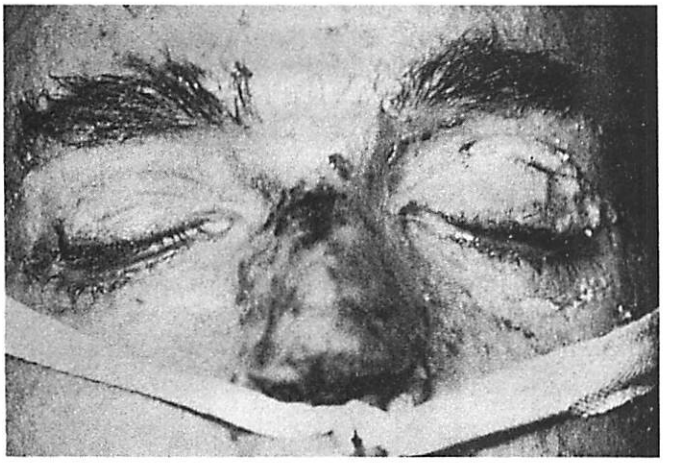


Figure 4. "Banjo strings" following tarsorraphy.

Figure 5. Complete take of autograft in the presence of unhealed contaminated burn.