Original Article

Single Sheet Skin Graft Coverage as Treatment of Post Burn Ectropion of Eyelids

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ABSTRACT

Objective: To describe the results of single sheet skin grafting after release of post burn contracture in both eye-lids of same eye. **Study design**: case series **Place and duration of study:** Department of Plastic Surgery and Burns, Allied hospital, PMC, Faisalabad from July 2012 to March 2014. **Methodology**: All the patients with post burn contracture of upper and lower lid contracture of the same eye who presented in OPD and were operated for contracture release followed by coverage with single split thickness sheet graft (STSG) , were included in the study. Variables considered were age, gender, mechanism of burn injury and histories of previous surgeries for the same problem. Outcome measures were studied in terms of improvement of contracture release, complications, recurrence and patient satisfaction.

Results: A total of 24 patients were included in study. Male to female ratio was 2:1, age ranged from 19 to 45 years. 16 patients presented with history of flame burn, 05 patients were with scald burn and 03 were chemical burn contractures. All of them were operated for upper and lower lid contracture release of same eye with skin graft coverage with a single sheet of STSG. There were improvements in eye lid closure, recurrence rate was very less and all of the patients were satisfied with the results. Complications occurred in 20 % of patients including partial graft failure and irritation in eye.

Conclusion: Sheet graft coverage after post burn contracture release of upper and lower eyelids is an effective procedure for durable correction and to prevent recurrence of contracture.

Key words: post burn contracture, ectropion, split thickness skin graft, sheet graft coverage

INTRODUCTION

Eye lids are the protective mechanism for eyes, and the upper and lower eyelids have been designed for their specific functions specially the protection of globe[1]. Eyelid involvement is common in facial burns.[2] Approximately 15-20 % of patients with facial burns exhibit ocular injuries[2,3].

One of the most common causes of loss of eye lid is burn injuries. In these injuries cornea initially escapes the injury but after developing upper and lower lid contractures the cornea gets involved secondarily.[1]

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Early eyelid surgical management is critical for the protection of cornea[2,3,4], and management of post burn ectropion is a challenge for oculo-plastic surgeon[3]. Inadequate reconstruction of eyelids may produce corneal exposure and sight threatening keratopathy[4, 5]. These secondary complications are preventable by appropriate early and sustained management[6]. Various techniques have been practiced for the burn reconstruction of face, head and neck, such as scar revisions, split thickness skin grafts, full thickness skin grafts, composite grafts, pedicle flap, and tissue replacements[5,7]. For release of eyelid contractures, it has been recommended that the area should be covered with split thickness skin grafts along with tarsorrhaphy of eyelids[3]. The procedure involved the release of contracture and upper and lower lids were united by tarsorrhaphies[8]. Recent studies are not in favour of tarsorrhaphy and they recommend early skin grafting[2].

Ectropion release of upper and lower lids with a single sheet graft of split skin has been used in our patients with graft acting as splint for eyelids as well. Sheet graft is incised and eyes are fully opened after 06 months of initial post burn ectropion release and patients showed better outcome in-terms of contracture recurrence.

MATERIALS AND METHODS

This is a prospective study of patients presented to the Department of Plastic Surgery and Burns, Allied hospital, PMC, Faisalabad, from July 2012 to march 2014 with upper and lower lid ectropion. All the patients who underwent single sheet split thickness skin grafting after release of upper and lower lid ectropion of same side were included in the study. Exclusion criteria were patients who had single lid ectropion or those who lost to follow up. A total of 24 cases were operated upon. The clinical data including the history, clinical findings, investigations and follow up notes of the patients were recorded. Detailed history and clinical examination of patients were done on their first visit. Examination included the visible deformity of eyelids and face, scars of burn and previous surgeries, along with intraocular examination by the ophthalmologist.

Blood complete picture, liver status, bleeding and clotting profile and pre-anesthesia evaluation were taken from relavant departments. Patients were admitted at least 02 days before surgery and detailed counselling of the procedure was done by the members of the operating team and all patient querries were answered satisfactorily. Detailed explanation of the chances of recurrence, partial closure of eyelids, advantages of binocular vison and long term post-operative follow up with physiotherapy and lubricant massage was explained.

Each patient received at least 03 doses of prophylactic antibiotics, one prior to surgery at the time of induction and 02 in the postoperative time. Patients were operated in supine position and the area was infiltrated with 0.5% xylocain with adrenaline (1:200,000) solution minimus of 15 minutes before the start of procedure. Corneal protective covers were used to avoid any injury to cornea and eyelashes were trimmed and antibiotic ointment was instilled into eyes. Incision was given at the edge of eye lashes line junction with skin at both upper and lower lids and contractures were released with full expansion of lids in centre with some over correction in upper lid sparing the underlying remaining structures of anterior lamellae of eye lids. haemostasis was done completely and the area was kept moist during the procedure. After complete release of ectropion the protective covering of cornea was removed from the eye. Split thickness skin graft (STSG) of thicker variety was taken preferably from inner side of right or left arms, or as on availability of normal skin for a better color match and lesser post operative contracture of the graft. Sheet graft was spreaded over the combined raw area of upper and lower eye lids and secured with silk 4/0 sutures. A small window was made in sheet graft in the area of pupil for central vision. Wounds were properly closed and Anti-septic dressing was done on both donor and recipient areas. Patients were monitored in recovery period and all necessary post operative measures were taken. Dressing on eye was opened on 3rd post operative day in all patients and findings were noted. Patients were discharged on 7th to 9th post operative day after silk stitches removal and were advised for follow up weekly for 1 month and then monthly for five months. In the mean time physiotherapy and lubricant massage was started. After completion of 06 months the patients were called in operating room as day surgery and the sheet graft was split open under local anesthesia and eyes were washed, antibiotics instilled and patients were sent to home with follow up after three days.

Data was collected in terms of patient age, gender, mechanism of injury, history of recurrence, complications and patient satisfaction. Complications were divided into two groups of early complication i.e., within 28 days of surgery and late complications i.e., after 28 days of surgery, including complication related to grafting and complications related to eye ball. Follow up visits were properly schadualed and on their visit patients were asked about improvement of eyelid closure and their satisfaction.

Analysis was made from the data using statistical package for social sciences version 16.0.

RESULTS:

A total of 24 (n = 24) patients were included in the study. Male to female ratio was 2:1. Age range was 19 to 45 years (table 1). 16 patients presented with history of flame burn, 05 patients were with scald burn and 03 patients presented with history of chemical burn (table-1). The patients with chemical burn were having severe degree of contracture in comparison to the flame and scald burn. All patients were operated as early as possible to avoid cornea problems like exposure karatopathy. Six patients were attempted for contracture release at other places and recurrence was developed so they were treated with same procedure.

Coverage after Contracture release with sheet graft of STSG with central window was done in all patients. Most of the patients had complaints of inability to close eyes with normal force and watering of eyes with irritation. Only 02 patients were with early corneal involvements. 100% patients got contracture release with graft cover in which partial failure of graft was observed in 02 patients(8.3 %) out of which 01 patient was of chemical burn (4.17 % of total).

Recurrence was observed in 03 patients (12.5%) and most of the patients were satisfied with the procedure (83.3%) while 04 patients(16.66%) complained of double vision with difficulty while walking. 03 patients (12.5%) complained about irritation inside the eye after about 28 days of procedure. (Table-2)

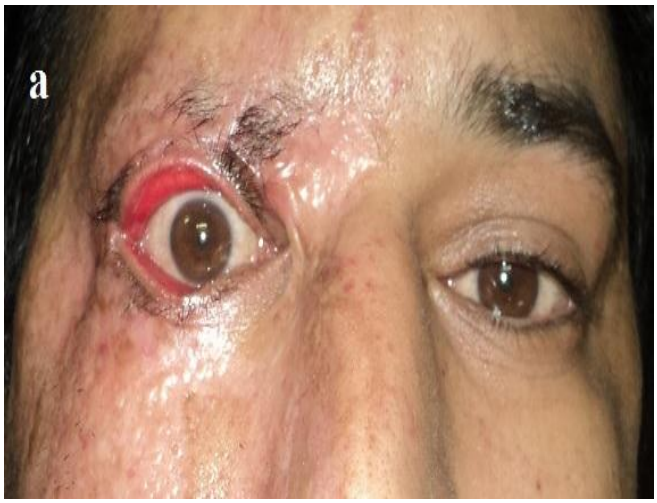
Total hospital stay of patients was from 09 to 15 days and they were followed uptil minimum of 06 months after surgery.

Table 2: Complications

Complications	**Early** (percentage)	**Late** (percentage)
Graft failure	02 (8.2%)	NIL
Irritation in eyes	NIL	03 (12.50%)
Double vision	NIL	04(16.66%)
Recurrence	NIL	03 (12.50%)

Table 1: Patient Data

Serial No.	**Patient age**	**Gender**	**Mechanism of injury**	**Previous surgery**
01	34	Male	Flame burn	No
02	22	Male	Flame burn	No
03	33	Female	Flame burn	No
04	30	Male	Chemical burn	Yes
05	22	Female	Scald burn	No
06	25	Female	Flame burn	No
07	21	Male	Flame burn	No
08	19	Female	Scald burn	No
09	26	Male	Scald burn	Yes
10	39	Male	Flame burn	No
11	32	Male	Flame burn	No
12	39	Male	Flame burn	No
13	43	Male	Flame burn	Yes
14	41	Female	Chemical burn	No
15	37	Female	Flame burn	No
16	41	Male	Scald burn	No
17	44	Male	Flame burn	No
18	29	Female	Chemical burn	No
19	31	Female	Scald burn	Yes
20	36	Male	Flame burn	Yes
21	27	Male	Flame burn	No
22	45	Male	Flame burn	No
23	23	Male	Flame burn	No
24	22	Male	Flame burn	Yes


a


b


c


d


e


f

Figure: 1st patient pre-operatively eyes open**(a),** preoperatively eyes close**(b),** 06 months post operatively eyes open **(c),** 06 months postoperatively eyes close **(d),** eyes open after incision **(e),** eyes close after incision **(f),** **2nd** patient pre-operative eyes open **(g**), pre-operative eyes close**(h),** per-operative sheet graft coverage with slits in center **(i),** 08 months post operative eyes open **(j),** 08 months post-operative eyes close(**k).**

DISCUSSION:

This study describes a new introduction in the field of eyelid contracture surgery and avoidance of its recurrence. Developing a contracture and then seeking its treatment without understanding and complying with the important role of post operative stretching exercises is very common in general public in Pakistan.

On the other hand early surgical intervention is indicated as the contractures involving eyelids leads to exposure of cornea and ultimately cornea damage[4]. About 30-60% of eyelid burns develop eyelid ectropion leading to cornea exposure and ultimately leading to corneal ulceration, corneal perforation and loss of vision[2,6] along with loss of cosmetic disfigurement of face[9]. Also it is evident that hairless skin of eyelids gets deeper burns as compared to hair bearing skin of face and scalp so developing a severe contracture or ectropion[6]. Other techniques for dealing with this problem are

to release the contracture, close the eye with tarsorrhaphy and coverage with full thickness or split thickness skin grafts[8]. In this technique patients have trouble in 3D vision and may hinder in their daily routine work and trichiasis at the site of tarsorraphy irritates the cornea[3]. Furthermore tarsorrhaphy leading to sharing of most of stretching force of eyelids and may not transfer them to the grafted area ultimately leading to contracture development after opening of tarsorrhaphy stitiches. Another important disadvantage of tarsorraphy is the surgeons inability to inspect the eye for four months and it is very inconvenient for the patient of having one eye closed for a long period of time[10].

Reconstruction of face especially contractures and scars of peri-orbital area remain the most challenging for the plastic surgeons[3,7]. Reconstruction of sequel and deformities may take several years and in the mean time plastic surgeons develop multiple plans for impartment of patient's problems[7]. The simplest option to deal with a contracture is the release and graft the site[11.] Another widely used method is to hold the lid with traction sutures post operatively[12.] All these methods include dealing with one lid at a time but if patient has contracture involving both upper and lower lid, then tarsorrhaphy has to be performed resulting in loss of 3D vision for a few months. Further more tarsorraphy has generated more controversy than any other procedure because of high incidence of breakage and now it is largly abandoned[6].

Patients with contracture of both upper and lower eyelids need early intervention for saving the cornea and eyesight. In our patients, the results of contracture release with graft were much better than previous techniques as the stretching of the grafted is area was provided naturally by the blink reflex and movement of eyeball. Also the important factor was to keep the 3D vision patent, and patients were able to continue their daily activities as usual. Release of contracture was done in both eye lids with complete release of anterior lamella and saving the maximum part of levator pelpebri superioris which is the major retractor of upper eyelid, similarly in lower lid the strips of inferior ractus and inferior tarsal muscle[13] were saved. Patients with chemical injuries were having very bad contractures and took more time for release of lid from contracture fibrosis. Generally it is thought that eyelid contracture need repeated surgeries for final outcome and subsequent relieve of eyelid traction[6]. Plastic surgeons are well aware of ectropion formation and its recurrence, so they show great caution & perform their procedure very precisely.

Only 02 patients had partial graft failure for which area was so small that revision of the procedure was not favourable. The graft success in this area is due to small size of grafts and abundant blood supply in peri-orbital region[14] and precisely applied sutures for fixation of graft[15].

CONCLUSION

Post burn contracture of upper and lower eyelid of the same eye can be released and grafted with single sheet of STSG with a central hole for saving the central and 3D vision. This procedure is better and effective than the release of contracture followed by grafting and tarsorrhaphy in which 3D vision is lost for minimum of 4 months. Further research in this procedure is continued.

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