Use of Cyanoacrylate Glue Casting for Stabilization of Periocular Skin Grafts and Flaps

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Purpose: To examine a novel technique for periocular skin graft and flap stabilization using cyanoacrylate glue applied to the host bed around the perimeter of the graft or flap to create an immobile cast in the immediate postoperative period to promote successful graft take and stable anatomic position.

Methods: Retrospective review was performed of a single surgeon's patients who underwent periocular skin graft or flap between August 1, 2011, and February 29, 2016, in which cyanoacrylate glue was applied postoperatively for graft stabilization. Data examined included indication for procedure, location and size of graft, postoperative complications, and length of follow up postoperatively.

Results: Of 164 cases reviewed, 9 cases were identified in which cyanoacrylate glue was used as the sole means of graft or flap stabilization. Indications for surgery included repair of cicatricial ectropion (3 cases) and repair of Mohs defect status after excision of basal or squamous cell carcinoma (6 cases). All cases involved reformation of the lower eyelid. Five cases employed full-thickness skin grafts and 4 cases employed adjacent tissue rearrangement. Size of defect repaired ranged from 8 mm to 35 mm when largest diameter was measured. Complications included mild residual ectropion or mild punctal ectropion in 2 patients who was asymptomatic and did not require further surgery. No cases were complicated by hematoma, infection, or graft necrosis.

Conclusion: Cyanoacrylate glue can be used to successfully stabilize skin grafts and flaps in the immediate postoperative period.

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Successful skin grafting relies on numerous factors including careful selection of host tissue, proper preparation of the graft and host bed, and postoperative immobilization to ensure successful graft take. Traditionally, full-thickness skin grafts and flaps have been stabilized in the immediate postoperative period with pressure patches and/or bolstering.[1,2] Periocular skin grafts, specifically those involving the eyelids, have unique postoperative requirements as close apposition to the globe is a mandate for preserved corneal integrity and visual function. These grafts have historically been managed with frost sutures in which the lower eyelid is stented upward by the placement of a suture through both the upper and lower eyelids and secured at the brow.[3]

This article will examine a novel technique not previously described in the literature in which cyanoacrylate glue is alternatively used in periocular grafts and flaps to promote not only successful graft take but also proper eyelid position and function.

METHODS

After obtaining institutional review board approval and in compliance with Health Insurance Portability and Accountability Act of 1996 (HIPAA), retrospective review was performed of a single surgeon's (R.M.) patients at the University of Texas Southwestern Medical Center and Parkland hospitals undergoing periocular skin graft or flap between August 1, 2011, and February 29, 2016. Medical records of patients who had undergone surgery in which cyanoacrylate glue was used as the sole means of tissue stabilization were selected for further review. Patients were excluded from review if cyanoacrylate glue was not used or if pressure patching or bolstering was additionally employed for graft stabilization. Data examined included indication for procedure, location and size of graft, postoperative complications, and length of follow up postoperatively. Pre- and postoperative photos were also examined and included in this article with signed consent obtained from the patient.

Surgical Technique. A full-thickness skin graft or flap was harvested/mobilized in the usual fashion for appropriate repair and sutured in

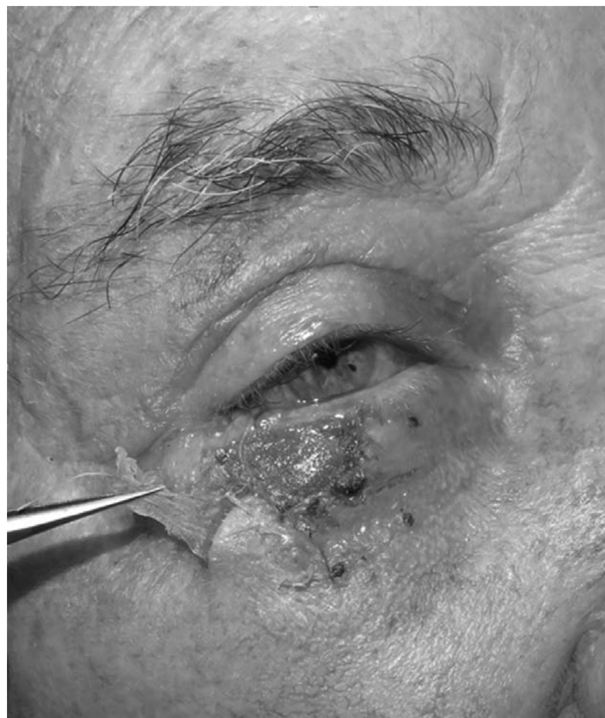

FIG. 1. Photograph demonstrating removal of cyanoacrylate glue cast at postoperative day 7.

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Selected details of qualifying cases

Donor site	Host site	Graft size	Indication	Complications	Postoperative follow up (months)
RUL	LLL	$15 \times 8\,mm^2$	LL cicatricial ectropion	Mild residual ectropion	29
LUL	LLL	—	Mohs defect BCC	None	3
LUL	LLL	—	LL cicatricial ectropion	None	35
LUL	RLL	$8 \times 8\,mm^2$	Mohs defect SCC	None	24
BUL	BLL	$35 \times 10\,mm^2$ and $35 \times 5\,mm^2$	Ectropion-involutional/cicatricial/ anterior lamellar insufficiency	None	6
RLL ATR	—	—	Mohs defect BCC	None	3
RLL ATR	—	20 mm	Mohs defect SCC	None	6
RLL ATR	—	—	Mohs defect BCC	Mild medial punctal ectropion	4
LLL ATR	—	¼ eyelid margin	Mohs defect BCC	None	3

ATR, adjacent tissue rearrangement; BCC, basal cell carcinoma; BLL, bilateral lower eyelid; BUL, bilateral upper eyelid; LLL, left lower eyelid; LUL, left upper eyelid; RLL, right lower eyelid; RUL, right upper eyelid; SCC, squamous cell carcinoma.

place with interrupted sutures (6-0 fast absorbing gut). Cyanoacrylate glue was then applied around the perimeter of the graft or flap to stent the normal surrounding lower eyelid tissues in an immobile cast in the immediate postoperative period. A key feature of the technique involves placement of the glue at the perimeter of the graft or flap on the normal adjacent tissue. The glue is not placed on the graft itself or graft host junction to avoid any potential interference with graft vascularization and take. This casting of the surrounding normal tissues during healing prevents excessive movement or corrugation of the graft secondary to orbicularis contraction and skin movement of these surrounding tissues during graft take. Cyanoacrylate glue was manually removed from all patients at postoperative day 7 (Fig. 1).

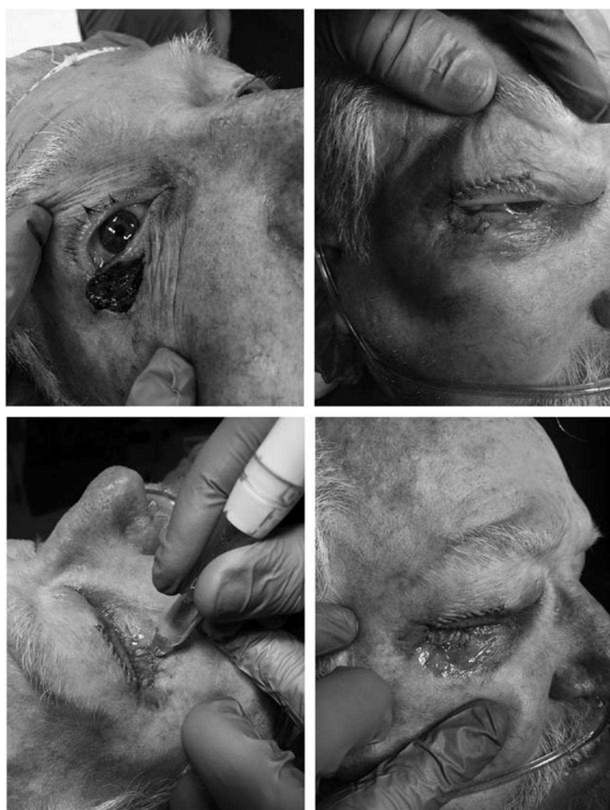

FIG. 2. Composite of intraoperative photographs demonstrating technique. **Top left**, Status after Mohs excision of squamous cell carcinoma. **Top right**, Status after adjacent tissue rearrangement with reformation of right lower eyelid. **Bottom left**, Application of cyanoacrylate glue around graft site to immobilize lower eyelid. **Bottom right**, Status after cyanoacrylate glue placement

RESULTS

One hundred sixty-four individual patient medical records were reviewed. Of these, 9 met the inclusion criteria (Table). Indications for surgery included repair of cicatricial ectropion (3 cases) and repair of Mohs defect status after removal of basal cell carcinoma or squamous cell carcinoma (6 cases). Five cases involved the use of free full-thickness skin grafts. All grafts were harvested from the contralateral or same side upper eyelid. Local advancement flaps were employed in 4 cases, all of which involved reformation of the lower eyelid. Size of defect repaired ranged from 8 mm to 35mm when largest diameter was measured. Pre- and postoperative pictures are included (Figs. 2 and 3) of one patient in whom cyanoacrylate glue was employed to stabilize a Frick-type flap harvested from the right upper eyelid and repositioned to reform the right lower eyelid status after Mohs excision of squamous cell carcinoma.

Time of postoperative follow up ranged from 3 to 35 months with all grafts showing viability at the last clinic visit. Complications included 1 patient with mild residual ectropion and 1 patient with mild medial punctal ectropion, neither of which was symptomatic or required further surgery. No cases were complicated by hematoma, infection, or graft necrosis.

DISCUSSION

This article examines a novel technique using cyanoacrylate glue for periocular skin graft and flap stabilization. Unlike pressure dressings and bolsters, cyanoacrylate glue allows for

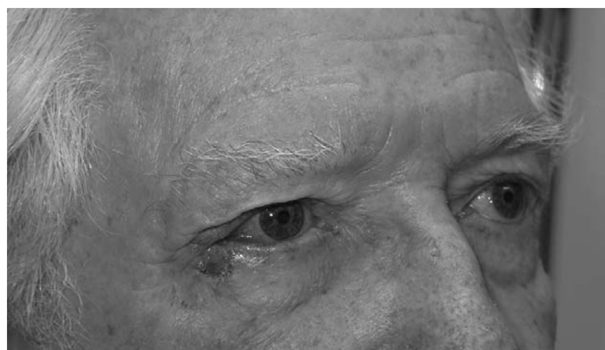

FIG. 3. Postoperative photograph. Same patient 1 week status after Mohs excision of squamous cell carcinoma with adjacent tissue rearrangement and reformation of right lower eyelid; flap is healing well with preserved eyelid contour and position.

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direct visualization of the skin graft. This allows for early recognition and management of potential postoperative complications such as hematoma/seroma formation or necrosis. Several studies have successfully demonstrated full-thickness skin grafting without bolstering for grafts <5 cm in length in areas of low tension.[3–5] However, to our knowledge this is the only study to use cyanoacrylate glue alone as an immobilizing cast in the periocular region to promote graft stabilization and prevention of corrugation during healing. The use of cyanoacrylate glue as an alternative to suturing periocular skin grafts in place has been described, but this is the first study to describe the use of cyanoacrylate glue as an alternative to pressure patching. In our cases, the cyanoacrylate glue was applied to the host bed around the graft (not at the interface) to create a scaffold promoting graft take, not to attach the graft to the host bed.[6] All grafts or flaps in this study were sutured, not glued, in place.

In this article, we demonstrate that cyanoacrylate glue, like the frost suture, can be successfully used to stent the lower eyelid in place in an upward position so that it rests properly against the globe and minimizes movement and corrugation during graft take. Unlike the frost suture, however, cyanoacrylate glue allows for the preservation of visual function in the immediate postoperative period. This is an important advantage in those monocular patients in whom the affected periocular tissues surround the better seeing eye.

In summary, for repair of full-thickness defects, particularly of the lower eyelid, cyanoacrylate glue is a viable means of postoperative graft or flap stabilization and offers some unique advantages over traditional methods of tissue immobilization in select cases.

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