Aesth. Plast. Surg. 16:269–272, 1992

Aesthetic Plastic Surgery

Minimal Suture Blepharoplasty: Closure of Incisions with Autologous Fibrin Glue

Mark A. Mandel, M.D.

Los Angeles, California, USA

Abstract. Blepharoplasty incisions can be closed safely with autologous fibrin glue. The fibrinogen, prepared either from a whole-blood or plasmapheresis source, is mixed with commercially available thrombin to form a seal that is both hemostatic and adhesive. The complication rate is low and primarily due to technical factors in the initial cases. When compared with standard suture techniques, the incidence of minor problems such as milia formation was much lower. In select cases, the technique of using fibrin glue and a minimal number of sutures may be useful as an alternative method of would closure in blepharoplasty patients.

Key words: Blepharoplasty—Fibrin glue closure

The closure of eyelid incisions can result in the development of suture cysts, granulomas, and poor quality scars. Many of these problems are the result of reaction to suture material [11]. The current study is concerned with blepharoplasty closure using autologous fibrin glue and a minimal number of sutures. The questions raised are whether fibrin glue has sufficient adhesive strength to obviate the need for a large number of sutures and what complications can result from this alternative method of would closure.

Presented at the annual meeting of the American Society of Aesthetic Plastic Surgery, April 30, 1990, New York, NY, USA

Address reprint requests to Mark A. Mandel, M.D., 950 South Fairfax Ave., Los Angeles CA 90036-4419, USA

Materials and Methods

Thirty two patients have had their blepharoplasty incisions closed with autologous fibrin glue with a followup period of 6 to 18 months. The initial group of 16 patients had fibrinogen prepared from a whole-blood source; all of these patients had other major procedures (i.e., liposuction) done concomitantly with the blepharoplasty and were felt to require red cell replacement. More recently patients undergoing blepharoplasty, either alone or in conjunction with procedures during which small amounts of blood are lost (e.g., rhytidectomy), have had fibrinogen obtained by plasmapheresis. In this technique, 500 mL of plasma are collected over 20 minutes using an Autopheresis C 200 machine (Baxter Health Care Corp., Deerfield, IL, USA). The cellular components are returned to the donor. Once the plasma is collected, from either the whole-blood or plasmapheresis source, fibrinogen is harvested by cryoprecipitation. The plasma is flash frozen to −85°C and then slow thawed in the refrigerator for 16 hours. The large fibrinogen molecule will precipitate and then can be concentrated by centrifugation. The final preparation can be kept frozen until needed.

Thrombin is available commercially (Parke-Davis, Morris Plains, NJ, USA). At the time of surgery, 10,000 units of thrombin in 10 mL of saline are put in one syringe; 10 mL of fibrinogen concentrate are drawn into a second syringe. A common Y-shaped delivery tube allows for mixing of equal amounts of these preparations. Drops of this mixture are placed on the wound and the fibrinogen and thrombin interact to instantly form fibrin monomer. In the presence of Factor XIII, polymerization rapidly occurs (within 15–30 s) and sufficient adhesive strength exists to maintain wound coaptation.

The control group of 32 patients had their blepharoplasty incisions closed by the standard suture technique [12]. These patients were treated concurrently with the fibrin glue group during a 15-month time frame.

Case Report and Results

A 48-year-old woman underwent a combined procedure consisting of upper- and lower-lip blepharoplasty, coronal lift, abdominoplasty, and liposuction. The eyelid incisions were closed using a minimal number of sutures. The excess skin of the upper eyelid at the time of surgery, prior to would closure, is seen in Figure 1A. A few sutures were positioned in the lateral aspects of the eyelid (Fig. 1B). The wound edges were approximated and then the fibrinogen–thrombin mixture was applied via a dual-syringe system. Cotton applicators were used to hold the edges together until sufficient adhesive strength was present. At the end of the procedure, a fine hazy film covered the would closures (Fig. 1C). The results one year after surgery are seen in Figure 1D.

Thirty two patients had blepharoplasty closure performed using autologous fibrin glue. Complications were few and consisted primarily of wound separation (Table 1). This occurred twice in the operating room and once in the recovery room and was easily corrected by application of additional fibrin glue and several fine sutures. Complications including milia and suture granulomas were not found, but a poor quality scar was noted in one patient. In contrast, significant numbers of control patients whose wounds were closed by me during the same time interval using standard techniques [12] developed milia and other minor wound complications ($p < 0.01$).

Discussion

Use of autologous fibrin glue with a minimal number of sutures can be used as an alternative method to close wounds. The autologous preparations are safer than commercial glues available in Europe and Japan since the risk of transfusion-transmitted disease is obviated. The technique has few complications and problems such as cysts, granulomas, and poor quality scars have been rare. One disadvantage is the additional cost for the fibrinogen preparation which is approximately $100.00 when whole blood is used as the donor source and $250.00 when plasmapheresis is utilized. The administration sets, consisting of applicator, syringes, needles, and thrombin, have an additional cost of approximately $75.00. In cases where the donor source is whole blood, the red cells

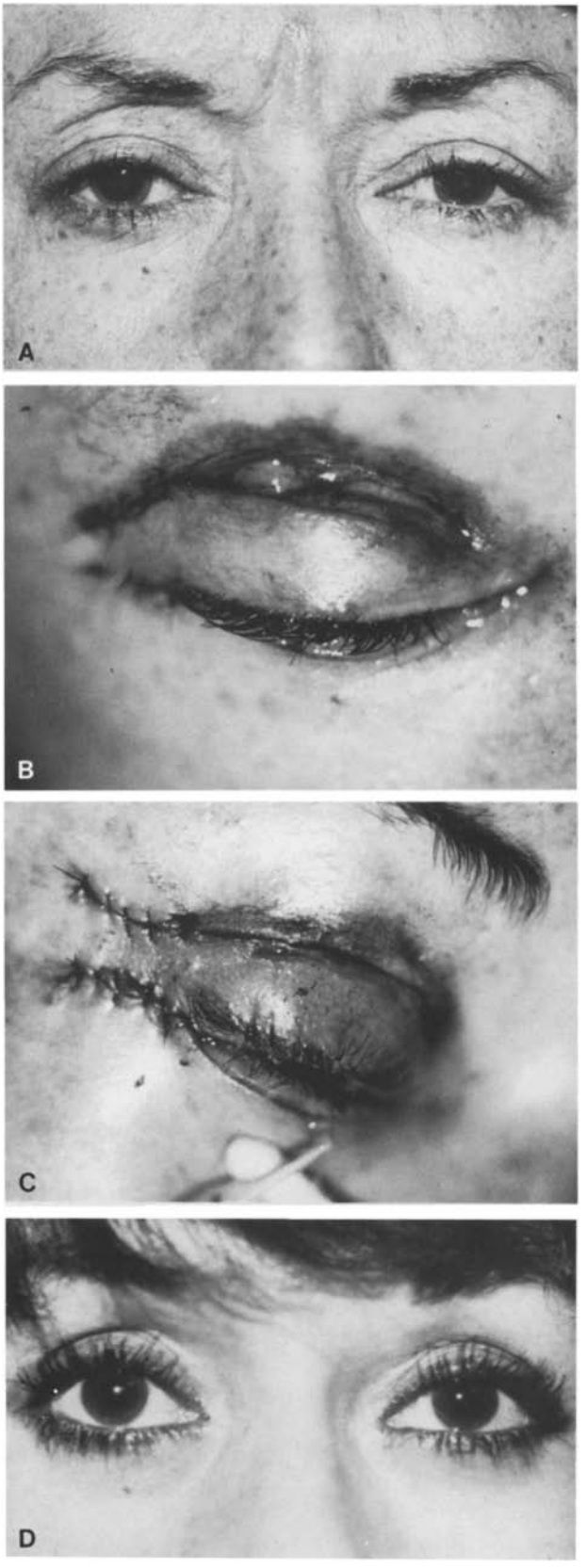

Fig. 1. (A). Excess skin defect seen before skin excision. **(B)** Fibrin glue is applied. **(C)** A hazy film forms when polymerization occurs. **(D)** Results at one year

Table 1. Complications of blepharoplasty closure[a]

	Number of patients	
	Fibrin glue	Suture
Total number in group	32	32
Wound separation	3	0
Poor quality scar	1	2
Milia	0	7
Granulomas	0	0
Ectropion	0	0
Dry eye syndrome	0	1

[a] Thirty two patients whose incisions were closed with fibrin glue were compared with an equal number of patients whose lids were closed with sutures. The incidence of complications is listed. All patients were treated by the same surgeon in a 15-month period

are used for autologous transfer in either an office or hospital setting if warranted by the operation performed. No patient had whole blood drawn specifically for the purpose of harvesting fibrinogen.

The uses of autologous fibrin glue are now being rediscovered by many investigators. First discovered 75 years ago by Grey to control bleeding, the adhesive qualities were described by Cronkite in skin graft procedures [3, 5]. Recent studies have confirmed its use in wound closure and to anchor a variety of grafts on irregularly contoured sites [2, 15]. Topical fibrin glue, in a radical mastectomy model, significantly decreased seroma formation. Grafts and flaps tightly bind to the subcutaneous matrix, enhancing revascularization and survival [9].

Fibrin glue has been found to be efficacious in wound closure and in decreasing fluid collection complications in rhytidectomy [1]. The extensive experience of Bruck [1] was obtained with a pooled plasma donor source; however, the mechanism of action when a autologous product is used is identical. The mixture of fibrinogen with thrombin results in clot formation, an action that is independent of platelet factors. Microscopic vascular and lymphatic channels are blocked, decreasing seroma and hematoma formation. Fibrin glue also strengthens the adhesion of skin flaps to the underlying tissues, further reducing the incidence of postoperative fluid accumulations.

The adhesive properties of fibrin glue have been evaluated in both experimental models and clinical studies. In addition to skin graft procedures, the glue has been helpful in otologic surgery and in the closure of cataract incisions [6, 10]. Dural defects approximated with fibrin glue can resist even high degrees of tension [14]. Wound healing is enhanced with fibrin glue and increased tensile strength has been noted [7]. It has achieved clotting in patients with coagulopathies due to massive transfusions, chronic diseases, and inflammatory conditions [8,13]. Family members can act as directed donors to provide a safe source of fibrinogen in either elective or emergency situations.

The applications for plastic surgery are widespread. Since fibrin glue is not dependent on platelet factors, drug-induced (aspirin) bleeding in patients can be controlled. Fluid collections under facelift or abdominoplasty flaps can be decreased, possibly eliminating the need for drains and avoiding complications such as subcutaneous pseudobursa formation [4]. Fibrin glue in an experimental model has been shown to decrease seroma formation as well as flap necrosis and would infection [9]. The positive results in this blepharoplasty investigation suggest that fibrin glue may be useful in many aesthetic and reconstructive procedures. It has sufficient adhesive qualities to maintain wound closure and the complications associated with its use are few.

References

1. Bruck HG: Fibrin tissue adhesion and its use in rhytidectomy. A pilot study. Aesth Plast Surg **6**:197–202, 1982
2. Chakravorty RC, Sosnowski KM: Autologous fibrin glue in full thickness skin grafting. Ann Plast Surg **23**:488–491, 1989
3. Cronkite EP, Lozner EL, Deaver JM: Use of thrombin and fibrinogen in skin grafting. J Am Med Assoc **124**:976–978, 1944
4. Ersek RA, Schade K: Subcutaneous pseudobursa secondary to suction and surgery. Plast Reconstr Surg **85**:442–444, 1990
5. Grey EG: Fibrin as a hemostatic in cranial surgery. Surg Gynecol Obstet **21**:452, 1915
6. Henrick A, Gaster RN, Silverstone PJ: Organic tissue glue in closure of cataract incisions. J. Cataract Refract Surg **13**:551–553, 1987
7. Jorgenson PH, Jensen KH, Andreassen B et al: Mechanical strength in rat incisional wounds treated with fibrin sealant. J Surg Res **42**:237–241, 1987
8. Kram HB, Nathan RC, Stafford FJ et al: Fibrin glue achieves hemostasis in patients with coagulation disorders. Arch Surg **124**:385–387, 1989
9. Lindsay WH, Masterson TM, Spotnitz WD et al: Seroma prevention using fibrin glue in a rat mastectomy model. Arch Surg **125**:306–307, 1990
10. Moretz WH Jr, Shea JJ Jr, Emmett JR et al: A simple autologous fibrinogen glue for otologic surgery. Otolaryngol Head Neck Surg **95**:122–124, 1986
11. Nesi FA, Katzen LB, LiVecchi JT: In: Smith BC, Della Rocca RC, Nesi FA, Lisman R (eds): Complications of Blepharoplasty in Ophthalmic Plastic and Reconstructive Surgery. St. Louis: C.V. Mosby, 1987, p 732
12. Rees TD: Blepharoplasty: Surgical Procedures in Aesthetic Plastic Surgery. Philadelphia: W.B. Saunders, 1980, p 470
13. Spotnitz WD, Dalton MS, Baker JW et al: Reduction of perioperative hemorrhage by anterior mediastinal

spray application of fibrin glue during cardiac operations. Ann Thorac Surg **44:**529–531, 1987
14. Steube D, Hamm KD, Pothe H et al: Fibrin glue on the Cohn I fraction basis in repairing cerebral and dural defects—an experimental study on rats. Folia Hematol **115:**213–217, 1987
15. Stuart JP, Morgan RF, Kenney JG: Single-donor fibrin glue for hand burns. Ann Plast Surg **24:**524–526, 1990