



Face lifts and sprayed fibrin glue: an outcome analysis of 200 patients

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SUMMARY. The use of aerosolised fibrin glue has been evaluated in a group of 100 consecutive patients undergoing face lift procedures and compared to a similar group of 100 consecutive patients who had face lifts but received no fibrin glue. There was a statistically significant decrease in the rate of major haematoma formation and presentation of ecchymosis associated with the use of fibrin glue. The incidence of total complications was unchanged between the two groups, despite the fact that there were no drains or postoperative dressings used in the fibrin glue treated group. Patients found the omission of drains and dressings to be most convenient.

Since the initial testing of fibrin glue by Young and Medawar in 1940,¹ it has been used in a broad range of clinical applications. The list includes skin grafts,^{2,3} bone grafts,⁴ microneural repairs,⁵⁻⁸ microscopic fallopian tube repairs,⁹ otolaryngologic surgery,¹⁰ craniofacial surgery¹¹ and aesthetic surgery.¹²⁻¹⁸ The benefits include improved haemostasis of large raw surfaces, close apposition of healing structures and a reduction in the number of sutures required.

Major haematomas are the most frequent serious complication of face lifting procedures. The reported incidence ranges from 0.2% to 8.1%.¹⁹⁻²⁴ The formation of a haematoma may compromise flap viability and may lead to skin slough, jeopardising the final aesthetic result.

In a previous study, Marchac *et al.*¹⁵ have evaluated the postoperative course in 55 patients who underwent face lift procedures with the application of aerosolised fibrin glue. A decrease in postoperative oedema and ecchymosis was noted.

In this case control study, we evaluated the results of 100 face lift patients in whom fibrin glue was used and compared this to a similar cohort of 100 patients in whom no fibrin glue was used.

Materials and methods

The records of 100 consecutive patients who underwent face lifting procedures in the senior author's practice were reviewed and the incidence of complications was noted. In order to be entered in the study, the following criteria were rigidly applied. All patients were female; no males were included because of the varying rates of haematoma reported between the sexes. All of the patients were non-smokers with no history of hypertension. All patients received primary face lifts with SMAS level manipulation and all received simultaneous lipo-aspiration. All had drains and postoperative dressings. These patients were treated between the years of 1983 and 1985 and all had a minimum follow-up of 2 years.

Another group of 100 consecutive patients who

received face lift procedures, but who also received aerosolised fibrin glue beneath their skin flaps, were also reviewed using the same rigidly applied criteria. There were no drains or postoperative dressings used in this group. These patients were treated between the years 1988 to 1990 and were followed postoperatively for a minimum of 2 years. All 200 patients in the study were operated upon solely by the senior author.

The patients' records were examined for the following serious complications: major haematomas (those containing greater than 20 cc of blood), facial palsy and skin slough. The minor complications that were noted included small haematomas (containing 20 cc of blood or less), trapped air pockets, infections, hypertrophic scars, sensory nerve injury, ear lobe deformity, and greater than usual oedema and ecchymosis as rated by the senior author. The rates of the various complications in the two groups were then compared using the Chi squared test and levels of statistical significance were noted.

Surgical procedure

In all those cases where fibrin glue was used, it consisted of a commercially available preparation known as Tissucol R (Immuno-France, Rungis, France). This biological glue consists of two main components: lyophilised human fibrinogen and bovine thrombin. The mixture of the two solutions is delivered via two syringes held in a plastic frame that allows mixing of the solutions at the outlet with compressed air, which aerosolises the final fibrin glue solution.

The usual face lift skin incision was made under local anaesthesia with intravenous sedation, administered in each case by the same anaesthetist. Wide skin undermining was performed and all cases received either a SMAS plication or a formal SMAS-platysmal flap. After multiple checks of haemostasis and skin flap tailoring, closure was commenced by the placement of five to six subcutaneous 4-0 Maxon sutures, both in front of and behind the ear. These were left untied and snapped by haemostats.

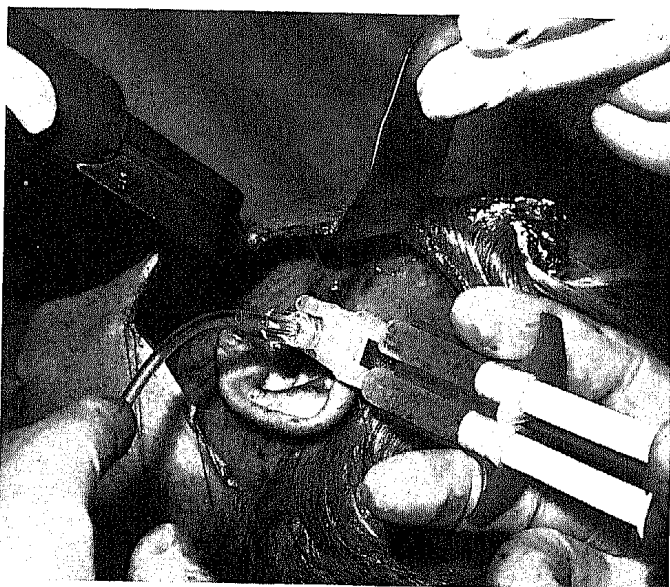


Fig. 1

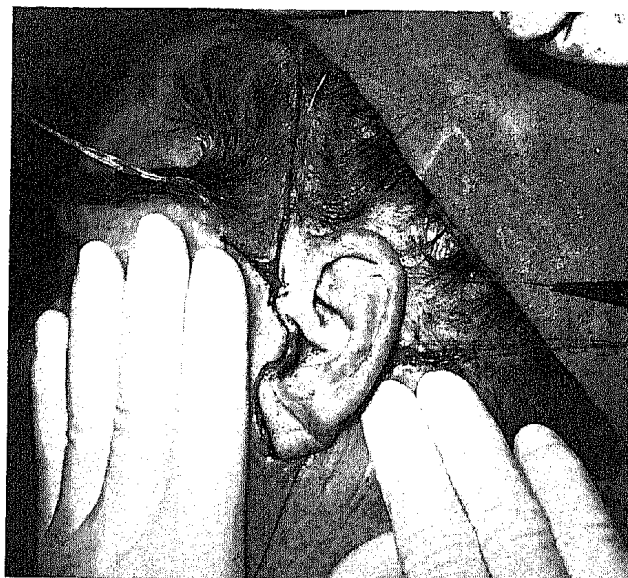


Fig. 2



Fig. 3

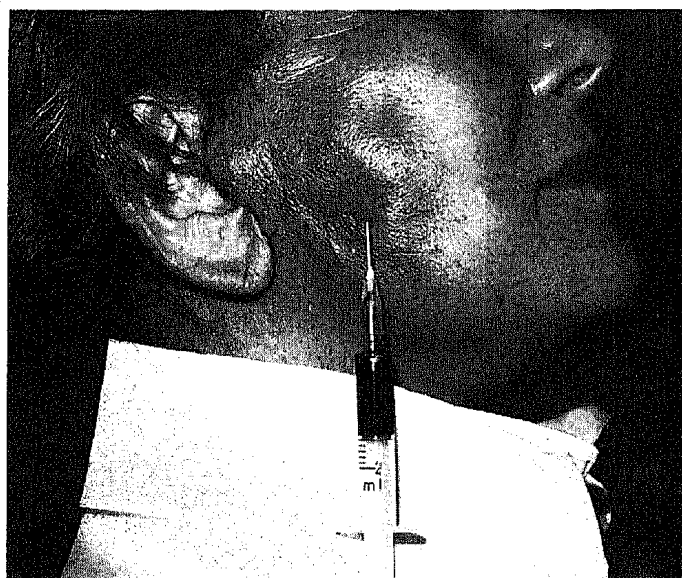


Fig. 4

Figure 1—After careful haemostasis, a few key stitches are placed and left long. All the undermined area is sprayed.

Figure 2—The key stitches are tied while well-distributed pressure is applied on the face.

Figure 3—A patient is shown the day after surgery. She has been brought back to her bed without drains and without dressings.

Figure 4—When a haematoma occurs, it is usually localised; the gluing prevents rapid dissemination of the clots.

Then the skin flaps were elevated with broad retractors, to expose the full extent of the undermining and a fine spray of glue was applied to the raw surface of the skin flap and its bed. In most cases 0.5–1.0 ml of glue was sufficient for each side, although this depended on the extent of the undermining (Fig. 1). The retractors were removed rapidly once the glue was applied, and the subcutaneous sutures were tied (Fig. 2). Skin closure was completed with the placement of a few pre and post auricular sutures of 5-0 and 6-0 nylon. A running 4-0 suture was used in the hairline. No drains or postoperative dressings were used in any of the fibrin glue patients (Fig. 3).

Results

The two groups of patients are described in Table 1; they had similar age ranges and average ages. The only concomitant operative procedure in the two groups of

patients was blepharoplasty which was performed in 32% of the non fibrin glue group as compared to 34% in the fibrin glue treated group. SMAS-platysma flaps were elevated in 38% of the patients in the non fibrin glue group and in 41% of the patients in the fibrin glue group.

The rates of major and minor complications are reported in Tables 2 and 3. There was a statistically

Table 1 Details of non fibrin glue and fibrin glue treated groups

	<i>Non fibrin glue</i>	<i>Fibrin glue treated</i>
Age range (years)	39–72	40–73
Average age (years)	53.4	56.0
Blepharoplasties (%)	32	34
SMAS-plications (%)	62	59
SMAS platysmal flaps (%)	38	41

Table 2 Rates of major complications in both groups

	Non fibrin glue	Fibrin glue treated	p
Complication			
Major haematoma (%)	9	2	< 0.03
Facial palsy	0	0	NS
Skin slough (%)	2	3	NS

Table 3 Rates of minor complications in both groups

	Non fibrin (%)	Fibrin glue treated (%)	p
Minor haematomas	8	9	NS
Trapped air	0	3	NS
Infection	3	2	NS
Hypertrophic scars	3	1	NS
Sensory nerve injury	3	1	NS
Ear lobe deformity	2	1	NS
Prolonged oedema and ecchymosis	12	2	< 0.006

significant difference in the rates of major haematomas occurring in the two groups ($p < 0.03$). In the non fibrin glue group the rate was 9%, whereas in the fibrin glue treated group it was 2%. None of the patients in either group was noted to have episodes of hypertension pre-, intra-, or postoperatively.

Of the minor complications, only greater than usual oedema and ecchymosis produced statistically significant differences between the no fibrin glue and fibrin glue treated groups. The incidence of these complications was lower in the fibrin glue treated group ($p < 0.006$). The rates of total major complications, total minor complications and total overall complications did not show statistically significant differences between the two groups.

One complication unique to the fibrin glue treated group was the postoperative finding of trapped pockets of air. These had the appearance of small haematomas and yielded 3–5 cc of air on aspiration.

Discussion

The use of fibrin glue seems to be associated with three benefits in this study. Firstly, there was a statistically significant reduction in the incidence of major haematomas in the group where fibrin glue was used. Secondly, the incidence of greater than usual oedema and ecchymosis was lower in the fibrin glue treated group. This observation has also been reported by Bruck in 1982¹² and also by Marchac *et al.* in 1987.¹⁵ Thirdly, the application of fibrin glue allows the omission of drains and postoperative dressings.

There are some drawbacks to this type of case control study which should be addressed. All cases were operated by the senior surgeon, who used a standardised technique between the years of 1983 to 1990. The possibility of a learning curve effect must be considered. The non fibrin glue group was operated upon five years prior to those patients who received fibrin glue. However, the senior author had already

been performing face lifts as a routine thirteen years prior to the treatment of the earlier non fibrin glue group. The only change in technique between the two groups was the already described addition of aerosolised fibrin glue and the total omission of drains and postoperative dressings.

Case control studies are by their very nature retrospective and only as good as the records that they review. This study was designed to try and minimise variables between the two groups as far as possible.

It is interesting to note that while the rate of major haematoma was significantly different between the two groups, the rates of minor haematomas did not vary significantly between the two groups. This was an unexpected finding. However, we believe that fibrin glue traps and limits the spread of bleeding, producing minor instead of major haematomas. These haematomas become visible earlier, due to the limitation of their size. They are then simply drained by aspiration.

The trapped air phenomenon is unique to the fibrin glue group. This can be minimised by setting the flap down gradually from the furthest extent of the undermining back towards the incision. Once air is trapped beneath the flap it becomes sealed by the fibrin glue. These pockets can either be aspirated or they will resorb in time.

The use of fibrin glue does require some changes in the operating routine of the surgical team. The agents must be reconstituted prior to use but no greater than 4 h in advance. They require a special warming bath and a magnetic stirrer. The technique is easily learned by the operating room staff.

During wound closure the subcutaneous sutures must be placed prior to the application of the fibrin glue and held untied by haemostats. Once the fibrin glue is sprayed onto the flaps, the sutures are tied. This step is easily incorporated into the operative routine.

The fact that human blood is used to prepare the fibrin glue presently represents an understandable concern, especially with the risk of HIV transmission.

However, the human fibrinogen in this product is heat treated to 60°C, which is known to inactivate the HTLV III virus.¹⁵ The repeated screening of blood donors and the finished product for antiviral antibodies is an additional safety measure.

There is a theoretical risk that the hepatitis B virus may survive heat treatment, but once again, rigid screening of the donors and the final product is undertaken.

In summary, the advantages of fibrin glue in face lifting include improved haemostasis with a decrease in major haematoma rate, decreased postoperative oedema and ecchymosis and improved patient comfort as no drains and dressings are required.

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