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SHORT COMMUNICATION

Fibrin sealant and parotidectomy wound complications in 100 patients

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Abstract

Purpose To determine whether the use of fibrin sealant impacted the rate of postoperative wound complications following parotidectomy.

Methods We retrospectively reviewed 100 consecutive parotidectomies with and without fibrin sealant. Primary outcomes were development of seroma, sialocele, abscess, or hematoma within the first 30 days as well as length of hospital stay for drain output if one was placed. Secondary outcomes analyzed wound complications based on several patient and surgical factors.

Results In our cohort, there were 82 superficial parotidectomies (82%), and the most common pathology was pleomorphic adenoma (39%) followed by Warthin's tumor (27%). Fibrin sealant was used in 46 patients (46%). Postoperative wound complications occurred in 20 patients, and were not statistically different with or without fibrin sealant placement (23.9% vs. 16.7%, $p = 0.454$). Fibrin sealant did not significantly reduce wound complications regardless of tissue volume removed, use of acellular dermis, history of smoking, diagnosis of diabetes, or active anticoagulant/antiplatelet use. Only four patients without fibrin sealant (7.4%) required hospitalization beyond 24 h for high drain output.

Conclusions In our retrospective cohort, the development of postoperative wound complications following parotidectomy did not appear to be significantly impacted by the use of a fibrin sealant.

Keywords Parotidectomy · Sialocele · Seroma · Fibrin sealant

Introduction

The most common wound complications after parotid surgery include seroma, hematoma, sialocele, salivary fistula, and Frey's syndrome [1–3]. While seroma and hematoma are reported complications in fewer than 5% of cases [2], the development of a sialocele, or leakage of saliva from remaining salivary tissue, has been reported to occur in up to 39% of parotidectomies [4]. The incidence of post-parotidectomy wound complications is impacted by surgical technique, awareness of diagnosis, and the definition of a clinically significant collection [5]. Some surgeons have suggested that techniques to reduce dead space, including drain placement, pressure dressing, or fibrin glue, can reduce the incidence of postoperative seroma [6].

Fibrin sealant (Tisseel®, Baxter Corp., Deerfield, IL) has been approved in the US since 1998 to improve hemostasis and apposition of healing surfaces [7]. Tissue adhesives such as fibrin glue have shown benefit in reducing postoperative drainage following rhytidectomy, thyroidectomy, parathyroid surgery, and parotidectomy [8]. The application of fibrin sealant following parotidectomy has been shown in a few small studies as a means to reduce postoperative drainage or postoperative seroma, and promote earlier drain removal and hospital discharge [7, 9, 10].

This retrospective study looks to determine the role of fibrin sealant in the development of postoperative wound complications following parotidectomy. We present our experience with fibrin sealant and its relationship to wound complications.

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Materials and methods

Compliance

This retrospective cohort study was approved by the SUNY Upstate Medical University Institutional Review Board with exemption. This article does not contain any studies with human participants performed by any of the authors. Given the retrospective nature of the study, informed consent was deemed not necessary by the Institutional Review Board and, therefore, was not obtained for this study. The authors declare that they have no conflicts of interest.

Study design and setting

We reviewed the medical records of consecutive patients between 2011 and 2016 who underwent a superficial or total parotidectomy without additional procedure. All surgeries were performed at an academic, tertiary medical center by one of four head and neck surgeons within our department. All patients at least 18 years of age at the time of surgery were included and operative reports, inpatient documentation, and office visits were obtained for analysis. Patients were excluded if they underwent a revision parotidectomy or had an additional procedure such as neck dissection.

Data included the type of procedure, final pathological diagnosis, volume of tissue removed, history of diabetes mellitus, smoking history, use of anticoagulant or antiplatelet medication, and a description of any local wound complication up to 30 days postoperatively. The decision to utilize fibrin sealant was based on surgeon preference, as was the decision to use a drain or acellular dermis in the wound bed. The surgical procedures were performed in the usual fashion and meticulous hemostasis was obtained at the conclusion. If used, prior to closure, 2 mL of Tisseel® was placed into the wound bed in the appropriate manner. An overlying acellular dermis graft was placed in the wound bed in a subset of patients. Drains (suction or passive) were utilized based on surgeon preference, patient anatomy, and wound size. Patients were grouped into parotidectomy with fibrin sealant or parotidectomy without fibrin sealant.

Statistical analysis was performed with a two-tailed Fisher's exact test or Student's *t* test where appropriate with significance level less than 0.05. SPSS Statistics for Windows (version 22.0; SPSS, Inc, an IBM Company, Chicago, IL) was used to calculate descriptive statistics and significance levels. The primary outcome was development of wound complications, including seroma, sialocele, salivary fistula, abscess, or hematoma within the first 30 days. Secondary measures included smoking status, diabetes mellitus, the use of acellular dermis, drain type and length hospital stay.

Results

There were 100 patients who met inclusion criteria between 2011 and 2016. Fibrin sealant was used in 46 cases (46%) and 54 cases were done without fibrin sealant (54%). The characteristics of the two groups are shown in Table 1. Most procedures were superficial parotidectomies (82%), pleomorphic adenoma (39%) was the most common pathology, and acellular dermis was used in 56% of cases. Of note, there was no statistical difference between the type of procedure, final pathology, smoking status, and patient history of diabetes mellitus between each group. The group without fibrin sealant was more likely to have a passive drain (42.6% vs. 8.7%; $p < 0.001$) or suction drain (38.9% vs. 0%; $p < 0.001$) placed compared to the fibrin sealant groups. There was no difference in the use of acellular dermis between groups with or without fibrin sealant (54.3% vs. 57.4%; $p = 0.841$).

Table 1 Characteristics of study population grouped by fibrin sealant and no fibrin sealant parotidectomies

	Fibrin sealant ($n = 46$)	No fibrin sealant ($n = 54$)	p value
Total parotidectomy	5 (10.9%)	13 (24.1%)	0.118
Pleomorphic adenoma	19 (41.3%)	20 (37.0%)	0.686
Warthin's tumor	10 (21.7%)	17 (31.5%)	0.367
Penrose or Vessel loop	4 (8.7%)	23 (42.6%)	**< 0.001**
JP or Blake drain	0	21 (38.9%)	**< 0.001**
Acellular dermis placed	25 (54.3%)	31 (57.4%)	0.841
Diabetes mellitus	4 (8.7%)	8 (14.8%)	0.539
Active smoker	12 (26.1%)	8 (14.8%)	0.211
Mean volume of tissue removed	59.5 cm^3 (SD: 37.1)	52.3 cm^3 (SD: 59.8)	0.285
Antiplatelet/anticoagulants (held)	15 (32.6%)	18 (33.3%)	1.00
Discharged within 24 h	46 (100%)	50 (92.6%)	0.122

Statistically significant p values are in bold ($p < 0.05$)

p values are based on Fisher exact testing with $\alpha < 0.05$ or with t testing for independent means

Within 30 days of surgery, there were a total of 20 local wound complications. These included hematoma, seroma, or sialocele. In the fibrin sealant group, the incidence of local wound complications was 23.9%, which was similar to the rate of 16.7% in the group without fibrin sealant ($p=0.454$) (Fig. 1). Observation or placement of a pressure dressing resolved all of these collections, except for one patient in the sealant group and two in the in non-sealant group who required needle aspiration. There were no major complications and there were no returns to the operating room. Active and passive drains, if placed, were removed within the first postoperative day for 100% of fibrin sealant patients and 92.4% of those without fibrin sealant ($p=0.122$). We identified higher rates of wound complications among patients requiring drain placement compared to those not requiring a drain (10.4% vs. 28.8%, $p=0.026$).

There was no statistical difference between the volume of parotid tissue removed between patients with and without wound complications (58.5 cm^3 vs. 57.9 cm^3, $p=0.483$) (Table 2). When fibrin sealant was applied to the wound bed, there was no difference in tissue volume removed among patients with and without wound complications (68.5 cm^3 vs. 52.5 cm^3, $p=0.087$). Comparing the use of passive drains, active drains, acellular dermis, and combinations of drains and sealant, wound complications occurred in patients who had similar volumes of tissue removed as those without wound complications.

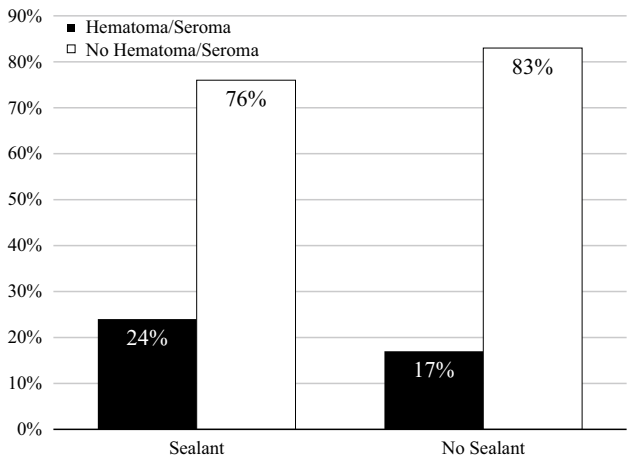

Fig. 1 Rates of hematoma or seroma after parotidectomy with or without fibrin sealant. There was a nonsignificant difference in hematoma/seroma ($p=0.454$) between the groups

Discussion

The development of local wound complications including seroma or sialocele is reported in 5–39% of parotid surgeries [5]. Among the various techniques that have been described to reduce the incidence of these events, fibrin sealant is an appealing option and has been adopted by some surgeons to help with wound hemostasis and tissue/skin flap re-apposition [6]. In our retrospective cohort, when fibrin sealant is applied at the conclusion of a parotidectomy, there is no statistical difference in local wound complications, length of hospitalization, or length of drain placement between the sealant and non-sealant groups. Although retrospective in nature, our cohort represents one of the largest series reported on parotidectomy wound complications after the use of fibrin sealant.

Fibrin glue has been used as a rapid hemostatic agent, tissue sealant, and adhesive since it was first introduced in 1990. The mixture of fibrin and thrombin solution is natural, nontoxic, biodegradable and mimics the final stages of blood coagulation and fibrin clot formation [8]. There has only been one randomized control trial looking at fibrin sealant in parotidectomy wound closure. Maharaj et al. found 22.7% of 22 patients without sealant developed a seroma versus 3.6% of 28 sealant patients ($p<0.05$). They reported nonsignificant reductions in time with a drain in place and hospital stay [10]. A small retrospective study identified significant reductions in hospital stay without difference in complication rate after superficial parotidectomy when fibrin glue was used instead of suction drains [11]. Patel et al. performed a retrospective study of 113 parotidectomies, 38 with fibrin sealant applied, and suggested that drains could be removed and patients discharged from the hospital sooner compared to placing absorbable hemostatic agents and/or meticulous

Table 2 Mean volume of parotid tissue removed (standard deviation) for patients with or without wound complications based on various methods of intraoperative management

	Wound complications	No wound complications	*p* value
All patients	58.5 cm^3 (44.2)	57.9 cm^3 (52.0)	0.483
Fibrin sealant placed	68.5 cm^3 (49.6)	52.5 cm^3 (25.4)	0.087
No fibrin sealant placed	46.2 cm^3 (32.5)	62.2 cm^3 (65.3)	0.243
Passive drain placed	70.5 cm^3 (51.0)	47.1 cm^3 (43.6)	0.247
Active drain placed	34.4 cm^3 (18.5)	61.9 cm^3 (54.7)	0.178
No drain placed	63.6 cm^3 (45.8)	63.3 cm^3 (54.8)	0.491
Alloderm placed	57.2 cm^3 (44.6)	53.0 cm^3 (36.7)	0.369

p values based on one-tailed Student's *t* test for independent means with significance level $\alpha<0.05$

hemostasis. They attributed better opposition of the skin flap to the parotid bed by the adhesive properties of the sealant to be responsible for reduction in output. Similar to our study, Patel et al. selectively employed passive or suction drainage (70% of sealant patients; 90% of patients without sealant) [7]. Interestingly, wound complications in our series occurred more commonly in the cases where a drain had been placed, but it is unclear how drain placement relates to such outcomes. None of these cases utilized fibrin sealant, which limits our ability to draw definitive conclusions. However, our results suggest that fibrin sealant may eliminate the need for drains in parotidectomies at high risk for local wound complications.

Several authors have described the extent of parotid surgery as having a significant impact on postoperative wound complications. The development of a sialocele requires residual functional parotid tissue to create a leakage of saliva. Witt reported in one series of 100 partial superficial parotidectomies, 39 sialoceles occurred while 20 near total parotid surgeries did not result in a sialocele [4]. Upton et al. and Tuckett et al. found that a sialocele or salivary fistula were more common in superficial parotid surgeries than more extensive or total procedures [1, 3]. Our series did not show any significant difference between type of parotid surgery or volume of tissue removed and the incidence of wound complications. Other hemostatic products have also been examined in parotid surgery. Herbert et al. found that the placement of Surgicel had a 28.6% sialocele rate compared with 11.3% of parotid surgeries without Surgicel [5].

Our study has several limitations. The retrospective data include selection bias, as the decision to place fibrin sealant was based on surgeon preference. We included patients that had acellular dermis placed and those that did not, though the use of acellular dermis did not vary between groups. This additional variable made it difficult to separate the impact on wound healing between the various products and also altered the wound bed volume. The use and type of drains did vary significantly between the groups. The placement of a passive drain may inhibit the apposition of skin flaps in the days following a parotidectomy, which would confound the results in our study. Future studies could look specifically at the role of having a drain after parotid surgery and the rates of postoperative wound collections. The retrospective nature of our data unfortunately does not allow broad conclusions to be drawn. Our dataset contained several additional confounders (acellular dermis, drain type), making data interpretation difficult.

Conclusion

After parotidectomy, we found a nonsignificant difference between post-surgical collections when fibrin sealant was used. Compared to prior studies, we have one of the larger cohorts of patients looking at post-parotidectomy fibrin sealant outcomes. While some studies have suggested a clearer impact on local wound complications, we have not been able identify similar findings. A prospective trial examining the role of fibrin sealant with and without drains in terms of surgical complication rate, costs, and length of stay would be a valuable addition to the otolaryngology surgical literature.

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