

Mucosal Defect Repair with a Polyglycolic Acid Sheet

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Objective: Early-stage oral or oropharyngeal carcinomas are often treated with surgical resection. Resulting wounds that are too large for primary closure can be covered with skin grafts or patches made from various biomaterials. Recently, polyglycolic acid sheets have been used for this purpose.

Methods: We treated six patients with large wounds resulting from the resection of oral or oropharyngeal squamous cell carcinoma by grafting polyglycolic acid sheet patches. All patients were initially treated at the National Cancer Center East Hospital from March 2010 through July 2012. After mucosal resection, the wounds were covered with polyglycolic acid sheet patches attached with fibrin glue. Oral intake was started 4 days after surgery.

Results: Mucosal resection was the initial treatment in seven patients (five with oral squamous cell carcinoma and two with oropharyngeal squamous cell carcinoma). The polyglycolic acid sheet patches became detached in two patients (on the day of surgery and on post-operative day 6), who then required large doses of analgesics. A patient who underwent tooth extraction also required large doses of analgesics. The other four patients required only small doses of analgesics. One patient had bleeding at the surgical site. No adverse effects were caused by the polyglycolic acid sheet patch or by fibrin glue.

Conclusions: Our study has shown that grafting of a polyglycolic acid sheet patch is effective and provides good pain control for patients with large, open wounds after mucosal resection of oral or oropharyngeal squamous cell carcinoma. We plan to evaluate tissue contraction and oral intake after polyglycolic acid patch grafting.

Key words: polyglycolic acid sheet – fibrin glue – good pain control

OBJECTIVE

Early-stage oral or oropharyngeal carcinomas are often treated with surgical resection. Because the resulting wounds are often too large for primary closure, they can be covered with skin grafts and patches made from various biomaterials. Skin graft leave donor-site wound and often detach within a few days. Some biomaterials often detach in the early post-operative period. Early detachment causes pain and tissue contraction. Recently, polyglycolic acid (PGA) sheets have been used to cover wounds and to prevent bleeding and leakage in liver and lung surgery (1–4). We evaluated the

use of PGA sheets to reduce postoperative complications after the resection of oral or oropharyngeal carcinomas.

PATIENTS AND METHODS

We reviewed seven patients with large wounds resulting from the resection of an oral or oropharyngeal squamous cell carcinoma (SCC) which were repaired with PGA sheet grafts. All patients were initially treated at the National Cancer Center East Hospital from March 2010 through July 2012 (Table 1).

Table 1. Patients' courses and outcomes

Case	Sex	Age	Tumor site	Stage	Resection	Mucosal defect (mm)	Oral feeding start	Analgesic (Loxoprofen) use	Complications	Discharge
1	M	86	Retromolar	T2N0	Mucosa	22 × 42	POD 10	None	None	POD 11
2	M	62	Oral floor	T1N0	Mucosa	34 × 31	POD 7	None	None	POD 13
3	F	64	Buccal mucosa	T2N0	Mucosa	10 × 22	POD 10	None	None	POD 13
4	M	78	Hard palate	T1N0	Mucosa, hard palate	34 × 34	POD 6	POD 2,9	None	POD 12
5	M	62	Soft palate	T1N0	Mucosa	35 × 32	POD 4	Every meal	PGA detached, day of surgery	POD 10
6	F	60	Soft palate	T2N0	Mucosa, hard palate	42 × 26	POD 8	Many times	Bleeding, POD7; PGA detached, POD 10	POD 12
7	M	52	Lower gingiva	T2N0	Mucosa, tooth extraction	40 × 35	POD 4	Many times	None	POD 9

Patients 1–4, without early sheet detachment, required no analgesics or only small doses of analgesics. In contrast, patients 5 and 6, with early sheet detachment, required large doses of analgesics. A patient who underwent tooth extraction also required large doses of analgesics. POD, postoperative day.

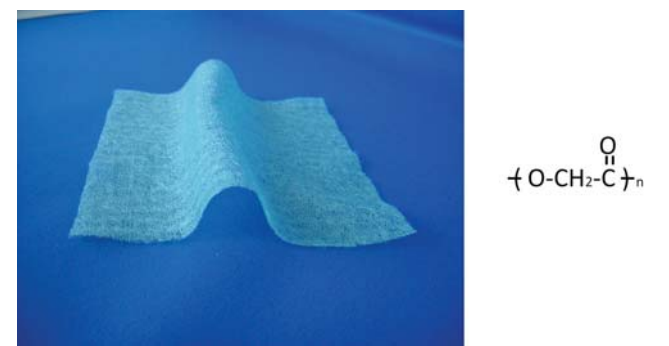


Figure 1. Polyglycolic acid (PGA) sheet. Soft nonwoven fabric with elasticity.



Figure 2. Case 7, before surgery. Lower gingiva T2N0 squamous cell carcinoma.

We indicate the patient with the defects resulting from SCC resection could not be closed primarily and when transfer of a bulky free cutaneous flap would interfere with oral function.

After mucosal resection, the wounds were covered with PGA sheet patches attached with fibrin glue. First, a solution of fibrinogen was applied to the wound. Secondly, the wound was covered with a PGA sheet that cut off one or many pieces slightly smaller than the area of resection. Finally, the wound was sprayed with a solution of fibrinogen and thrombin. Oral intake was started 4 days after surgery, and analgesics (nonsteroidal anti-inflammatory agent loxoprofen) were administered as required. At the surgical site, the edges of separated PGA sheets were cut off.

EQUIPMENT

Polyglycolic acid felt sheet is a soft nonwoven fabric that becomes elastic through a special process. (Neoveil®, Gunze Co., Ltd., Tokyo, Japan) (Fig. 1). The PGA sheet was attached with fibrin glue derived from human blood (Bolheal®, Chemo-sero-Therapeutic Research Institute, Kumamoto, Japan).

RESULTS

Mucosal resection was the initial treatment in seven patients (five with oral SCCs and two with oropharyngeal SCCs; Figs 2 and 3). The PGA sheet patches became detached in two patients (on the day of surgery and on postoperative day 6), who then required large doses of analgesics. A patient who underwent tooth extraction also required large doses of analgesics. The other four patients required no analgesics or only small doses of analgesics (Table 1). The PGA sheets in



Figure 3. Case 7. Mucosal resection with tooth extraction.



Figure 4. Case 7. The mucosal defect was covered with a PGA sheet attached with fibrin glue.



Figure 5. Case 7. Six days after surgery. The PGA sheet and fibrin are observed.

these four patients detached on postoperative days 26 to 38. One patient had bleeding at the surgical site. No adverse events were caused by the PGA sheet patch or by fibrin glue. In patients without early PGA patch detachment, healing was



Figure 6. Case 7. Nine days after surgery. The PGA sheet and fibrin are observed. The edge of the PGA sheet is covered with granulation tissue.



Figure 7. Twenty-two days after surgery. Most of the defect is covered with mucosa and granulation tissue.

excellent. Wound contraction was not observed in any patient, with or without early detachment.

DISCUSSION

After the resection of oral or pharyngeal cancers, mucosal defects are repaired primarily with sutures or covered with skin grafts or various biomaterials. Skin grafts or various biomaterials attached with sutures easily become detached and cause pain. Because adhesion is weak between the materials and the mucosal defects, gaps can open, through which saliva or ingested food can pass. Several authors have reported the usefulness of PGA sheets attached with fibrin glue for covering wounds after oral and pharyngeal surgery (5,6). Covering wounds with PGA sheets and fibrin glue is simple and less time-consuming than the tie-over method or skin grafting or the use of other artificial materials and may avoid the need for microvascular graft reconstruction.

Murata et al. (5) have reported that covering wounds with PGA and fibrin glue reduces postoperative pain. Our report confirms the reduction of pain, as no analgesics or only small doses of analgesics were required by patients in whom the PGA sheets did not detach early. In contrast, large doses of analgesics were required by patients in whom the PGA sheets had detached early, and one patient had bleeding. Therefore, the use of PGA sheets and fibrin glue for covering open wounds after oral resection was useful for avoiding postoperative pain.

In the present study, tissue contraction was not observed. However, Yonezawa et al. (7) have reported that the use of PGA sheets and fibrin glue causes early epithelialization in experiments in rabbits. Furthermore, in the present study, PGA sheets and fibrin glue seemed to cause early epithelialization and to reduce pain.

We plan to study additional patients in whom wounds have been covered with PGA sheets and fibrin glue and to evaluate tissue contraction and oral intake after PGA patch grafting.

Products from animal tissue, such as fibrin glue, carry a risk of blood-borne disease. However, our patients showed excellent pain control and good healing wound. Our findings suggest that PGA sheets attached with fibrin glue can be used to cover mucosal defects.

CONCLUSION

The use of PGA sheet patch grafts attached with fibrin glue is effective and provides good pain control for patients with

large, open wounds after mucosal resection of oral or oropharyngeal SCC (Figs 4–7).

Conflict of interest statement

None declared.

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