



BRIEF REPORT

Secondary intention healing with satisfactory outcome after nodular basal cell carcinoma excision on the face

Jia-Ming Yeh¹, Chun-Yen Ou², Julia Yu-Yun Lee¹, Tak-Wah Wong^{1,3,*}

¹ Department of Dermatology, National Cheng Kung University Medical College and Hospital, Tainan, Taiwan

² Department of Otolaryngology, National Cheng Kung University Medical College and Hospital, Tainan, Taiwan

³ Department of Biochemistry and Molecular Biology, National Cheng Kung University Medical College, Tainan, Taiwan

ARTICLE INFO

Article history:

Received: Jun 12, 2012

Accepted: Jul 17, 2012

Keywords:

cosmetic outcome
nonmelanoma skin cancer
secondary intention
wound healing

ABSTRACT

Secondary intention healing on concave areas of the face may provide acceptable cosmetic outcome after tumor excision but is underused. We evaluated cosmetic outcome and tumor recurrence of this technique in 10 patients with nodular basal cell carcinoma and one patient with basosquamous carcinoma on the face. The average size of these tumors was 1 cm. Subjective evaluations included patients' satisfaction on the degree of wound pain, ease of wound care, and satisfaction with cosmetic outcome. Objective evaluations included physician's scoring on the time to complete wound healing, wound infection, cosmetic outcome, and tumor recurrence after operation. The operations were completed in 30 minutes on average. All wounds healed well without infection within 4 weeks. Postoperation wound pain was absent to mild. Wound care was neither difficult nor troublesome. All patients were satisfied with the cosmetic outcome. Physicians scored good or excellent cosmetic outcome in 91% of patients. No tumor recurred during 3–60 months (median, 13 months) of follow-up. Secondary intention healing appears to be a good option after excision of nodular basal cell carcinomas located on concave areas of the face. Good to excellent cosmetic results can be expected after wound healing.

Copyright © 2012, Taiwanese Dermatological Association.
Published by Elsevier Taiwan LLC. All rights reserved.

Introduction

Surgical removal of cutaneous neoplasms from the head and neck region creates a variety of cutaneous defects requiring tissue reconstruction. The ideal reconstruction of skin defects aims to close the defects with good cosmesis and without morbidity. Wound reconstruction techniques include primary closure; healing by secondary intention; skin grafts; and local, regional, and sometimes free flaps. The choice of reconstruction method often depends on the preference and experience of the surgeon and patients' expectations.

Healing by secondary intention offers the advantages of optimal cancer surveillance, simplified wound management, and avoidance of sophisticated reconstructive procedures. In the early days of tumor removal using Mohs' fixed tissue technique, most of the surgical wounds were allowed to heal by secondary intention.¹

Although there are many reports on secondary intention healing (SIH) in the literature, data with a sound statistical basis are limited.^{2,3} In 1983, Zitelli⁴ reviewed facial defects managed by SIH comprehensively and found that the anatomic location of surgical wounds was the most important predicting factor for the cosmetic outcome (Figure 1). Wounds located on the concave surfaces of the nose, eye, ear, and temple areas usually heal with functional and cosmetic outcomes that equal or are superior to those achieved by grafts and flap transpositions.^{4–6} However, SIH is usually underused after surgery. In this study, we evaluated SIH in 11 patients with basal cell carcinoma on the face.

Patients and methods

Patients

All facial reconstructions after tumor excision that healed with SIH in one medical center between 1990 and 2010 were reviewed. Photos of patients before and after operation were reviewed from a database (Crux system) of the department. Eleven patients, eight males and three females, aged 57–86 years (mean age, 73 years), with nonmelanoma skin cancers on the face were included

* Corresponding author. Department of Dermatology, National Cheng Kung University Medical College and Hospital, No.138, Sheng Li Road, Tainan 704, Taiwan. Tel.: +886 2353535x5352; fax: +886 6 2004326.

E-mail address: Dr.kentwwong@gmail.com (T.-W. Wong).

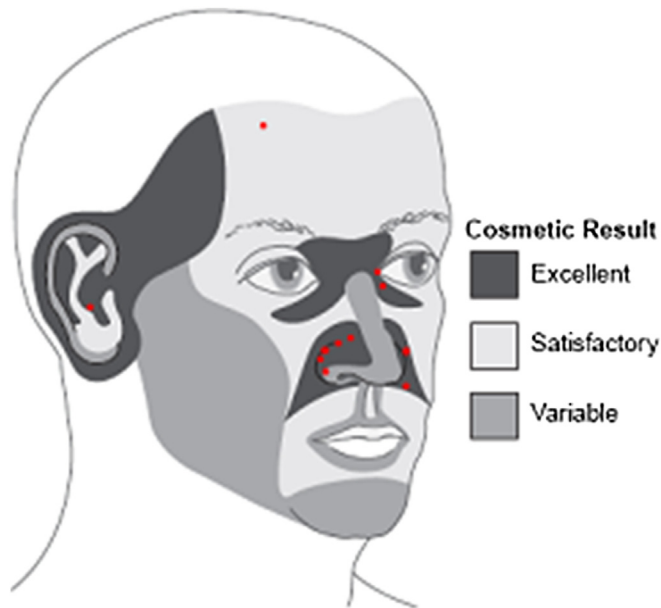


Figure 1 Acceptable cosmetic outcome of secondary intention healing on a particular anatomic area of the face. The location of tumors in our patients (red spots) is shown on the figure. Note. From "Wound healing by secondary intention: a cosmetic appraisal" by JA Zitelli, 1983. *J Am Acad Dermatol* 9, p 407–15. Adapted with permission.

(Table 1). All tumors were basal cell carcinoma except for one basosquamous carcinoma that was confirmed histopathologically. The tumors of 10 patients were located on the concave areas of the face and one patient's tumor was on the convex area (Figure 1). The sizes of the tumors ranged from 0.3 to 3 cm (average, 1 cm) and were noted for 4 months to 10 years (mean, 2.8 years) by the patients before operation. The benefits and risks of SIH were well explained to patients before surgery.

Secondary intention healing

The facial tumors were excised with adequate free margins, usually 3–5 mm. The skin defect after tumor excision ranged from 1.3 to 4 cm. Primary closure or closure by skin graft or flap were considered to be less ideal than SIH. All patients were instructed to change the wound dressing once daily with topical antibiotic ointment after gentle cleansing with normal saline, and then cover

the wound with gauze. All patients were prescribed oral cephalexin and acetaminophen four times daily for 1 week after operation.

The subjective evaluations included degree of wound pain (none, mild, moderate, and severe); ease of wound care (easy, fair, difficult, and troublesome); and satisfaction with cosmetic outcome (satisfied or not satisfied). Objective evaluations, including time to complete wound healing, wound infection, tumor recurrence, and cosmetic outcome with photographs using a categorical judgment scale (poor, average, good, and excellent),⁷ were assessed by two physicians blinded to the study.

Results

All patients were followed up 3–65 months (median, 13 months) after surgery (Table 1). All tumors were located at concave areas of the face except for one on the forehead (Figure 2C). One tumor (in patient 4) had been treated with liquid nitrogen spray and one (in patient 5) had been partially excised at another clinic.

The operation was completed in 30 minutes on average. The wounds needed 2–6 weeks (average, 4 weeks) to heal completely. No recurrence of tumor was found during 3–65 months' (mean, 22.3 months) follow-up.

Postoperative wound care was neither difficult nor troublesome for all patients (easy in two patients [18.2%] and fair in nine patients [81.9%]). Analgesic agents other than acetaminophen was not required because there was no wound pain in seven patients (63.3%) and only mild pain in four patients (36.4%). No wound infection was observed and all patients were satisfied with the cosmetic outcome. Objective cosmetic outcome was good to excellent in 91% of patients (good, 77.3%; excellent, 13.6%) (Figure 2). In particular, patient 10 had two facial tumors. The tumor on the left nasofacial sulcus was excised earlier and the wound was closed with primary closure, which resulted in mild nostril deformity. The tumor on the left nasolabial fold was left to SIH. Both the patient and surgeon were more satisfied with the cosmetic result of SIH (Figure 3).

Discussion

We reported the success and satisfactory results of SIH in a series of patients with basal cell carcinoma of the face after excision. In the current era of elegant and elaborate reconstructive techniques, SIH is often underutilized. However, under certain circumstances, SIH can offer functional and cosmetic outcomes that equal or are superior to those achieved by primary closure, grafts, and flaps.^{4–6} This simple reconstructive method allows optimal wound bed

Table 1 Demographic data of patients.

Patient number/ sex/age (y)	Location	Tumor size (cm)	Duration (y)	Operation time (min)	Healing time (wk)	F/U (mo)	Objective cosmetic outcome rated by two dermatologists
1/M/86	Inner canthus	3	10	50	5	13	G, G
2/M/76	Nasal ala	1.2 × 1	4	40	3	65	G, A
3/M/67	Forehead	1	4	20	3	38	G, G
4/M/79 ^a	Ear	0.4	6	25	4	36	G, G
5/M/57 ^b	Nasal ala	0.5	1	30	4	40	G, G
6/F/78	Nasolabial fold	0.5	1	25	4	15	G, G
7/M/77	Nasal ala	1	1	30	6	13	A, G
8/M/66 ^c	Nasal ala	0.5	0.3	30	4	8	G, G
9/F/75	Inner canthus	1.5 × 1.2	1.5	40	3	8	G, E
10/F/73	Nasofacial sulcus	0.3	1	40	5	6	E, E
11/M/75	Nasal ala	0.3	1	25	2	3	G, G
Mean, 73		0.9 × 0.9	2.8	32.3	3.9	22.3	

A = average; E = excellent; F/U = follow-up; G = good.

^a This patient had been treated with cryosurgery.

^b Inadequate excision.

^c Basosquamous carcinoma.



Figure 2 (A) A basal cell carcinoma on the left nasolabial fold of a 73-year-old woman was excised and the wound healed with secondary intention. Neither scar nor pigmentation change was present at 2 months postoperation. It was graded as excellent cosmesis in our grading score. (B) A basal cell carcinoma on the left inner canthus of a 75-year-old woman healed with a little mismatch in edge contour with good color match to surrounding skin after secondary intention wound healing. The cosmetic outcome was graded as good. (C) A basal cell carcinoma on the right forehead of a 67-year-old man healed with a mild depressed scar with good color match after secondary intention wound healing at week 3 postoperation. The cosmetic result was graded as average.

surveillance for tumor recurrence with a low complication rate, and the avoidance of complex procedures in patients who are at risk of long operation time.⁸ However, SIH in anatomic areas with high contractile forces, such as eyelid margins and eyebrow and lip vermilion borders, may result in retraction of free tissue margins. Thus, this technique is not recommended in these anatomic areas. Disadvantages of SIH include prolonged healing time, the need for daily wound care, and occasionally unpredictable cosmetic

results.^{9,10} The cosmetic outcome can only be assessed after complete wound healing.

There are some factors to consider when choosing patients for SIH. Location is probably the most important predictive factor for the esthetic outcome SIH.^{4,11} Wound contraction is usually more favorable in concave areas. The extent of wound contraction depends on the initial wound size and is positively correlated with the degree of surface concavity, adjacent skin laxity, and the



Figure 3 Better cosmesis was achieved with secondary intention healing than healing with primary closure on the same patient. A 78-year-old woman had a 1-year history of basal cell carcinoma on the left nasofacial sulcus and nasolabial fold. (A) Primary closure was performed after tumor excision and resulted in deviation of the patient's nostril. (B) A tumor on the patient's left nasolabial fold was left to heal by secondary intention, which showed good cosmetic outcome. The nostril deviation improved with time.

action of underlying skeletal muscles.¹² The favorable outcome in our patients may relate to relatively small tumor sizes in our series (average, 1 cm). A small wound (<1 cm) can heal more than 70% by wound contracture with acceptable cosmetic outcome in comparison with a larger wound (>2.5 cm in diameter).^{13,14} A superficial defect, even on a convex surface, may also heal with acceptable cosmesis as illustrated by the wound on the forehead in patient 3 (Figure 2C).^{4,15} Aged skin (in patients with mean age 73 years) may be another factor attributed to a more favorable outcome in our patients. Skin in elderly patients is more relaxed and the presence of irregular contour and pigment can readily camouflage operation scars. Indeed, several authors suggested that elderly patients are better candidates for SIH.^{5,8,14,15}

The traditional wound dressing for an incisional wound contains three layers – a nonadhering layer in contact with the wound, an absorptive layer that absorbs wound exudates, and a binding layer to fix the dressing in place.¹⁶ However, the dressings may be too bulky and cumbersome for patients and the relatively dry environment is not optimal for wound healing. An occlusive or semioclusive dressing that provides a moist healing environment is believed to facilitate wound healing by accelerating reepithelialization and minimizing desiccation, necrosis, and pain.^{16,17} For our patients, the goal was a simple wound dressing that could be done by the patient at home. We educated the patients on how to clean the wound with normal saline and cover with gauze after filling the wound with

antibiotic ointment. The ointment provides a semioclusive environment for the wound. Indeed, all wounds healed without complications within 4 weeks.

In conclusion, our results suggest that SIH is a simple technique for wound closure after excision of nodular basal cell carcinoma if the wound is smaller than 2.5 cm and located over concave areas of the face. In such clinical settings, SIH proved to be an alternative for wound closure, with good to excellent cosmetic results.

Acknowledgments

The study was supported by the National Science Council of Taiwan grants NSC992627E033001 and NSC1002627E033001 to Dr Tak-Wah Wong.

References

1. Mohs FE. Chemosurgery for the microscopically controlled excision of skin cancer. *J Surg Oncol* 1971;**3**:257–67.
2. Mohs FE. Chemosurgery. *Clin Plast Surg* 1980;**7**:349–60.
3. Shriner DL, McCoy DK, Goldberg DJ, Wagner Jr RF. Mohs micrographic surgery. *J Am Acad Dermatol* 1998;**39**:79–97.
4. Zitelli JA. Secondary intention healing: an alternative to surgical repair. *Clin Dermatol* 1984;**2**:92–106.
5. Moscona R, Pnini A, Hirshowitz B. In favor of healing by secondary intention after excision of medial canthal basal cell carcinoma. *Plast Reconstr Surg* 1983;**71**:189–95.
6. Bernstein G. Healing by secondary intention. *Dermatol Clin* 1989;**7**:645–60.
7. van der Eerden PA, Lohuis PJ, Hart AA, et al. Secondary intention healing after excision of nonmelanoma skin cancer of the head and neck: statistical

- evaluation of prognostic values of wound characteristics and final cosmetic results. *Plast Reconstr Surg* 2008;**122**:1747–55.
8. Goldwyn RM, Rueckert F. The value of healing by secondary intention for sizeable defects of the face. *Arch Surg* 1977;**112**:285–92.
 9. McGrath MH, Simon RH. Wound geometry and the kinetics of wound contraction. *Plast Reconstr Surg* 1983;**72**:66–73.
 10. Cordoro KM, Russell MA. Minimally invasive options for cutaneous defects: secondary intention healing, partial closure, and skin grafts. *Facial Plast Surg Clin North Am* 2005;**13**:215–30. v.
 11. Diwan R, Tromovitch TA, Glogau RG, Stegman SJ. Secondary intention healing. The primary approach for management of selected wounds. *Arch Otolaryngol Head Neck Surg* 1989;**115**:1248–9.
 12. Hinrichsen N, Birk-Sorensen L, Gottrup F, Hjordtal V. Wound contraction in an experimental porcine model. *Scand J Plast Reconstr Surg Hand Surg* 1998;**32**:243–8.
 13. Mott KJ, Clark DP, Stelljes LS. Regional variation in wound contraction of mohs surgery defects allowed to heal by second intention. *Dermatol Surg* 2003;**29**:712–22.
 14. Lawrence CM, Comaish JS, Dahl MG. Excision of skin tumours without wound closure. *Br J Dermatol* 1986;**115**:563–71.
 15. Zitelli JA. Wound healing by secondary intention: a cosmetic appraisal. *J Am Acad Dermatol* 1983;**9**:407–15.
 16. Lionelli GT, Lawrence WT. Wound dressings. *Surg Clin North Am* 2003;**83**:617–38.
 17. Dziejwski P, James S, Taylor D, et al. Modern dressings: healing surgical wounds by secondary intention. *Hosp Med* 2003;**64**:543–7.