Successfully Closing an Acquired Palatal-fistula Using a Turnover Flap from a Previously Transferred Forearm-free-flap

Jason Ashville, BS*†
Hina Panchal, MD, MPH*
Evan B. Rosen, DMD, MPH‡
Evan Matros, MD, MMSc, MPH*

Summary: Palatal fistula between the oral and nasal cavities occurs in about 20% of palatal repairs after oncologic resection. Although healing by secondary intention may be employed as an initial strategy, persistent nonhealing symptomatic fistula necessitates intervention. Folded free flap used for primary repair of palatpectomy defects enables placement of epithelialized tissue on both the oral and nasal cavities. In case of acquired palatal fistula, a turnover flap can be easily created, based on the free margin of the folded forearm free flap to serve as a reconstructive lifeboat. (Plast Reconstr Surg Glob Open 2017;5:e1598; doi: 10.1097/GOX.0000000000001598; Published online 28 December 2017.)

Surgical resection of palatal tumors creates a palatomaxillary defect, leading to a variety of potential complications including hypernasal speech, oronasal regurgitation, difficulty in swallowing, and impaired masticatory function. Any of these complications can substantially diminish health-related quality of life.1 The postpalatomegallecctomy defect can be reconstructed using either a palatal obturator or a free tissue transfer with or without a bone graft. One particular option is a radial forearm free flap (RFFF) folded onto itself to create a double-layer closure allowing both oral and nasal cavities to be lined by epithelialized tissue. However, incomplete healing between the flap and native palate may lead to an acquired fistula occurring in up to 20% of patients.2 The literature on the management of acquired fistulae after cleft palate repair is abundant; however, information on oncologic fistula repair is scant.3 The aim of this report is to present a case of acquired palatal fistula closed using a novel local turnover flap based on the previous free flap used for closure of the initial palatomegaly defect.

From the *Biomolecular Science, Plastic and Reconstructive Surgery Service, Memorial Sloan Kettering Cancer Center, New York, N.Y.; †University of Michigan, Ann Arbor, Mich.; ‡Dental Service, Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, N.Y.

Received for publication July 28, 2017; accepted October 20, 2017.

Supported in part through the NIH/NCI Cancer Center Support Grant P30 CA 008748.

Copyright © 2017 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

DOI: 10.1097/GOX.0000000000001598

CASE REPORT

A 48-year-old man with a 11 × 10 × 21 mm3 adenoid cystic carcinoma of the left hard palate underwent a left partial maxillectomy, resulting in a Cordeiro type 2A maxillectomy defect of size 40 mm at the junction of the soft and hard palate. Immediate reconstruction was achieved using a folded RFFF (FRFFF) with 2 skin islands, each measuring 55 × 50 mm2. One island was used intraorally, whereas the other was used for reconstruction of the nasal floor. Microvascular anastomosis was performed between the radial and facial arteries in the end-to-end fashion, and cephalic and internal jugular vein, using nonabsorbable suture. Postoperatively at 2 weeks, the patient presented with a 5 × 5 mm2 oronasal fistula at the junction of the neo-palate and native hard palate (Fig. 1).

As the fistula remained patent and symptomatic, closure of the oronasal fistula was performed at 6 months. Intraoperatively, the fistulous tract was completely excised. Separate flaps were designed to reconstruct the nasal lining and palatal mucosa (Fig. 2). First, a 15 × 15 mm2 turnover flap with its base at the free margin of the radial forearm flap was created to close the nasal floor. The flap was incised and turned over like a book such that the radial forearm skin now lined the nasal cavity (Fig. 3). The transposition flap was elevated off the remaining hard palate to completely cover the former fistula site with a second layer of vascularized tissue. The donor areas for the radial forearm turnover and palatal transposition flaps were allowed to remucosalize secondarily.

Disclosure: The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.
Postoperatively, the patient was put on a nasogastric tube for 7 days followed by slow dietary advancement. At 2-month follow-up, the patient showed complete healing of the fistula and flap donor sites (Fig. 4). On functional assessment, he was able to eat and drink without oronasal regurgitation and had normal speech. The patient subsequently underwent laser ablation of hair follicles. At 2-year follow-up, there were no signs of recurrent cancer or fistula formation (Fig. 4).

DISCUSSION

Free tissue transfers are the most effective means to close acquired palatal defects, specifically either the radial forearm or anterolateral thigh free flaps because of their thin pliable skin and ease of being folded onto themselves. Soft-palate fistula presents a variety of complications, which disturbs oronasal function, making closure necessary for oral proficiency and improved quality of life. Given the folded nature of the original forearm flap reconstruction, a turnover flap based on the blood supply from the nasal skin island can be employed to close the acquired fistula. A local palatal transposition flap can then be used to stabilize the turnover flap, creating a bilayer closure. Similar approaches of creating a local turnover flap have been described in the literature for the closure of tracheocutaneous and urethrocutaneous fistula.

The ability to perform a turnover flap is contingent upon the original reconstruction being performed with 2 skin islands, as there would be no blood supply to a turnover flap of a single island at its free margin. Furthermore, single island flaps, which leave a raw surface on the nasal side, are not preferred because they can be associated with crusting, nasal discharge, and bacterial overgrowth causing malodor. Anterolateral thigh flaps are equally versatile and offer high success rates similar to those of radial forearm flap reconstruction of the palate. Thus, free flaps are the ideal means of repairing most moderate-sized oncologic palatal defects because of their ability to introduce highly vascularized tissue for primary wound healing.

Other reconstruction approaches have been described for acquired palatal fistula, but there is no well-defined classification system or treatment algorithm similar to postpalatoplasty fistulae repair for congenital defects. Traditionally, locoregional flaps such as the pharyngeal, tongue, and uvulopalatal flap have been described for palatal fistula repair. The facial artery musculomucosal flap is perhaps the most utilized intraoral flap because of its robust blood supply and the favorable arc of rotation; however, a sacrifice of the facial artery often occurs along with the removal of the submandibular gland as part of the neck dissection. For small fistulae in the setting of limited local options, acellular dermal matrices can be used, but with a high failure rate. Prevention of fistula formation in oncologic oral reconstruction may be attained by...
use of Mitek mini bone anchors, which can provide secure support to the soft flap and avoid dehiscence.10

CONCLUSION

The bilayer design of a folded free flap for oncologic palatal repair provides an opportunity for the creation of a turnover flap in the event of postoperative fistula formation.

Evan Matros, MD, MMSc, MPH
Plastic and Reconstructive Surgery Service
Memorial Sloan Kettering Cancer Center
1275 York Avenue, MRI 1036
New York, N.Y. 10065
E-mail: matrose@mskcc.org

REFERENCES

1. Bernhart BJ, Huryn JM, Disa J, et al. Hard palate resection, microvascular reconstruction, and prosthetic restoration: a 14-year retrospective analysis. Head Neck 2003;25:671–680.
2. Elsherbiny M, Mebed A, Mebed H. Microvascular radial forearm fasciocutaneous free flap for palatomaxillary reconstruction following malignant tumor resection. J Egypt Natl Canc Inst. 2008;20:90–97.
3. Marshall DM, Amjad I, Wolfe SA. Use of the radial forearm flap for deep, central, midfacial defects. Plast Reconstr Surg. 2003;111:56–64; discussion 65.
4. Miyamoto S, Sakuraba M, Nagamatsu S, et al. Combined use of anterolateral thigh flap and pharyngeal flap for reconstruction of extensive soft-palate defects. Microsurgery 2016;36:291–296.
5. Futran ND, Gal TJ, Farwell DG. Radial forearm free flap. Oral Maxillofac Surg Clin North Am. 2003;15:577–591, vi–vii.
6. Kitazawa T, Shiha M. Closure of a tracheocutaneous fistula with a local turnover flap combined with pregrafted palatal mucosa: a case report. Eplasty 2016;16:e30.
7. Losee JE, Smith DM, Afifi AM, et al. A successful algorithm for limiting postoperative fistulae following palatal procedures in the patient with orofacial clefting. Plast Reconstr Surg. 2008;122:544–554.
8. Pribaz J, Stephens W, Crespo L, et al. A new intraoral flap: facial artery musculomucosal (FAMM) flap. Plast Reconstr Surg. 1992;90:421–429.
9. Aldekhayel SA, Sinno H, Gilardino MS. Acellular dermal matrix in cleft palate repair: an evidence-based review. Plast Reconstr Surg 2012;130:177–182.
10. Arnez ZM, Novati FC, Ramella V, et al. How we fix free flaps to the bone in oral and oropharyngeal reconstructions. Am J Otolaryngol. 2015;36:166–172.