Endoscopic Nasopharyngectomy for Recurrent Nasopharyngeal Carcinoma

Ming-Yuan Chen, Yi-Jun Hua, Xiang-Bo Wan, Rui Sun, Pei-Yu Huang, Yan-Qun Xiang, Ling Guo, Hao-Yuan Mo, Yue Yang and Ming-Huang Hong

Otolaryngology -- Head and Neck Surgery 2012 146: 409 originally published online 6 January 2012
DOI: 10.1177/0194599811430918

The online version of this article can be found at:
http://oto.sagepub.com/content/146/3/409

Published by:
SAGE
http://www.sagepublications.com

On behalf of:
AMERICAN ACADEMY OF
OTOLARYNGOLOGY--
HEAD AND NECK SURGERY

American Academy of Otolaryngology- Head and Neck Surgery

Additional services and information for Otolaryngology -- Head and Neck Surgery can be found at:

Email Alerts: http://oto.sagepub.com/cgi/alerts
Subscriptions: http://oto.sagepub.com/subscriptions
Reprints: http://www.sagepub.com/journalsReprints.nav
Permissions: http://www.sagepub.com/journalsPermissions.nav

>> Version of Record - Mar 1, 2012

OnlineFirst Version of Record - Jan 6, 2012

What is This?
A Posteriorly Pedicled Middle Turbinate Mucoperiosteal Flap Resurfacing Nasopharynx after Endoscopic Nasopharyngectomy for Recurrent Nasopharyngeal Carcinoma

Ming-Yuan Chen, MD, PhD1, 2, Yi-Jun Hua, MD1, 2, Xiang-Bo Wan, MD, PhD1, 2, Rui Sun, MD, PhD1, 2, Pei-Yu Huang, MD, PhD1, 2, Yan-Qun Xiang, MD, PhD1, 2, Ling Guo, MD1, 2, Hao-Yuan Mo, MD1, 2, Yue Yang, MD, PhD3, and Ming-Huang Hong, MD1, 2

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

Keywords
nasopharyngeal carcinoma, nasopharyngectomy, endoscope, middle turbinate, flap

Received August 16, 2011; revised October 19, 2011; accepted November 3, 2011.

Radical radiotherapy is the primary treatment for newly untreated nasopharyngeal carcinoma (NPC), but salvage surgery is the first choice for some selected local recurrent nasopharyngeal carcinomas (rNPC). With the development of nasal endoscopic surgery, the approaches for nasopharyngectomy are being switched from open surgeries, such as transpalate, transcervical, and maxilloswing, to the endoscopic endonasal approach (EEA). However, the healing time of nasopharyngeal defects was up to a median 12 weeks, and during this period, some of those patients complained of postoperation headache, accompanied by crusting and heavy odor in the nasal cavity and frequent clearance. Therefore, we designed a new technique to resurface the nasopharyngeal defects using a posterior pedicled middle turbinate mucoperiosteal flap (middle turbinate flap [MTF]) based on the middle turbinate artery, a branch of the sphenopalatine artery.

Patients and Methods
From May 2005 to June 2009, 18 rNPC patients, after 1 or 2 prior cycles of radiotherapy, received salvage endoscopic nasopharyngectomy followed by MTF reconstruction. The present study was approved by the ethical committee of Sun Yat-sen University Cancer Centre. Written informed consent was obtained from all the patients.

Surgical Technique
Endoscopic nasopharyngectomy was performed as previously described by Chen et al., and then the ipsilateral middle turbinate (MT) was selected to harvest the MTF. First, 2 parallel incisions were performed on both sides of the MT following the sagittal plane. The superomedial incision (line I) could be extended to the superior nasal meatus or near the roof of the nasal cavity and the inferior incision (line II) extended to the middle meatus to harvest a wider flap. A vertical incision (line III) was placed in the anterior head of the MT to connect the 2 previous incisions. When both sides of the middle turbinate mucoperiosteum were separated from the MT completely, except for a posterior pedicle to avoid injury to the MT artery, the flap was gently rotated backward to cover the nasopharyngeal defect (Figures 1 and 2). A nasal packing was inserted to gently press the MTF against the defect and pulled out in 7 to 10 days. Regional perfusion with mint or cod liver oil twice a day and crust cleaning every 2 weeks was required to keep the wound humid and clean until the wound recovered.

1Department of Nasopharyngeal Carcinoma, Sun Yat-sen University Cancer Center, PR China
2State Key Laboratory of Oncology in South China, Sun Yat-sen University Cancer Center, PR China
3Department of Head and Neck Surgery, West Los Angeles Medical Center, Los Angeles, California, USA

Presented at the 4th World Congress of International Federation of Head and Neck Oncologic Societies (IFHNOS); June 15, 2010; Seoul, Korea.

Corresponding Author:
Ming-Huang Hong, MD, Department of Nasopharyngeal Carcinoma, Sun Yat-sen University Cancer Center, 651 Dongfeng Est Road, Guangzhou 510060, PR China
Email: hongmy@sysucc.org.cn
Results

All 18 surgical procedures were performed without severe surgery-related complications. The median operation time for the reconstructions was 115 minutes (range, 60-225 minutes), with an average blood loss of 55 mL (range, 30-200 mL). During 12 to 54 months of follow-up (median, 31 months), no postoperative headache was reported in any of the 18 cases, and only 3 patients had experienced local or distant failure, 1 of whom died of tumor.

Fifteen flaps relined the defects completely in a median 53 days (range, 20-84 days), had good self-clean ability, and maintained constant humidity without crusting or producing a heavy odor. Furthermore, no frequent maintenance for the flaps was needed after surgery. However, the remaining 3 flaps survived but failed to reline the whole defects in these patients received 2 prior cycles of radiotherapy with excessive total dosages of radiotherapy (140.31, 145.02, and 142.32 Gy, respectively).

Discussion

Previous studies on nasopharyngectomy reported significant rates of partial and total graft failure by using free grafts of turbinate mucosa and partial-thickness skin to resurface the nasopharynx but excellent functional recovery in 2 patients who underwent maxillary-swing approach by using a free radial forearm flap. But how to resurface the nasopharynx after endoscopic nasopharyngectomy using a vascularized local flap in EEA remains unreported. The Hadad-Bassagasteguy flap (HBF), based on the posterior septal

Figure 1. Diagrams to outline the procedure for posterior pedicled middle turbinate mucoperiosteal flap. According to the inside (line I), outside (line II), and front (line III) incisions of middle turbinate mucoperiosteum (MTM), both sides of MTM were separated and rotated back to cover the nasopharyngeal defect except a pedicle tip.

Figure 2. Resurfacing the nasopharyngeal defect by MTF. With the front middle turbinate mucoperiosteum (MTM) excised and both sides of MTM separated, the middle turbinate flap (MTF) was rotated back to cover the nasopharyngeal defect except the posterior pedicle. Two months later, the missed space of middle turbinate was functionally compensated by septum mucosa hypertrophy.

Figure 3. A five-year-old girl with nasopharyngeal defect treated with a free radial forearm flap after EEA. A. Line I, B. Line II, C. Line III, D. Posterior pedicle.
artery, has been widely used to reconstruct defects of the skull base. We also have applied successfully a modified nasal septum and floor flap to resurface the nasopharyngeal defects after endoscopic nasopharyngectomy in rNPC. However, in some cases, the posterior septal artery was previously interrupted, which precludes the use of HBF. An inferior turbinate mucoperiosteal flap pedicled on the inferior turbinate artery has been used to reconstruct the skull base when the HBF is not available. However, we found that rNPC patients spoke with a strong nasal sound and experienced severe nasal xerosis when their inferior turbinate was removed.

The MTF was reported to be advantageous for the reconstruction of limited defects of the anterior median skull base and sella in a fresh cadaveric study and applied successfully in 10 patients for skull base reconstruction. In this study, we originally explored the development of an extensive MTF, which required extending the superior incision to superior nasal meatus or near the roof of the nasal cavity and the inferior incision to the middle meatus to harvest a wider flap than MT surface and used it for covering the nasopharyngeal defect in rNPC patients for the first time.

Although the MTF is not large enough to cover the entire nasopharyngeal defect because of the limited size of the MT, most patients (83.3%, 15/18) achieved functional recovery without postoperative headache with MTF reconstruction. In the other 3 patients who received 2 cycles of radiotherapy with a total dosage of more than 140 Gy, the flaps survived without patients complaining of postoperation headache, even though they failed to cover the entirety of the defects.

Conclusion
The MTF is a new and reliable option to resurface nasopharyngeal defects after endoscopic nasopharyngectomy and to avoid postoperative headache for most rNPC patients. The surgical procedure is safe and minimally invasive with promising oncological outcomes.

Acknowledgment
We thank Professor Jian-Sheng Han, University of South China Medical School, for lending diagrams to this article.

Author Contributions
Ming-Yuan Chen, substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data, drafting the article and revising it critically for important intellectual content, and final approval of the version to be published; Yi-Jun Hua, contributions to conception and design, acquisition of data; Xiang-Bo Wan, contributions to acquisition of data, or analysis and interpretation of data; Rui Sen, contributions to acquisition of data, or analysis and interpretation of data; Pei-Yu Huang, contributions to acquisition of data; Yan-Qun Xiang, contributions to acquisition of data; Ling Guo, contributions to acquisition of data; Hao-Yuan Mo, contributions to acquisition of data; Yue Yang, final approval of the version to be published; Ming-Huang Hong, final approval of the version to be published.

Disclosures
Competing interests: None.
Sponsorships: None.
Funding source: National Natural Science Foundation of China, No. 81071890; Science and Technology Planning Project of Guangdong Province, China, No. 2009B030801189.

References