Transoral Robotic Submandibular Gland Transposition to Reconstruct Radical Tonsillar Resection Defects

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Introduction

Tonsillar squamous cell carcinoma (SCC) has an incidence rate of 8.4 cases per 100,000 which has been rising over the last 40 years due to the HPV epidemic.

Radiotherapy or combined chemotherapy and radiation (CXRT), while comparable to surgery in local-regional control and survival rates, has significant toxicities including mucositis, xerostomia and dysphagia.

Transoral robotic surgery (TORS) has emerged as an alternative form of treatment with better saliva-related quality of life than CXRT. However, complications include dysphagia, pain and risk of postoperative hemorrhage

Submandibular gland transposition flap (SGTF) was first described as a way to mitigate radiation induced xerostomia. We now propose this surgical technique to reconstruct TORS tonsillar defects to reduce dysphagia and postoperative hemorrhage.

Methods

Ten patients from 2019 to 2021 with HPV+ SCC of the palatine tonsils were included in the study.

Each patient underwent a selective neck dissection for levels II, III, and IV. Cervical level IB was carefully dissected to preserve venous and arterial blood supply to the submandibular gland, along with Wharton's duct (Fig A). A background was placed at the deep margin to help locate the submandibular gland intraorally. Next, TORS radical tonsillectomy was performed and the background identified at the deep margin(Fig B). The submandibular gland was then transposed into the oral surgical defect and sutured in place with robotic assistance (Fig C).

Results

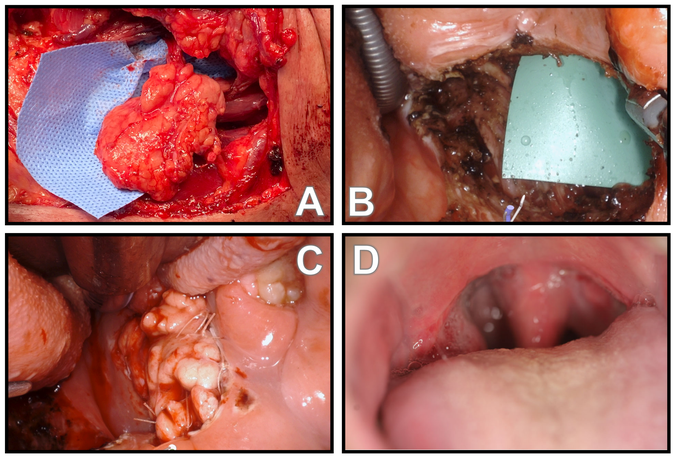


Figure A. Left Submandibular gland isolated in the neck
Figure B. Intraoral radical tonsillectomy defect with background
Figure C. Submandibular gland transposed into tonsillectomy defect
Figure D. Well-healed tonsillar fossa at POD 14.

Age	TNM Staging	P16+ SCC Site	LOS (days)	POD diet (days)	POD 1 Pain	Bleeding
50	T2N1M0	R	3	1	0	none
63	T1N2M0	L	2	1	6	none
79	T1N1M0	L	3	1	4	none
72	T3N1M0	L	9	8	6 (POD 5)	none
64	T1N1M0	L	2	1	4	none
53	T2N1M0	L	3	2	5	Contralateral
68	T2N1M0	L	4	2	7	none
71	T2N0M0	R	4	1	1	none
56	T2N2M0	L	2	1	4	none
57	T3N2M0	R	2	1	3	none

Table 1. Patient characteristics.
10 patients with a follow up average of 8 months. Average length of stay (LOS) in the hospital is 3.4 days and post operative day (POD) diet was initiated in average of 1.9 days. Average POD 1 pain is 4, except for the fourth patient who was intubate until POD 5. There were no surgical site bleeding at the flap reconstruction.

Discussion

Immediate reconstruction of the radical tonsillar resection defect with the transposed submandibular gland and covering the underlying exposed muscle fibers, vasculature, and nerve may lessen pain, decrease time to satisfactory swallowing, potentially reduce the risk of postoperative hemorrhage, and shorten the length of hospital stay.

Ten patients with T1-T3 tumors were successfully reconstructed with SGTF with average hospital length of stay of 3.4 days and average peroral diet initiation within 1.9 days. Previous studies have shown hospital length of stay ranging from 3.7 to 7.6 days[4].

In current literature, radical tonsillectomy surgical sites are left to heal by secondary intention. 11% of patients need temporary feeding tube and only 69-73% of patients can tolerate oral intake prior to discharge[5].

Although our cohort size is small, 100% of our patients were tolerating oral diet prior to discharge with initiation of diet within 1.9 days. There were no postoperative bleeding at the flap site. There was 1 case of bleeding from the contralateral tonsillectomy side.

Postoperative hemorrhage from TORS radical tonsillectomy can be fatal. The rate is reported to be 3.1% to 9.8%[6]. Immediate coverage of vessels by SGTF may help prevent catastrophic postoperative bleeding.

Future large-scale, non-inferiority studies comparing submandibular gland transposition that covers vessels at risk for bleeding, to only prophylactic ligation of vessels in the neck, will be needed to determine its potential benefits in reducing postoperative hemorrhage rates.

Studies have shown an occult metastasis rate of up to 5-8% in level 1 nodes in oropharyngeal carcinoma[13]. We acknowledge that intraoperative frozen specimen of level 1B may miss microscopic tumor due to limited sampling and some tissue loss, but final permanent specimens in all our patients did not show any signs of malignancy.

Conclusion

Submandibular gland transposition flap (SGTF) is a safe and feasible method to reconstruct oropharyngeal defect in radical tonsillectomy.

TORS-assisted submandibular transposition to reconstruct the oropharyngeal defect after deep TORS radical tonsillar resection is a viable option and may theoretically reduce dysphagia, pain and the risk of hemorrhage.

References

1. Parsons JT, Mendenhall WM, Stringer SP, Amdur RJ, Hinerman RW, Villaret DB, Moore-Higgs GJ, Greene BD, Speer TW, Cassisi NJ, Million RR. Squamous cell carcinoma of the oropharynx: surgery, radiation therapy, or both. Cancer. 2002 Jun 1;94(11):2967-80. doi: 10.1002/cncr.10567. PMID: 12115386.
2. Pang J, Ching HH, Sobel RH, Orosco RK, Califano JA 3rd, Wang RC, Sanghvi P, Coffey CS. Implementation of submandibular gland transfer: A multi-institutional study of feasibility and time to treatment. Head Neck. 2019 Jul;41(7):2182-2189. doi: 10.1002/hed.25685. Epub 2019 Feb 5. PMID: 30723965.
3. Young A, Bigcas J, Yang A, Reeve N, Kim Y, Wang RC. Transoral robotic submandibular gland transposition to reconstruct radical tonsillar resection defects. Head Neck 2021 Jan 27. doi: 10.1002/hed.26622. Online ahead of print. PMID: 33506547
4. Chung TK, Rosenthal EL, Magnuson JS, Carroll WR. Transoral robotic surgery for oropharyngeal and tongue cancer in the United States. Laryngoscope. 2015 Jan;125(1):140-5. doi: 10.1002/lary.24870. Epub 2014 Aug 5. PMID: 25093603; PMCID: PMC4347815.
5. Albergotti WG, Jordan J, Anthony K, Abberbock S, Wasserman-Wincko T, Kim S, Ferris RL, Duvvuri U. A prospective evaluation of short-term dysphagia after transoral robotic surgery for squamous cell carcinoma of the oropharynx. Cancer. 2017 Aug 15;123(16):3132-3140. doi: 10.1002/cncr.30712. Epub 2017 May 3. PMID: 28467606; PMCID: PMC5544540.
6. Hay, A., et al Hay A, Migliacci J, Karassawa Zanoni D, Boyle JO, Singh B, Wong RJ, Patel SG, Ganly I. Complications following transoral robotic surgery (TORS): A detailed institutional review of complications. Oral Oncol. 2017 Apr;67:160-166. doi: 10.1016/j.oraloncology.2017.02.022. Epub 2017 Feb 28. PMID: 28351571; PMCID: PMC5407467.
7. Stanford-Moore GB, Ochoa E, Larson A, Han M, Hoppe K, Ryan WR. Patterns of Nodal Metastases and Predictors of Occult Disease in HPV-Associated Oropharynx Cancer. Otolaryngol Head Neck Surg. 2021 Mar;164(3):624-630. doi: 10.1177/0194599820951473. Epub 2020 Sep 8. PMID: 32894979.