



Case Report

Squamous cell carcinoma initially arising in the midline of the dorsum of the tongue in a young adult: A case report and review of the literature

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ARTICLE INFO

Keywords:

Squamous cell carcinoma
Dorsum of tongue
Dorsum midline
Young adults

ABSTRACT

Squamous cell carcinoma (SCC) of the tongue typically affects individuals over 50 year of age, is relatively rare in patients who are less than 40, and occurs most often on the lateral borders. SCC of the dorsum of the tongue is relatively rare and reported to comprise only 2.9%–7.2% of all cases, and SCC in the midline of the tongue dorsum accounts for less than 1% of tongue carcinoma. We report an exceedingly rare case of SCC of the tongue arising in the midline of the dorsum in a 33-year-old man and review the literature. The patient was referred by a primary care physician and visited our hospital with a chief complaint of a mass in the midline of the tongue dorsum. Intraoral examination revealed a mass with a diameter of 14 × 13 mm anterior to the vallate papillae in the midline of the dorsum of the tongue. The mass was ellipse, well-circumscribed and elastic hard with no surrounding induration. There was no palpable enlarged lymph in the submandibular and cervical region. An incision biopsy was performed under local anesthesia. The pathological diagnosis was well-differentiated SCC. Based on a clinical diagnosis of tongue carcinoma T1N0M0, a partial glossectomy setting 10 mm or more safety margin around the tumor was performed under general anesthesia in June 2015. The postoperative course was uneventful, therefore, the patient was discharged on the 10th postoperative day. During follow-up for 3 years, there has been no dysfunction such as dysphagia and dysarthria, and no sign of recurrence or metastasis.

1. Introduction

Squamous cell carcinoma (SCC) of the tongue usually affects individuals over 50 year of age. It is relatively rare in patients who are less than 40 years old [1,2]. The incidence of young adults with SCC of the tongue is reported as 5.2% to 14.1% [1]. SCC of the tongue of the lateral borders is the most common, followed by the base of the tongue, the ventral surface, the apex, and the dorsum. Risk factors for SCC of the tongue include mechanical stimulation such as rubbing a sharp edge of dental caries and defective prostheses [3–5]. The lateral border of the tongue is the most susceptible site to mechanical stimulation and therefore SCC of the tongue in lateral borders occurs more than in other sites [6,7]. In contrast, the dorsum of the tongue is anatomically more difficult to receive the mechanical stimulation deriving from teeth and prostheses. For this reason, SCC of the dorsum of the tongue is reported to be only 2.9%–7.2% of all cases of SCC of the tongue [6,8–13]. As the dorsum of the tongue has no single, clear definition in the medical literature, for the purposes of this paper SCC of the dorsum of the tongue includes SCC arising not only in the midline but also in the right

side, in the left side and in the whole of dorsum of tongue [12]. Therefore, SCC in the midline of the tongue dorsum is very rare and accounts for less than 1% of tongue carcinoma [11,14]. There are some case reports of SCC in the dorsum of the tongue, but there are only a few case reports of SCC occurring on the midline of the dorsum of the tongue in a young adult.

We report an exceedingly rare case of SCC initially arising in the midline of the dorsum of the tongue in a 33-year-old man and review the literature.

2. Case report

A 33-year-old man had been aware of the feeling of discomfort in the tongue for 2 weeks. He visited a primary care physician and the mass formation in the dorsum of the tongue was identified. The patient was referred to our department in April 2015 for examination and treatment of the mass. Intraoral examinations revealed that the mass was found anterior to the vallate papillae in the midline of the dorsum of the tongue and had a diameter of 14 × 13 mm (Fig. 1). The mass was

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<https://doi.org/10.1016/j.ajoms.2018.12.001>

Received 1 June 2018; Received in revised form 5 December 2018; Accepted 5 December 2018

Available online 27 December 2018

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Fig. 1. Intraoral photograph on first visit. Mass formation at the dorsum of the tongue.

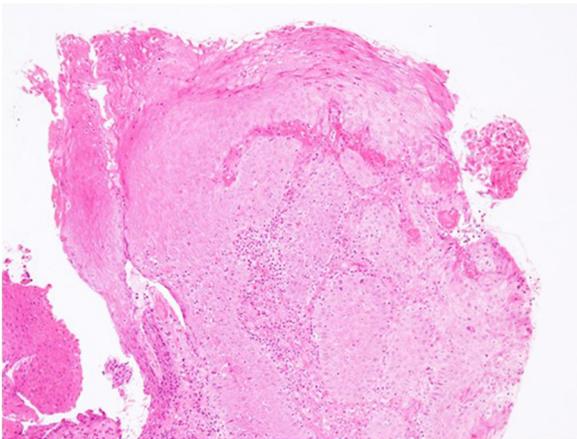


Fig. 2. Pathological examination of the biopsy. Infiltration of differentiated squamous cell carcinoma with stromal invasion (hematoxylin-eosin stain, original magnification $\times 100$).

ellipse, well-circumscribed, elastic hard with no surrounding induration. No spontaneous pain, tenderness, or dysfunction of motility and sensory in the tongue were observed. The other oral soft tissues were normal. There were no palpable enlarged cervical lymph nodes. There had been no other issues related to the tongue reported by the patient until this time. The patient had no significant medical history, was a non-smoker, and identified as an occasional drinker. There was no history of cancer in the family. A blood test was within normal range with no inflammation findings and a bacteriological examination on the surface of the tongue dorsum revealed resident bacteria in the oral cavity. To ascertain whether the mass reacted to anti-inflammatory therapy, the patient was given cefcapene-pivoxil (CFPN-PI) 300 mg per day for 5 days and oral cavity ointment containing an anti-inflammatory steroid agent, and gargles for 2 weeks. The examination after 2 weeks revealed that CFPN-PI was not effective and the size of the mass had not changed. Therefore, the mass was suspected to be a tongue tumor, and incision biopsy was performed under local anesthesia. Pathological examination of a biopsy showed infiltration of differentiated squamous cell carcinoma with stromal invasion (Fig. 2). Computed tomography (CT), positron emission tomography-computed tomography (PET-CT), and magnetic resonance imaging (MRI) examinations were performed. A fat suppression T1-weighted MRI revealed the tumor with a thickness of 3 mm in the midline of the tongue dorsum (Fig. 3). CT and PET-CT showed no lymph node metastasis in the submandibular and cervical regions. The clinical and laboratory findings led to a diagnosis of SCC in the midline of the dorsum of the tongue, T1N0M0. A partial glossectomy setting 10 mm or more safety margin around the tumor was performed under general anesthesia in

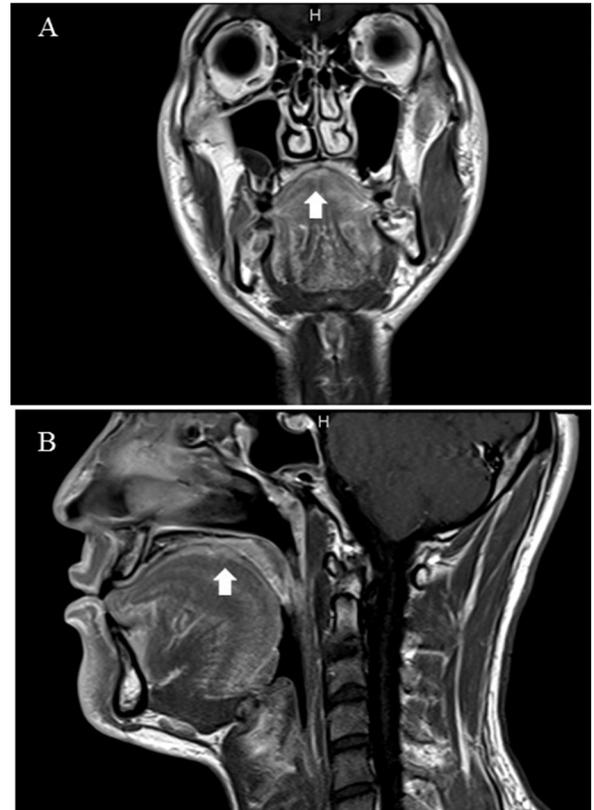


Fig. 3. A fat suppression T1-weighted MRI test before treatment: (A) coronal section, (B) sagittal section. The arrow indicates the enhanced tumor with a thickness of 3 mm in the midline of the tongue dorsum.

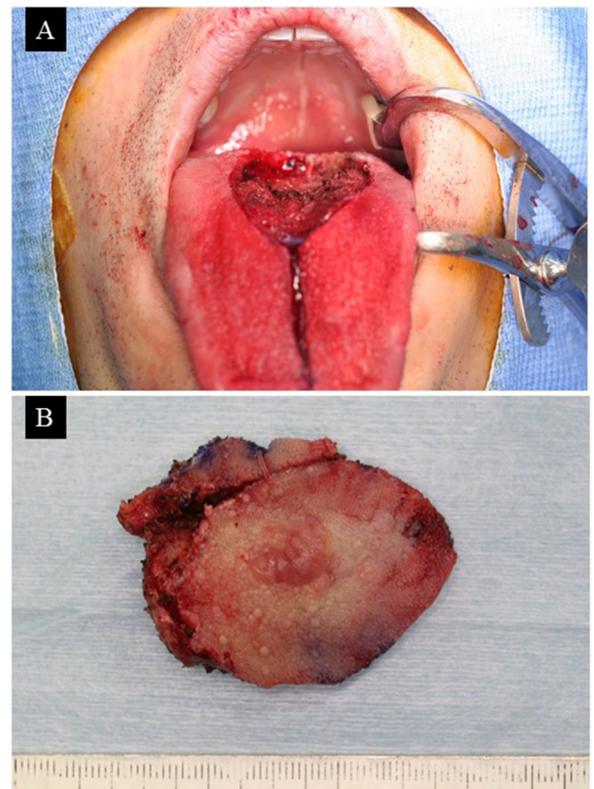


Fig. 4. Intraoperative photograph: (A) surgical field after resection, (B) surgical specimen measuring 48 \times 37 mm in size.



Fig. 5. Pathological examination of resection specimen. Squamous cell carcinoma infiltrating connective tissues beneath the specialized mucosa.

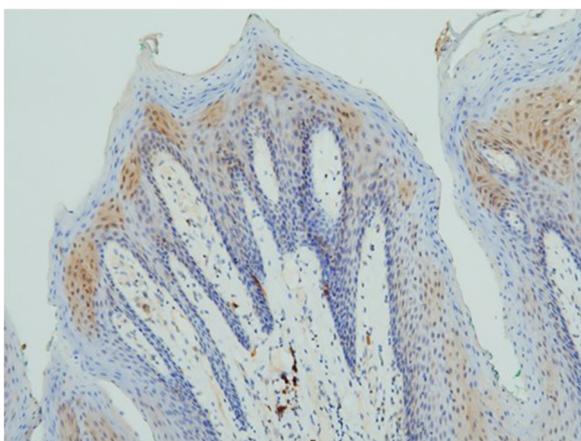


Fig. 6. Immunohistochemical staining of p16 of resection specimen. Immunohistochemical staining of p16 shows weak expression in resection specimen. (original magnification $\times 100$).

June 2015 (Fig. 4). Muscular layer suture and mucosal suture were performed on the surgical excision for primary suture. Pathological examination using the surgical specimen showed that SCC invaded a connective tissue under the epithelium (Fig. 5). A p16 immunohistochemical analysis shows weak expression in the resection specimen (Fig. 6). The postoperative course was uneventful, therefore, the patient was discharged on the 10th postoperative day. During the follow-up for 3 years after operation, there has been no dysfunction such as dysphagia and dysarthria, and no sign of recurrence or metastasis.

3. Discussion

Our search of the literature revealed that there are only 4 case reports, including ours, of SCC initially arising in the midline of the dorsum of the tongue in a young adult shown in Table 1 [11,15,16]. Of the 4 young adult patients we identified with SCC in the midline of the dorsum of the tongue, there were 1 man and 3 women, with a male-to-female (M/F) ratio of 1:3. The M/F ratio for all cases of SCC of the tongue is 1.5–2.4:1, and SCC of the tongue in young adults under the age of 40 is 1.1–1.6:1 [1,9,17]. The proportion of women with SCC of the tongue increases in younger patients [2,17,18]. Although the reason oral SCC in young patients is preferably found in females remains unclear, it is reported that other risk factors beyond tobacco and alcohol

consumption may be involved in carcinogenesis because young adult women have lower rates of smoking and alcohol consumption than men in the same age group, and when compared to the male population overall [1,17]. It is reported that another risk factor is human papilloma virus (HPV) infection which is involved in the increasing incidence of oral SCC [17]. However, oral HPV rates are higher in men than in women, and HPV may be absent in young women with SCC of the tongue [17]. More than 100 types of HPV have been identified, and only type 16 is most often associated with SCC of the tongue. So, it is possible that other HPV types may be associated with SCC of the tongue [17,19]. There are several ways of analyzing for specific HPV infection types, including PCR and *in situ* hybridization. The most common HPV is the high-risk-type HPV16. It has also been proposed that expression of p16 correlates with HPV infection [20]. There are several possible reasons for weak p16 expression. It is reported that 67–85% of SCC of the tongue were negative for the presence of p16 independent of the site of lesion [21,22]. Another reason may be that HPV is either not present or present at extremely low levels, as is the case for the majority of p16-positive SCC of the tongue, including those arising in young patients [21].

SCC of the tongue in young women may be an emerging and distinct clinical entity, although future research is necessary to clarify the reason [17]. Due to the small sample size, it remains unclear why there were more women than men in the 4 patients shown in Table 1. Staging of these 4 patients based on TNM classification revealed that 1 patient (25%) had stage 1, and 3 patients (75%) had stage 2, and all of the stages of the 4 patients were early stage cancer. There is a relationship between early stage tongue cancer and the patient's age, with the incidence of early stage cancer in all cases of SCC of the tongue and SCC of the tongue in young adults under the age of 40 being 54%–60% and 64%–66%, respectively [2,5]. There is a similar trend in SCC of the dorsum of the tongue in young adults [1,17,23]. The relation between early cancer detection in SCC of the dorsum of the tongue relative to all cases of SCC of the tongue is considered to be because the dorsum of the tongue is easily visualized by opening the mouth and it is possible to feel mass formation on the palate. Ease of detection may be the reason that lesions are identified at an early stage. These reasons may explain why all patients in Table 1 have early stage cancer. It is reported that there is often a benign lesion such as median rhomboid glossitis, bald tongue, oral candidiasis, or lichen planus, detectable before the squamous cell carcinogenesis site in the tongue dorsum [4,14,24–28]. Some cases are reported of SCC of the dorsum of the tongue progressing to advanced stage cancer because the SCC is treated as a follow-up to a previous lesion and subsequently develops into cancer [3,12,24,29]. On average, the observation period from an initial precancerous lesion such as median rhomboid glossitis and oral candidiasis to a cancer diagnosis is 1 year and 10 months, and 2 years for a stage 2 cancer diagnosis. In contrast, the observation period in the case of no precancerous lesion is 2 weeks with stage 1. The observation period from initial symptom to diagnosis of cancer has a tendency to be longer in cases where a precancerous lesion is present, than in the absence of a precancerous lesion. Even with SCC of the tongue, the presence of a precancerous lesion is very important for improving the prognosis and increasing the survival rate to detect and treat cancer early.

The clinical diagnosis of SCC of the dorsum of the tongue is difficult both because of its rarity and because it may be mimicked by a wide variety of benign and premalignant lesions. It is important to obtain a definitive diagnosis by performing a biopsy promptly when there is a possibility of cancer [12,13,26]. The treatment of the 4 patients in Table 1 varied, with 2 patients, including our patient, receiving only surgery, 1 patient receiving surgery followed by radiation treatment, and only radiotherapy being performed in the remaining patient. In cases of advanced SCC of the tongue dorsum, the resection range is wider than the lateral border because a complicated resection of the healthy tissue in the tongue tip direction from the characteristics of the site is required. So a functional disorder in the tongue such as dysarthria

Table 1

4 cases of SCC in the dorsum of the tongue in young adult.

Authors (Ref.)	Year	Patient's Age(Sex)	Initial symptom	Precancerous lesion	Risk factor	Observation period	Stage	Treatment
Gorsky [16]	1993	35 (F)	Reddish	Median Rhomboid Glossitis	Smoking	1 year and 10 months	T2N0M0	Radiation
Lustig [15]	1995	32 (F)	Mass	Oral candidiasis	Unknown	2 years	T2N0M0	Surgery
Goldenberg [11]	2000	36 (F)	Burning	None	None	Unknown	T2N0M0	Surgery, Radiation
Present study	2018	33 (M)	Mass	None	None	2 weeks	T1N0M0	Surgery

and dysphagia may occur [25,30–32].

In our case, a biopsy was performed 2 weeks after our first encounter with the patient. Since definitive diagnosis as SCC of stage 1 was obtained, a partial glossectomy setting 10 mm or more safety margin around the tumor was performed. The postoperative course was uneventful and no functional disorder has been recognized.

In conclusion, SCC of the dorsum of the tongue occurs very rarely in young adults. SCC of the dorsum of the tongue can develop from a wide variety of benign lesion such as median rhomboid glossitis and oral candidiasis, and progress to advanced cancer because it is followed as a previous lesion even after cancer occurs. There is a possibility that various dysfunctions in the tongue may appear after treatment for advanced cancer in the dorsum of the tongue. Early detection and treatment for SCC of the dorsum of the tongue in young adults are necessary to avoid many tongue dysfunctions after treatment because long-term survival is expected after treatment in young adults.

Therefore, in cases where SCC may be suspected, surgeons should perform a biopsy promptly to avoid delayed diagnosis, and start treatment early.

Ethical approval

Informed consent from the patient's guardian has been obtained prior to submission of this paper.

Conflicts of interest

The authors declare no conflict of interest with any part of submission of this paper.

Acknowledgment

I am deeply grateful to Professor Ishimaru for providing us the pathological findings.

References

- [1] Schantz SP, Guo-Pei Yu. Head and neck cancer incidence trends in young Americans, 1973–1997, with a special analysis for tongue cancer. *Arch Otolaryngol Head Neck Surg* 2002;128:268–74.
- [2] Hasegawa H, Matuura H, Ito Y, Hasegawa Y, Kano M. Squamous cell carcinoma of the tongue in patients under 40 years of age. *Head Neck Cancer Res* 1995;21:93–8.
- [3] Sagawa K, Terada T, Saeki N, Uwa N, Sakagami M. A case of squamous cell carcinoma of the dorsum of the tongue. *Pract Otol* 2009;102:347–51.
- [4] Hayashi Y, Yambe M, Shinoda T, Takeuchi Y, Goto Y, Tohna I, et al. Squamous cell carcinoma of the dorsum of tongue thought to be derived from Plummer-Vinson syndrome: case of report. *Jpn J Head Neck Cancer* 1989;15:192–6.
- [5] Ohkubo Y, Ohkubo J, Ikezaki S, Takeuchi S, Takenaga F. A study on 50 cases of tongue cancer. *Pract Otol* 2016;109:863–9.
- [6] Franzell EL, Lugas Jr. JC. Cancer of the tongue. Report of the management of 1554 patients. *Cancer* 1962;15:1085–99.
- [7] Gibbel MI, Cross JH, Ariel IM. Cancer of the tongue. A review of 330 cases. *Cancer* 1946;2:411–23.
- [8] Flamant R, Hayem M, Lazar P, Denoix P. Cancer of the tongue. A study of 904 cases. *Cancer* 1964;17:377–85.
- [9] Saxena VS. Cancer of the tongue: local control of the primary. *Cancer* 1970;26:788–94.
- [10] Kari S, Alho OP, Jokinen K, Hyryn Kangas K, Laara E. Carcinoma of the oral tongue in Northern Finland: trends in overall incidence and patient and tumour characteristics. *J Oral Pathol Med* 1997;26:480–3.
- [11] Goldenberg D, Ardekian L, Rachmiel A, Peled M, Joachims HZ, Laufer D. Carcinoma of the dorsum of the tongue. *Head Neck* 2000;22:190–4.
- [12] Okubo M, Iwai T, Nakashima H, Koizumi T, Oguri S, Hirota M, et al. Squamous cell carcinoma of the tongue dorsum: incidence and treatment considerations. *Indian J Otolaryngol Head Neck Surg* 2017;69:6–10.
- [13] Ogus HD, Bennett MH. Carcinoma of the dorsum of the tongue: a rarity or misdiagnosis. *Br J Oral Surg* 1978;16:115–24.
- [14] Pogrel MA, Weldon LL. Carcinoma arising in erosive lichen planus in the midline of the dorsum of the tongue. *Oral Surg Oral Med Oral Pathol* 1983;55:62–6.
- [15] Lustig JP, Lugassy G, Neder A, Sigler E. Head and neck carcinoma in Fanconi's anaemia Report of a case and review of the literature. *Oral Oncol, Eur J Cancer* 1995;31:68–72.
- [16] Gorsky M, Raviv M, Taicher S. Squamous cell carcinoma mimicking median rhomboid glossitis region: report of a case. *J Oral Maxillofac Surg* 1993;51:798–800.
- [17] Patel SC, Carpenter WR, Tyree S, Couch ME, Weissler M. Increasing incidence of oral tongue squamous cell carcinoma in young white women, age 18–44 years. *J Clin Oncol* 2011;29:1488–94.
- [18] Ramirez-Amador V, Esquivel-Pedraza L, Ochoa-Carrillo FJ, Cuapio-Ortiz A, Frias-Mendivil M, Meneses-Garcia A, et al. Cancer of the mobile tongue in Mexico. A retrospective study of 170 patients. *Oral Oncol, Eur J Cancer* 1995;31:37–40.
- [19] Chaturvedi AK, Engels EA, Anderson WF, Gillison ML. Incidence trends for human papillomavirus-related and -unrelated oral squamous cell carcinoma in the United States. *J Clin Oncol* 2008;26:612–9.
- [20] Schlecht NF, Brandwein-Gensler M, Nuovo GJ, Li M, Dunne A, Kawachi N, et al. A comparison of clinically utilized human papillomavirus detection methods in head and neck cancer. *Mod Pathol* 2011;24:1295–305.
- [21] Sgaramella N, Coates PJ, Strindlund K, Loljung L, Colella G, Laurell G, et al. Expression of p16 in squamous cell carcinoma of the mobile tongue is independent of HPV infection despite presence of the HPV-receptor syndecan-1. *Br J Cancer* 2015;113:321–6.
- [22] Vijayalakshmi R, Viveka TS, Vidyarani S, Prathiba R, Arvind K. Risk stratification of early stage oral tongue cancers based on HPV status and p16 immunorexpression. *Asian Pac J Cancer Prev* 2014;15:8351–9.
- [23] Garavello W, Spreafico R, Gaini RM. Oral tongue cancer in young patients: a matched analysis. *Oral Oncol* 2007;43:894–7.
- [24] Tanaka K, Omura K, Harada H, Ikuta M, Shiraki R. A case of squamous cell carcinoma arising at the dorsum of the tongue in a patient with Behcet's disease. *Jpn J Oral Maxillofac Surg* 2011;57:319–23.
- [25] Matsuda K, Teshima T. A case of atypical shaped tongue cancer in the dorsum of the tongue. *Jpn J Oral Maxillofac Surg* 1993;39:1350–2.
- [26] Coombes D, Cascarini L, Booth PW. Carcinoma of the midline dorsum of the tongue. *Br J Oral Maxillofac Surg* 2008;46:485–6.
- [27] Katz RW, Brahim JS, Travis WD. Oral squamous cell carcinoma arising in a patient with long-standing lichen planus. A case report. *Oral Surg Oral Med Oral Pathol* 1990;70:282–5.
- [28] Fowler CB, Rees TD, Smith BR. Squamous cell carcinoma on the dorsum of the tongue arising in a long-standing lesion of erosive lichen planus. *J Am Dent Assoc* 1987;115:707–10.
- [29] Lam KH, Wong J, Lim STK, Ong GB. Carcinoma of the tongue: factors affecting the results of surgical treatment. *Br J Surg* 1980;67:101–5.
- [30] Suzuki T, Hamada Y, Takahashi T, Karakida K, Sakamoto H. A case of malignant transformation of oral leukoplakia at the dorsum of tongue. *J Jpn Oral Med* 2017;23:17–22.
- [31] Dziegielewski PT, Ho ML, Rieger J, Singh P, Langille M, Harris JR, et al. Total glossectomy with laryngeal preservation and free flap reconstruction: objective functional outcomes and systematic review of the literature. *Laryngoscope* 2013;123:140–5.
- [32] Rihami J, Lee MR, Lee T, Ducic Y. Flap selection and functional outcomes in total glossectomy with laryngeal preservation. *Otolaryngol Head Neck Surg* 2013;149:547–53.