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Ex corpore linguae: A cohort analysis after a unique surgical technique in oral cancer resection

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ABSTRACT

Objective: Resection of posteriorly located oral squamous cell carcinomas (OSCCs) remains challenging for head and neck surgeons. However, several surgical techniques, such as lip and mandibular splitting, as well as submental "visor drop-down" of intraoral soft tissues, have been proposed for this purpose. Merrick et al. suggested that a pedicled genial drop-down surgical approach should be used to resect dorsally located OSCCs. Our study investigated patient outcomes following this surgical procedure, as no previous study has analyzed long-term follow-up data.

Material and methods: All patients who underwent surgery using the pedicled genial "visor drop-down" approach at the Maxillofacial Department of the University Hospital Giessen in Germany between 1995 and 2010 were included in this study. In addition, our study required that patients diagnosed with OSCC had no history of other intraoral malignancy or any other form of malignancy. A preliminary questionnaire was completed for each patient based on retrospective analysis of available data from medical reports.

Results: A total of 51 patients fulfilled all inclusion and exclusion criteria and were evaluated retrospectively. In total, 32 patients were excluded from the study due to OSCC recurrence or acquisition of a different type of malignancy. The male to female distribution of patients in our study was 30 to 21 (58.8%–41.2%), and the mean ages of female and male patients were 57.7 (SD 14.3) and 55.7 (SD 14.4) years, respectively. Approximately 76.5% of tumors were located along the dorsal aspect of the tongue, 17.6% were along the floor of the mouth, 3.9% were in the dorsal mandibular region, and 1.9% were in the dorsal palatal region. The mean overall operation time was 6.25 h, and 28 patients received microvascular flaps for reconstruction. Results of final histopathological examination suggested primary in-sano resection of the tumor in 84.3% of patients. Overall, the 5-year postoperative survival rate was 52.9%; 31.3% of the patient cohort was not followed up for the full 5-year period. In addition, 15.7% of the patients included in our study died during the study period. Unimpaired functional outcomes in terms of swallowing and speech were observed in 86.3% of patients.

Conclusion: The pedicled genial "visor drop-down" approach, also known as the ex corpore linguae, is a suitable method for the radical resection of dorsally located OSCCs, with a promising 5-year survival rate and satisfactory postoperative oral function.

1. Introduction

Oral squamous cell carcinoma (OSCC) is among the five most common malignant neoplasms, and its prevalence has increased in recent years (Siegel et al., 2015). OSCC is associated strongly with several risk factors, including alcohol and nicotine consumption

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(Altieri et al., 2002; Schmidt et al., 2004), poor oral hygiene (Javed and Warnakulasuriya, 2016; Oji and Chukwuneke, 2012), betel-nut chewing (Lin et al., 2005), and human papillomavirus infection (Gupta and Gupta, 2015). The therapy of choice for OSCC is radical surgical resection (Tae, 2009), with possible cervical lymph node resection depending on individual clinical staging results and tumor size (Fakih et al., 1989; Huang et al., 2008; Kähling et al., 2016). Immediate reconstruction of the surgical defect site is commonly performed (Mucke et al., 2010) and involves the use of anastomosed microvascular free flaps (Chen et al., 2005; Wei et al., 2002). However, OSCC (which is located dorsally in the oral cavity) can be challenging to treat using the common surgical pathway. Several approaches have been described to address these challenges; they include the lip and mandibular split approach (Gooris et al., 1989; Mehanna et al., 2010) and the "visor drop-down" approach (Cilento et al., 2007; Stringer et al., 1992), whereby the intraoral soft tissues are displaced to the submandibular region. However, these approaches may have several postoperative complications, such as fistula formation, restriction of orofacial function, non-junction of the osteotomized mandibular branches (pseudarthrosis), and cosmetic issues (Cilento et al., 2007). In 2007, Merrick et al. proposed a promising surgical pathway to remove dorsally located OSCCs, and received patient consent to publish the long-term outcomes of this approach. Their surgical approach combined non-discontinuous osteotomy of the mandible with the "visor drop-down" technique. This combined approach is believed to minimize orofacial functional impairment by reattachment of the tongue to the mandibular symphysis, to improve postoperative healing and patient comfort, and to reduce fistula formation, ultimately shortening the time before radiation therapy can be administered.

The "pedicled genial osteotomy approach," which was adapted from the original surgical approach developed by Otto Kriens, has been practiced in Giessen University Hospital since 1995, and many patients with OSCC have been treated by means of this procedure, known as ex corpore linguae. Therefore, we evaluated all patients with primary diagnoses of OSCC who were subsequently treated using ex corpore linguae since 1995 in a retrospective cohort study to explore long-term survival, complications, and individual well-being.

2. Materials and methods

2.1. Study design

All patients with primary diagnoses of OSCC who were treated between 1995 and 2010 using the ex corpore linguae surgical approach were included in this study. Patients who were diagnosed with recurrent cancer, and thus underwent further treatment using this approach, were excluded from the data set. Patients who required major bony resection of the mandible to ensure adequate tumor treatment were also excluded from the study. Finally, all patients with any other type of tumor were excluded from the study. Available patient data from medical records were evaluated to answer the following questions, which were formulated prior to the commencement of our study:

1. What was the age and sex of the patient?
2. What was the mean operation time?
3. Was it possible to sufficiently resect the tumor using the ex corpore linguae method?
4. What was the TNM classification?
5. How long were the length of stay in the ICU and overall hospitalization time?
6. What was the intraoperative blood loss?
7. How long was the period between operation and radiation (if required)?
8. Did the postoperative panoramic radiograph show signs of disturbed bony healing or infection?
9. Were revisional surgical procedures required because of complication or infection?
10. (How often) did cancer recur? How long was the mean tumor-free survival period?
11. What was overall survival (OAS) period?
12. What was the 5-year survival (5-YS) rate?
13. How was individual patient satisfaction after ex corpore linguae?

Ethical approval was obtained from the responsible commission of Giessen University Hospital before data collection (ID 232/15).

2.2. Surgical procedure

After anesthetization of the patient and extraction of relevant teeth, an ipsilateral submandibular skin and platysma incision was performed, as described by Kocher (1880) or Macfee (1960). The necessary lymph-node levels are addressed and dissected. The mandibular brooch was then exposed subperiosteally, extending to the contralateral side. The genioglossal musculature was then identified and looped with a sterile stomach tube (Fig. 1).

Thereafter, a trapezoidal osteotomy was performed at the lingual aspect of the mandible, including the bony attachment of the genioglossal muscles (Fig. 2). Full-thickness transection of the

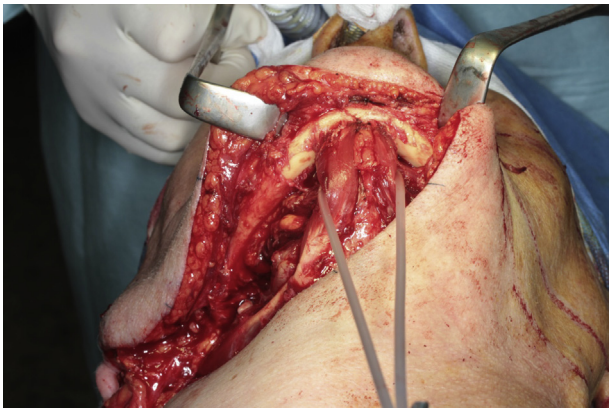

Fig. 1. Surgical exposition of digastric and genioglossal musculature looped with a sterile stomach tube.

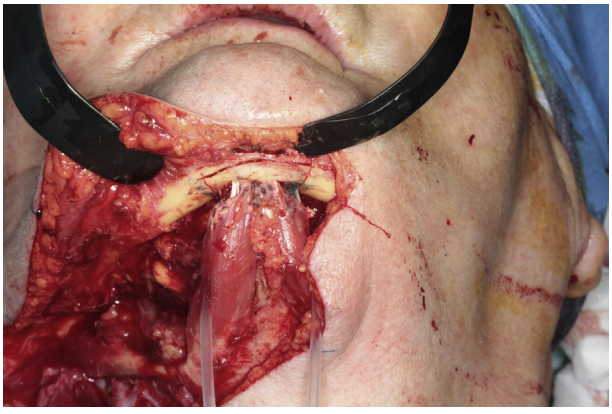

Fig. 2. Trapezoidal osteotomy of the posterior mandibular spine.