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Does a mandibular access osteotomy improve survival in pT2 oral tongue cancers? Retrospective study at a single institution

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Abstract. The surgical approach to the resection of oral tongue cancers can involve transoral resection (TOR) or a temporary mandibulotomy access (TMA). There are no relevant guidelines, and the oncological safety of TOR needs consideration. The objective of this study was to investigate TMA and TOR in pT2 oral tongue cancer surgery with regard to cancer outcomes. Demographic, surgical, and histology data from primary pT2 tongue cancers were recorded and evaluated through multivariate Cox regression for local recurrence (LR), disease-free survival (DFS), and overall survival (OS). A total of 166 patients with pT2 primary oral tongue cancer fulfilled the inclusion criteria; TOR was used in 95 patients and TMA in 71 patients. The minimum follow-up was 29 months. Group comparisons showed a significantly higher frequency of perineural spread ($P = 0.013$) in the TMA group; a higher frequency of involved margins on initial resection was seen in TOR patients ($P = 0.010$). Adjuvant postoperative radiotherapy was preferred in the TMA group, in line with the high pN positive status. Multivariate Cox regression showed significantly higher LR and lower DFS in the TOR group despite stratification of the major prognostic factors. The 5-year survival rate was reduced to 82.2% in the TOR group, while it remained constant at 93.0% in the TMA group. TMA provided superior local control and DFS compared to TOR in pT2 tongue cancers.

Key words: head neck neoplasm; surgical approach; transoral; temporary mandibulotomy; osteotomy split; local control.

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Oral tongue cancer accounts for a large proportion of head and neck cancers[1–3]. As surgery is the mainstay of therapy for oral tongue cancers, continuous evaluation of surgical techniques is needed to improve the outcomes for these patients.

The surgical approach to the resection of oral tongue cancers involves transoral resection (TOR) or a temporary mandibulotomy access (TMA); the method of choice often depends on the individual surgeon's preference in the overall

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management of the patient. There are no guidelines regarding the surgical approach, and any method that gains adequate access to the tumour and provides optimal margin clearance is acceptable. In certain instances, optimal clearance at the posterior margin becomes difficult and a TMA becomes necessary. Critics of minimal access surgeries and transoral surgeries are sceptical about the oncological safety of TOR. Nevertheless, minimal access surgeries are gaining popularity.

T4 tumours involve the mandible -± suprahyoid muscles, and resection of the mandible or clearance of the suprahyoid muscles improves access to the tumour, allowing optimal margin clearance. In early stage T1 tongue cancer, the three-dimensional tumour volume is low and adequate manipulation is possible for marginal control intraorally. In contrast, T2 tumours do not require removal of the mandible or suprahyoid muscles and yet the tumour volume is at times large enough to complicate intraoral manipulation.

The aim of this study was to investigate the oncological outcomes of the access osteotomy in the management of pT2 oral tongue cancers.

Patients and methods

This was a retrospective study and was approved by the institutional review board. The data of patients treated for pT2 primary tongue cancers (squamous cell carcinoma) at a tertiary hospital during the years 2007 to 2013 were retrieved for this study. The inclusion criterion was pT2 tongue cancer. Cases in which preoperative radio-imaging showed tumours involving the mylohyoid muscle or mandible were excluded. Likewise, cases in which the tumours extended to the tongue base and those found to be non-squamous cell carcinoma on histology were excluded.

Demographic characteristics (age and sex), clinical staging, details of the surgical procedure (TMA or TOR), neck dissection, pathology data (margin status, pN status, perineural spread, histological grading of the tumour), and the details of adjuvant postoperative radiotherapy (PORT) were recorded. The decision regarding PORT was based on the opinion of the multidisciplinary tumour board and was made on a case by case basis; PORT was applied in patients with high risk factors such as multiple lymph node metastasis (pN $\geq$2), lymphovascular emboli, and perineural spread on final histology.

The end-points of this study were local recurrence (LR), disease-free survival (DFS), and overall survival (OS). The prognostic and therapeutic factors were analysed along with the method of surgery (TMA or TOR) by univariate and multivariate analysis. Further, group comparisons were made between the TMA and TOR patients for prognostic factors.

At the study institution, patients with T2 oral tongue cancers are managed either by TOR or through a TMA. When TOR is selected, the surgeon ensures mouth opening with a gag and uses stay sutures for manipulation. A minimum 1-cm clinical margin is excised along with the tumour. Frequent palpation of the tumour through the substance of the tongue determines the oncological margins in three dimensions. When a TMA is selected, the mandible is accessed through a lip split incision extending to the neck. The surgeon plans a paramedian temporary split of the mandible with an oscillating saw. Titanium miniplates are adapted and screwed into place prior to the osteotomy and then removed before sectioning of the bone. The plates are replaced using the pre-existing screw holes after resection and reconstruction of the tongue. In all cases, an intraoperative frozen section assessment of the margin is routinely performed and positive margins are immediately revised.

Statistical analysis

The distributions of demographic/clinical–pathological data with regard to the different surgical approaches used (TOR and TMA) were compared between the two groups with the χ^2 test. The Student *t*-test was performed to compare the time to LR and time to regional recurrence between the TOR and TMA groups. Multivariate Cox regression was applied to investigate independent prognostic factors for LR, OS, and DFS. A two-sided *P*-value of <0.05 was considered statistically significant. The survival index was obtained using the Kaplan–Meier method and compared using the log-rank test. The statistical analysis was performed using SPSS version 13.0 software (SPSS Inc., Chicago, IL, USA).

Results

A total of 166 patients with pT2 primary oral tongue cancers were included in the study following the application of the inclusion and exclusion criteria. The minimum period of follow-up was 29 months (mean 54.62, median 55 months) for patients who remained alive. All patients underwent selective level I to level III neck dissection along with resection of the primary tumour. The patients ranged in age from 24 to 70 years (mean 52.77 years). Ninety-three patients were male and 73 were female. TOR was used in 95 of these patients and TMA was used in 71 for the management of the primary tumour.

The surgical approach to primary tumour resection was either through TOR or a TMA. None of the patients in this cohort had involvement of the mylohyoid muscle or mandible, or required a pull-through manoeuvre for primary resection. Frozen sections were examined for margins in all patients, and cases in which there was tumour at the margin were revised until margins were clear. The margin sampling was performed from the surgical bed after resection, and a minimum of six margins were examined (anterior, posterior, medial, lateral, and two deep margins). The final histology of the patients was categorized as 'involved revised' when the initial resection showed tumour at the margin, and as 'not involved' when the initial margins were clear of tumour (Table 1). None of the patients had tumour at the final margin on histology assessment (referring to revised margins if initially positive). All patients underwent reconstructive surgery with regional flaps (sternocleidomastoid flap), a pectoralis major myocutaneous flap (PMMF), or free flaps. The patients were recalled once every 3 months for the first 3 years and once every 6 months thereafter.

At the time of the study, 23 patients (13.9%) had died. All of them died of disease relapse; therefore OS was equal to disease-specific survival (DSS) in this study. Thirty-six patients (21.7%) experienced exclusive local recurrence, 24 patients (14.5%) developed exclusive neck recurrence, 17 patients (10.2%) experienced both local and neck recurrence, and eight patients (4.8%) developed distant metastasis. However, none of these patients had developed distant metastasis without evidence of loco-regional failure. All patients with local or/and regional relapse underwent additional surgery. The 5-year local control rate was 78.7%, 5-year DFS was 75.9%, and 5-year OS was 86.0%.

Table 1 shows the distribution of demographic data, clinical and pathological prognostic factors, choice of reconstruction surgery, and use of adjuvant radiotherapy for the patients in the TMA and TOR groups. Comparison of the

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