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Original article

Clinical Presentation of Tongue Squamous Cell Carcinoma at the Maxillofacial Clinic of the National Institute of Oncology, Sabrata, Libya

Ayad Alkhalifi*[1,2], Nagia Bengharbia[1], Mustafa Zaneen[2,3], Nagah Majdoub[2]

[1]*Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, University of Tripoli, Tripoli, Libya*
[2]*Maxillofacial Surgery Unit, National Institute of Oncology, Sabrata, Libya*
[3]*Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Zawia University, Zawia, Libya*
Corresponding email. *E.khalifi@uot.ly*

Abstract
Squamous cell carcinoma (SCC) of the tongue is the most common oral malignancy, accounting for over 90% of tongue cancers. Despite its accessibility for clinical examination, delayed diagnosis remains common due to nonspecific early symptoms, contributing to a poor prognosis in advanced stages. This study describes the clinical profile and surgical outcomes of tongue SCC at the National Institute of Oncology, Sabrata, Libya. Thirty-three patients with tongue carcinoma between 2017 and 2022 were included in this study. Data on age, gender, tumor characteristics, smoking and alcohol use, clinical features, and histopathological findings were recorded. Surgical treatments included local excision, hemiglossectomy, and radical neck dissection. Out of the 33 patients, 23 underwent local excision with direct closure, 7 underwent hemiglossectomy, and 3 underwent radical neck dissection. Most cases presented in late primary or secondary stages, with significant associations between lesion size (>2 cm) and lymphatic metastasis (p=0.008). Chronic irritants, such as decayed teeth, appear to be risk factors for larger lesions and metastasis. The findings of this study are consistent with the literature regarding the relationship between tongue SCC, age, sex, and chronic irritants. Our findings underscore the critical need for early diagnosis through community screening and multidisciplinary management to mitigate the high burden of advanced-stage stage in Libya
Keywords*: Tongue, Squamous Cell Carcinoma, Maxillofacial, Sabrata.*

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Introduction

Oral cavity squamous cell carcinoma (OCSCC), particularly involving the tongue, accounts for a significant proportion of head and neck malignancies. The tongue is the most common subsite, representing 36–55% of cases [1,2]. Risk factors include tobacco use, alcohol consumption, betel nut chewing, and HPV (though HPV's role in oral tongue SCC remains less defined than in oropharyngeal cancers) [3].

The tongue, a muscular organ in the mouth and throat, is essential for speaking, chewing, and swallowing. Anatomically, it is divided into the anterior two-thirds (oral tongue) and posterior base, with the lateral borders and ventral surface being the most common sites for squamous cell carcinoma (SCC) [4,5], The oral tongue's mucosa is lined by stratified squamous epithelium, which is continuously exposed to mechanical friction and carcinogens, predisposing it to malignant transformation [6], Globally, oral SCC accounts for over 90% of tongue malignancies, with tobacco, alcohol, and betel nut use as primary risk factors [7,8]. In high-incidence regions like India, tobacco-related products drive nearly one-third of cases [9]. While human papillomavirus (HPV) is strongly linked to oropharyngeal SCC, its role in oral tongue SCC remains unclear and warrants further investigation [10].

Clinically, tongue SCC often presents as ulcerative, exophytic, or infiltrative lesions, frequently mimicking benign conditions (e.g., traumatic ulcers or lichen planus), leading to diagnostic delays [11]. The side of the tongue is the most commonly affected area (36.8–57%), likely due to constant rubbing against teeth and trapped cancer-causing substances [12, 13]. Early detection is vital, as tumors larger than 2 cm are more likely to spread to neck lymph nodes and result in worse outcomes [14,15]. This study aims to describe the clinical presentation, surgical management, and outcomes of patients diagnosed with tongue SCC at the National Institute of Oncology, Sabrata, Libya. Through an analysis of patient demographics and therapeutic outcomes, this study aims to enhance understanding of tongue carcinoma management in the Western Libyan population.

Methods

Study design and setting

This was a retrospective study of five years conducted between 2017 and 2021 at the Maxillofacial Surgery Unit of the National Institute of Oncology, Sabrata, Libya. Thirty-three patients diagnosed with tongue SCC

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and treated surgically at the institute were included in the study. Ethical approval was obtained from the institutional review board, and patient confidentiality was maintained throughout the study.

Eligible criteria

Inclusion Criteria included all patients diagnosed with histopathologically confirmed squamous cell carcinoma of the tongue [20], and who underwent surgical treatment at the maxillofacial surgery unit, were included. All Patients with incomplete medical records, such as missing tumor staging or follow-up data, and those patients who received non-surgical treatment (e.g., chemotherapy or radiotherapy only) are excluded. Out of which 33 patients met the inclusion criteria.

Data collection

The Data were collected retrospectively from patient medical records. Variables recorded included demographic Information such as age, gender, occupation, smoking status, and alcohol use. Tumor Characteristics also included tumor size (Greatest diameter), anatomical location (tip, lateral border, dorsum, ventral), consistency, symptom duration, presence of pain, lymph node involvement, and distant metastasis. The studied variables included histopathological tumor grading (well, moderately, and poorly differentiated) as well as depth of invasion.

Surgical Management

Type of surgery performed (local excision, hemiglossectomy, with or without neck dissection) was recorded, and the clinical outcomes and complications, metastasis recurrence, and survival were studied. Local excision was used for tumors ≤ 2 cm with negative margins (T1-T2, N0), Hemiglossectomy for tumors >2 cm or deeper invasion (T2-T3), and neck dissection was performed for clinically positive lymph nodes (levels I–V).

Data analysis

Data were analyzed using IBM SPSS Statistics v28.0 [18]. Descriptive statistics (means, frequencies, percentages) summarized demographics and tumor characteristics. Fisher's exact test was employed to assess the relationship between tumor size (>2 cm vs. ≤2 cm) and lymph node metastasis. Survival outcomes (overall survival [OS], disease-free survival [DFS]) were analyzed via Kaplan-Meier curves, with log-rank tests comparing groups. A two-tailed *p*-value <0.05 was considered statistically significant.

Results

Patient Demographics

Among 33 patients included in the study of surgically treated tongue SCC, predominantly male (67%, n=22) and female (33%, n=11) with a male-to-female ratio of 2:1. (Fig.1). The mean age was 54.8 years (range: 37–82), with the highest incidence and most cases in the 50–69 age group (66%, n=22) (Table.1).

Table 1: Age and Gender Distribution of Tongue

Age Group	Total Patients	Male	Female
30–39	1	0	1
40–49	3	1	2
50–59	11	8	3
60–69	12	9	3
70–79	5	3	2
80–89	1	1	0
Total	33	22	11

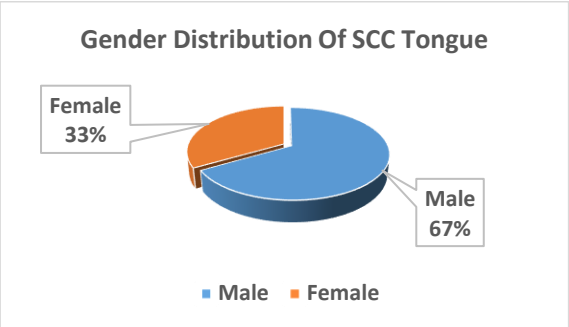

Fig.1: Gender distribution of SCC of the Tongue

Khalij Libya Journal of Dental and Medical Research. 2025;9(1):110-118
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Occupational distribution included manual laborers (40%, n=13), farmers (30%, n=10), and employees (30%, n=10) (Table 2). However, occupational exposure to chronic irritants may be a potential risk factor in these cases.

Table. 2: Occupational distribution of Tongue SCC Patients

Occupation	n= patients	%
Manual Laborers	13	40%
Farmers	10	30%
Employees	10	30%
Total	33	100%

Anatomical Distribution

Clinically of most of the patients presents with lesions at the Lateral tongue borders were the most common site (57%, n=19), followed by the tip (15.5%, n=5), ventral surface (15.5%, n=5), and dorsum (12%, n=4) (Table.3) (Fig.2).

Table 3: Anatomical Distribution of Lesions Among the anterior two-thirds of the Tongue:

Anatomical site of the Tongue	Number of cases	%
Lateral side	19	57 %
Tip	5	15.5 %
Dorsum/Body	4	12 %
Ventral/Body	5	15.5 %
Total	33	100 %

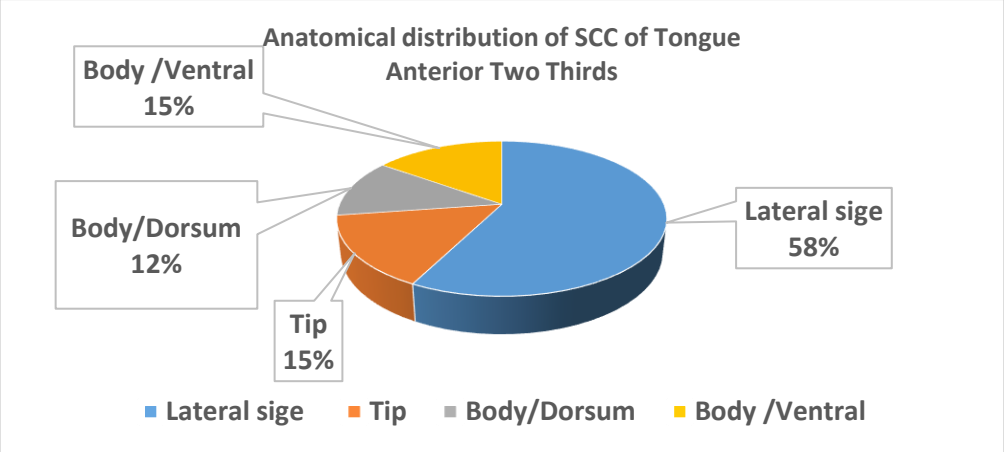

Figure 2: SCC anatomical distribution SCC of the tongue

Lesions ranged from 1–4 cm in diameter. Tumors >2 cm (n=18) were significantly associated or linked with lymph node metastasis (66.7% vs. 20%, p = 0.008) (Table 4).

Table 4: Association Between Tumor Size and Lymph Node Metastasis

Tumor Size	Lymph Node Metastasis (+)	Lymph Node Metastasis (-)	*p*-value
≤2 cm (n=15)	3 (20%)	12 (80%)	0.008*
>2 cm (n=18)	12 (66.7%)	6 (33.3%)	

The majority of patients presented with ulcerative or exophytic type of lesions, mostly located on the lateral borders of the tongue (Figure 3).

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Figure 3. Exophytic type of lesions, mostly located on the lateral borders of the tongue

Pain was a common complaint, especially in larger lesions. Tumor Size: Lesions ranged from 1 cm to 4 cm in diameter.

Surgical management and outcomes of our surgical intervention of tongue carcinomas and cancers in general require a multi-disciplinary approach to treat, such as a surgical oncologist, a medical oncologist, a radiotherapy oncologist, a speech therapist, and a physical therapist for rehabilitation and emotional support, all that to obtain good results and outcomes. In our study, according to the size, location, and node involvement using the WHO TNM classification [19], and the selection of the surgical procedure used based on tumor size and node involvement, so, three surgical techniques were used to excise squamous cell carcinomas of the tongue (SCC). Local excision (70%, n=23) (Figure 4), hemiglossectomy (21.2%, n=7), and neck dissection (9.1%, n=3). Local surgical Excision technique used in 23 patients (70 %), local excision with direct closure with or without local reconstruction flaps. These patients had early-stage tumors (Stage I-II) sized 2 cm or less with negative margins or less than 5 mm depth of invasion [20] (T1), some tumors have a size 2-3 cm in diameter with positive depth of invasion about 5-7mm (T2 (T1-T2)). Cervical lymph node examination revealed negative nodes (N0) on both sides.

Hemiglossectomy was performed in 7 patients out of 33 (21.2%) (Fig.5) Those with larger lesions sized 2-4 cm in diameter or more, but with depth of invasion less than 10 mm as it was proved by histopathological reports (T2-T3), although, hemiglossectomy caused some speech impairment and difficulty swallowing which were common in some cases as a post-operative complication. Neck Dissection is performed in 3 patients (9.1%) out of 33 cases that were included in this study, the selection of this method is taken when the regional lymph nodes are positive and the dissection is done in the same procedure when the primary tumor of the tongue is excised (Fig.6). A radical neck dissection was done in 4 cases as it is recommended with advanced-stage tumors (T3-T4) with clinically positive lymph nodes. The other 3 cases of T1-T2 with positive level I lymph nodes were treated by standard elective neck dissection.

Figure 5: SCC at the lateral border of the tongue (A). The lesion was excised, and the defect closed (B)

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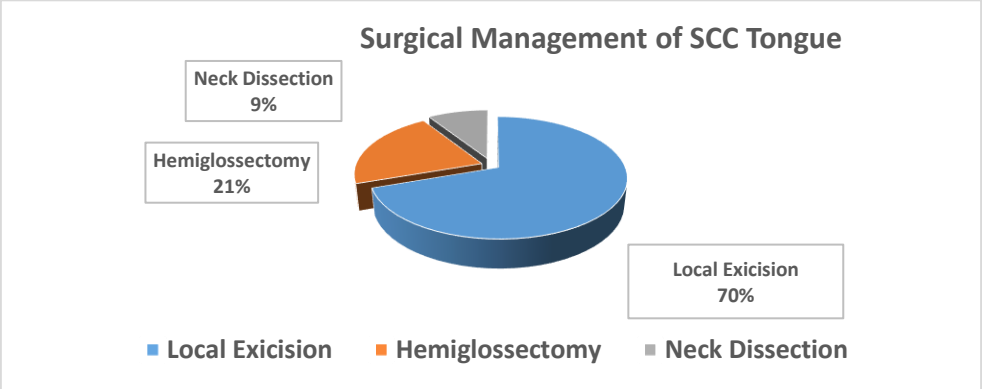

Figure 5. Surgical management of SCC of Tongue:

Most lesions were dealt with by surgery, either by local excision (70%) or hemiglossectomy (21%). Treatment of neck lesions was by neck dissection (9%).

Figure 4. Local Excision of Tongue SCC and direct Closure of the defect.

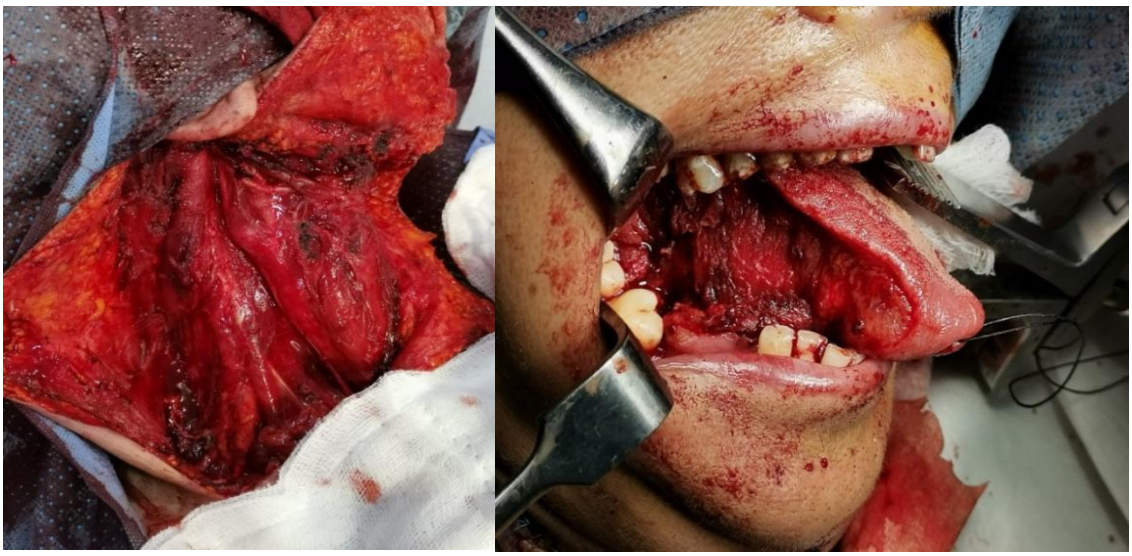

Figure 6. Hemiglossectomy of SCC of Tongue and Neck dissection of the cervical lymph nodes

Histopathological Diagnosis: All cases were confirmed to be squamous cell carcinoma, with varying degrees of differentiation (well-differentiated, moderately-differentiated, and poorly-differentiated), and it was in aligns with WHO criteria for clarity [20]. These patients had higher rates of postoperative complications, including seroma and delayed wound healing. (Fig.4).

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Complications and Recurrence

Minor postoperative complications were observed in the local excision group. Hemiglossectomy and neck dissection were associated with more significant functional impairments, including speech and swallowing difficulties. (Table 5).

Table 5: Surgical Techniques used to excise the tongue ulcer, and the complications:

Surgical Procedure	n= patients	Complications	Recurrences	Survival
Local Excision	23	Minor Wound Dehiscence (2)	No recurrences	100%
Hemiglossectomy	7	Speech Difficulty (3) Dysphagia (2)	2	71 %
Neck Dissection	3	Seroma (1) Delayed Healing (2)	1	66 %

Recurrence was observed in 3 patients, all of whom had advanced-stage disease (T3-T4). Two of these patients developed local recurrence, while one patient experienced distant metastasis to the lungs. Survival and Prognosis Overall Survival: The 2-year overall survival rate was 78%. Disease-Free Survival: The 2-year disease-free survival rate was 70%. These patients had higher rates of postoperative complications, including seroma and delayed wound healing (Figure 7).

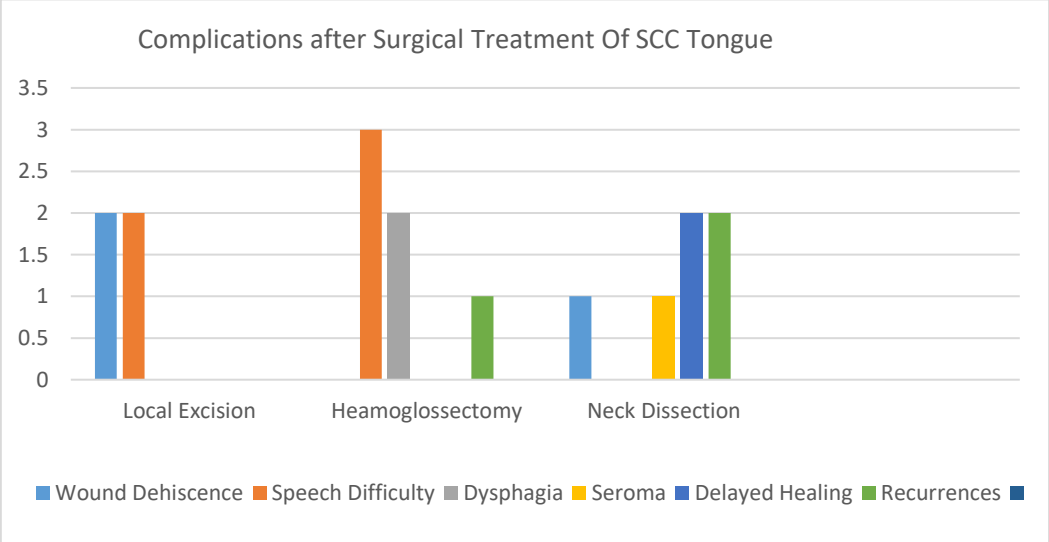

Figure 7: Surgical Techniques and Complications the complications:

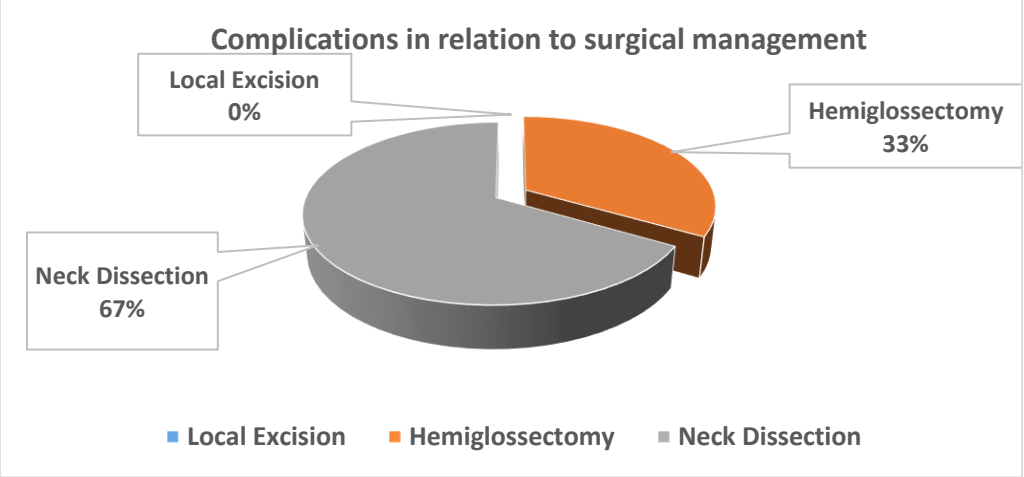

Figure 8: Hemiglossectomy of SCC of Tongue and Neck dissection of the cervical lymph nodes:

Lymph Node Metastasis: A strong association was observed between tumor size (>2 cm) and the presence of cervical lymph node metastasis ($P < 0.05$).

Khalij Libya Journal of Dental and Medical Research. 2025;9(1):110-118
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Findings of Statistical Results

Tumor Size and Lymph Node Metastasis: Association Between Tumor Size and Lymph Node Metastasis: Tumors exceeding 2 cm demonstrated a significantly higher rate of cervical lymph node metastasis compared to smaller tumors (66.7%) [12 of 18 patients] vs. (20%) [3 of 15 patients], $p = 0.008$; Fisher's exact test).

Survival Outcomes

The 2-year overall survival (OS) rate was 78% (95% CI: 62–89%), while the 2-year disease-free survival (DFS) rate was 70% (95% CI: 54–82%). Patients with lymph node metastasis had significantly poorer (Overall Survival) OS compared to those without (2-year OS: 60% vs. 89%, $p = 0.03$, log-rank test).

Discussion

This study provides the first comprehensive analysis of tongue squamous cell carcinoma (TSCC) management in Libya, offering critical insights into demographic patterns, tumor behavior, and surgical outcomes. Conducted at the National Institute of Oncology in Sabrata, our findings align with global epidemiological trends while highlighting region-specific challenges: delayed diagnosis, limited multidisciplinary care, and the impact of chronic irritants. Below, we contextualize these themes and their implications for clinical practice and public health.

Our cohort (n=33) exhibited a male predominance (67%, 2:1 ratio) and peak incidence in the sixth decade (mean age: 54.8 years), consistent with global TSCC epidemiology [3,9,16]. This aligns with behavioral risk factors; notably higher tobacco/alcohol use among Libyan males [3,16]. The lateral tongue border was the most frequent subsite (57%), mirroring studies by [12] (36.8% lateral involvement) and [3]. A notable divergence emerged in occupational exposures: 40% reported chronic mechanical irritants (e.g., farming, untreated dental trauma), reinforcing the synergy between poor oral hygiene, physical carcinogens, and chemical risks (tobacco) [3,16]. This contrasts with [21], which reported lower male predominance (1.15:1) and rare tongue involvement (14.8%) [23].

While our TSCC patterns reflect conventional risk profiles, HPV's role diverges from Western trends. Unlike rising HPV-associated oropharyngeal SCC in younger, non-smoking populations [17], none of our cases exhibited HPV-related histopathology. Though definitive testing was unavailable, this distinction underscores the need for systematic HPV surveillance in Libya to clarify etiological contributions and guide prevention strategies.

Advanced-stage tumors (>2 cm) dominated our cohort (64%), correlating strongly with lymph node metastasis (66.7% vs. 20% for ≤2 cm; $p<0.05$) and echoing Saha et al.'s [22] findings in resource-limited settings. Ulcerative/exophytic morphology (84.3%) and lateral tongue predilection (57%) align with [11,13], were chronic friction and carcinogen exposure drive tumorigenesis.

Therapeutic outcomes starkly differed by stage: early tumors (T1-T2) treated with local excision had 100% survival and 0% recurrence, whereas advanced cases (T3-T4) necessitated hemiglossectomy/neck dissection (30%) with substantial morbidity (43% speech impairment, 29% dysphagia) and 9.1% recurrence. These findings validate [14,24] on tumor size/depth as metastasis predictors and the limitations of surgery alone for advanced disease. Delayed diagnosis, attributed to low public awareness, nonspecific early symptoms, and healthcare access barriers, remains a critical driver of poor outcomes, demanding urgent early-detection initiatives.

Our 2-year survival rates (78% OS, 70% DFS) lag behind high-income nations, reflecting late presentation (64% T3-T4) and limited adjuvant therapies. Advanced-stage recurrences (1.1–4.4%) correlated with lymphovascular/perineural invasion (20% in stage II, 55.5% in stage IV), underscoring the need for molecular prognostic tools. Functional deficits post-hemiglossectomy (30% requiring rehabilitation) highlight gaps in survivorship care, particularly speech/swallowing support, a challenge exacerbated by Libya's resource constraints.

These outcomes align with [25,26], emphasizing that while hemiglossectomy remains essential for locally advanced disease, multidisciplinary rehabilitation is critical to mitigating morbidity. Priority interventions include standardized surveillance protocols, margin-controlled resections, and regional referral networks to integrate surgical, dental, and rehabilitative care.

Limitations

This study has several important limitations that should be acknowledged. The retrospective design and relatively small sample size (n=33) may affect the generalizability of our findings and limit more detailed subgroup analyses. The absence of HPV/p16 testing prevented etiological stratification of cases, particularly relevant given the growing global significance of HPV-related oropharyngeal cancers. Additionally, the relatively short follow-up period (median 24 months) may lead to underestimation of true recurrence rates and long-term survival outcomes. These constraints highlight the need for future prospective studies with:

(1) larger patient cohorts to enhance statistical power, (2) comprehensive HPV/p16 testing to enable molecular stratification, and (3) extended follow-up periods (≥5 years) to better characterize survival patterns and late recurrences. Such studies would provide more robust evidence to guide clinical management of tongue SCC in similar resource-limited settings.

Conclusion

This study highlights the critical challenges in managing tongue squamous cell carcinoma (TSCC) in Libya, where advanced-stage presentation (64% T3–T4 tumors) remains a persistent barrier to optimal outcomes. Our findings demonstrate that tongue SCC in this setting is driven by a confluence of factors: traditional risks (tobacco/alcohol use), chronic mechanical irritants (sharp dental edges, decayed teeth), and delayed diagnosis—all contributing to the predominance of lateral border tumors (57%) and aggressive disease biology. While early-stage lesions (≤2 cm) showed excellent outcomes with local excision (100% survival), advanced tumors required extensive resections (30% hemiglossectomy/neck dissection) and were associated with significant morbidity (43% speech impairment, 29% dysphagia) and poorer survival (70% 2-year DFS). The strong correlation between tumor size >2 cm and nodal metastasis ($p=0.008$) further underscores the imperative for early intervention. To address these challenges, we propose the following evidence-based recommendations:

Conflict of Interest

The authors declare that they have no known competing financial interests, personal relationships, or professional affiliations that could have influenced the work reported in this paper. No funding was received for this study, and there are no financial or non-financial interests directly or indirectly related to this manuscript. The authors affirm that the content of this article reflects their own work and has not been influenced by any undisclosed interests.

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