Acta Scientific Dental Sciences (ISSN: 2581-4893)

Volume 7 Issue 11 November 2023

Research Article

Clinical Risk Factors for Local Recurrence of Oral Squamous Cell Carcinoma in Retro-Molar Trigone at a Tertiary Level Hospital

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DOI: 10.31080/ASDS.2023.07.1739

Received: October 16, 2023

Published: October 29, 2023

Abstract

Background: Oral Squamous Cell Carcinoma (OSCC) represents a significant portion of head and neck malignancies, with high morbidity and mortality rates. Despite advancements in therapies, OSCC remains challenging due to local invasion and recurrence. The retro-molar trigone (RMT), an area overlying the mandible, is susceptible to aggressive bone invasion and poor prognosis of OSCC. However, factors contributing to local recurrence are poorly understood.

Methods: An investigation based on prospective observation occurred at Dhaka Dental College and Hospital, involving thirty-five patients with histopathologically confirmed OSCC between March 2017 and August 2018. Detailed information was gathered regarding patient attributes, habits, tumor characteristics, clinical and pathological stages, and postoperative treatments. The data underwent statistical analysis using SPSS version 26 to discern noteworthy risk factors linked to local recurrence.

Results: Patients had a mean age of 50.37±9.49 years, with a significant proportion (37.1%) falling within the 41-50 age group. Gender distribution revealed a 1:1.5 male-to-female ratio among 35 subjects. Habits such as betel quid use and smoking were prevalent, and co-morbidities like hypertension (34.3%) and diabetes mellitus (20.0%) were notable. Tumor characteristics showed a majority with T2 tumors (54.3%), while clinical staging indicated that most patients presented at an advanced stage, with 60% classified as stage III. Notably, our analysis revealed a significant correlation between clinical stage IV and recurrence ($p = 0.03$), emphasizing the importance of staging and adjuvant therapy in managing OSCC in this region.

Conclusions: Recurrence of OSCC in the retro-molar trigone is influenced by clinical, pathological, and histological factors. The study underlines the significance of accurate staging, margin evaluation, and appropriate postoperative therapy for effective management. Identifying these risk factors can aid in devising strategies to reduce local recurrence in OSCC patients undergoing radical surgery.

Keywords: OSCC Recurrence; Retro-Molar Trigone; Clinical Factors; Lymph Node Metastasis

Introduction

Oral squamous cell carcinoma is the utmost communal malignancy in the oral cavity, accounting for 90% of all oral cancers [1]. The risk factors for local recurrence of OSCC in RMT are not fully understood. However, several clinical and histopathological factors have been acknowledged as being related with an increased risk of local recurrence, including Higher TNM [2], Metastatic neck lymph nodes [3], Close resection margin [4], Retro-molar trigone squamous cell carcinoma, a subset of OSCC, is particularly notorious for its aggressive bone invasion and unfavorable prognosis. Recognizinag the clinical risk factors associated with local recurrence in this site is critical for refining treatment strategies and improving patient outcomes. However, current knowledge about these factors remains limited [5]. This prospective observational study aims to bridge this gap by comprehensively evaluating clinical parameters that contribute to the recurrence of retro-molar trigone squamous cell carcinoma. By elucidating these risk factors, the study aspires to enhance the understanding of OSCC behavior in this challenging anatomical site and offer insights into more effective management strategies. Smokers have a two to five times higher risk of developing oral cancer than nonsmokers. Numerous clinical and epidemiological data have indicated that OSCC caused by tobacco smoking may cause epigenetic changes in oral epithelial cells, suppress immune system function, and cause oxidative stress. The managing of patients with oral cancer is a tremendous universal obligation. In spite of significant efforts, the global five-year comparative existence rate from oral cancer is usually fewer than 50%. This low survival rate has continued unmoved for more than three decades. Initial analysis of oral cancer is related with better-quality survival; however, the invasive nature, technical requirements, and skill required to perform intra-oral biopsies limit their usefulness in civic oral cancer broadcast. The usage of saliva-

based diagnostic testing to evaluate the presence of well-known salivary biomarkers would be beneficial if it could be shown to be a reliable method to detect early-stage tumors and identify high-risk patients [6]. Tobacco smoke contains at least 70 carcinogens and cancer-promoting substances [7]. A randomized, single-masked clinical trial was accomplished amongst 20 patients with BMS. Photobiomodulation was practical in the study group (n = 10) through a dose of 12 J/cm2 throughout ten sessions, compared with a placebo group (n = 10) with the laser turned off. Discomfort was measured by the visual analog scale (VAS) before opening each treatment session and at the 1-month and 4-month follow-up appointments [8]. Discordance was noted between the presurgical (clinical-radiologic) and postsurgical (pathological) nodal status in 40.3% (88/218; 54 pathologically upstaged;34 downstaged). Pathological downstaging was particularly significant with advanced-stage Gingivo-Buccal Cancers (25/73-34.7%) [9]. Oral cavity squamous cell carcinoma has a little possible to metastasize to the SMG; however, high-risk factors include primary tumor site in the flooring of mouth or tongue, weighty level IB nodal burden, and presence of LVI, PNI, and ECE. Without these high-risk issues, SMG protection with complete nodal clearance in level IB is a auspicious technique for reducing future complications [10]. Oral cavity cancer (OCC) is categorized under head and neck cancer (HNC) and is sixteenth in malignancy worldwide. OCC is the most common malignancy in Southeast Asia and the Pacific regions due to the habit of betel nut chewing. More than 90% of OCC originates from the squamous tissues, hence widely known as OCSCC. The contributing factor to the development of OCC is the consumption of tobacco products in smoked or smokeless form. Moreover, low socioeconomic status, self-negligence, and lack of awareness are the key factors for OCC. It is generally observed in people above 40 years old compared to younger ones. Worldwide, a higher prevalence of OCC occurs in males than females. It is linked with various factors, including tobacco consumption in the form of smoke and smokeless tobacco (SLT) products, alcohol, and human papillomavirus (HPV). OCC can also occur at an early age because of the family history of some genetic alterations in the genome [11]. OSCC is a key public health tricky in the Indian subcontinent, where it ranks among the country's top three types of cancer [12]. Tumor thickness and invasion depth are critical prognostic indicators for upper aero-digestive neoplasm, especially regional metastasis [13]. Most of the case report emphasizes the relevance of simultaneously developing bilateral primary oral cavity tumors in a patient with a history of consuming beetle nuts. A small body of research has also documented the self-governing rate of bilateral main OSSC in persons without a history of tobacco, beetle nut, or alcohol use. It is essential to include bilateral primary OSSC when making a differential diagnosis of OSSC [14]. Expression of biomarkers Oct4, Nanog, and CD24 significantly impact management answer and endurance in patients with locally progressive OSCC smoked with neoadjuvant chemo-radiation. Existence of these patients is significantly affected by the ypN stage, the ypTNM stage, expression of all three biomarkers, and clinical and pathological response to neoadjuvant therapy [15]. About 16.3% to 27.2% of patients without clinically evident nodal disease will have occult nodal metastases found with neck dissection[16].

Methods

The study employed a prospective observational design within the Department of Oral and Maxillofacial Surgery at Dhaka Dental College and Hospital, Dhaka.The research spanned one year and six months. The study population comprised patients undergoing surgical treatment for histopathologically confirmed OSCC at the same department, adhering to specific inclusion and exclusion criteria. The sample size was resolute using the formula $n = Z^2pq/e^2$, where n represented the sample size, Z was 1.96 (standard normal distribution value at 5% significance level), p was 2.3% (P = 0.023) of OSCC patients, q was 0.977 (1-p), and e was 0.05 (10% of p). The calculated sample size was approximately 35 participants. Inclusion criteria encompassed histologically confirmed oral squamous cell carcinoma patients who underwent radical surgical resection with curative intent, including selective or comprehensive neck dissection, within the retro-molar trigone of the mandible, with lesions sized T1 to T3. Exclusion criteria encompassed individuals with residual/recurrent carcinoma, synchronous carcinoma, prior radiotherapy/chemotherapy history, and insufficient preoperative data or follow-up information. Clinical variables examined were TNM staging and postoperative radiotherapy/chemoradiotherapy, while histopathological variables included tumor grading, resection margin status, and pattern of invasion. Confounding variables assessed comprised age, sex, personal habits, and co-morbidity.

Results

The results of this study disclose significant visions into the clinical factors associated with the recurrence of oral squamous cell carcinoma in the retro-molar trigone. The patient demographics and clinical characteristics are summarized in table 1 and figure 1. The age distribution of study patients ranged from 35 to 65 years, with a mean age of 50.37±9.49 years. A significant proportion of patients (37.1%) fell within the age group of 41-50 years. In terms of gender distribution (Figure 1), out of the 35 subjects, 14 (40.0%) were male, while the remaining 21 (60.0%) were female patients, resulting in a male-to-female ratio of 1:1.5.

Table 2 sheds light on the habits of patients with OSCC in the study. It reveals that 51.4% of patients had a habit of consuming betel quid, 42.9% indulged in betel quid with smoking, and 5.7% were tobacco users. Notably, during the study period, no patient was found without any habit, underscoring the significance of these risk factors (Table 2). The prevalence of co-morbid diseases among OSCC patients is detailed in Figure 2. It was observed that 34.3% of respondents had hypertension, 20.0% had diabetes mellitus, and 5.7% were on long-term steroid therapy, emphasizing the importance of considering these comorbidities in the management of OSCC.

Tumor characteristics, as depicted in Table 3, indicated that the majority of tumors were classified as T2 (54.3%), followed closely by T3 (45.7%). This distribution highlights the tumor stage distribution among the study cohort. Figure 3 provides insights into the clinical staging of the study subjects, revealing that a majority of patients were diagnosed with clinical stage III (60%), followed by stage IV (25.7%) cases, underlining the advanced stage of presentation among most patients. In terms of treatment modalities, figure 4 showcases that the majority of patients received postoperative adjuvant radiotherapy alone (45.7%), while 22.9% underwent chemo-radiotherapy, reflecting the diversity in treatment approaches in our cohort.

Table 4, which examines the association of clinical factors with recurrence, demonstrates that clinical stage IV was significantly higher in the recurrence group (p = 0.03). Moreover, the absence of postoperative adjuvant therapy was significantly more prevalent in the recurrence group compared to the non-recurrence group, with percentages of 45.5% and 4.2%, respectively, underscoring the critical role of adjuvant therapy in preventing local recurrence (p = 0.015).

Age (in years)	Number of patients	Percent (%)
30-40	6	17.1
41-50	13	37.1
51-60	10	28.6
>60	6	17.1
Mean ± SD Range	50.37 ± 9.49 (35-65) years	

Table 1: Age distribution of the study population (n = 35).

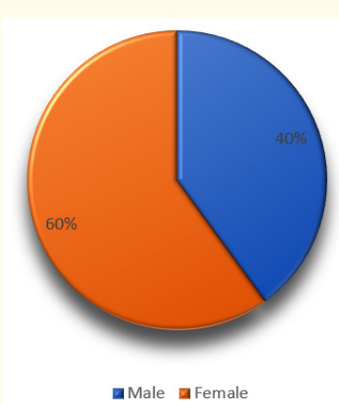

Figure 1: Gender distribution of the study subjects (n = 35).

Table 1 shows the age distribution of the study patients. Age range of the patient was 35 to 65 years. The mean age of the patients was 50.37 ± 9.49 years. Most of the patients (37.1%) belong to the age group of 41-50 years.

Figure 2 Demonstrates the distribution of sex among the patients. Out of 35 subjects 14(40.0%) were male and rest of 21(60.0%) were female patients. Male: female ratio was 1:1.5.

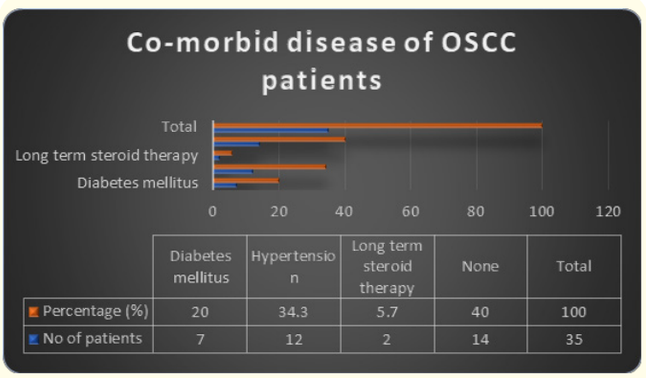

Figure 2: Distribution of the patients according to co-morbid disease (n = 35).

Habitual factor	No. of patients	Percentage (%)
Betel quid	18	51.4
Tobacco (chewing, smoking)	2	5.7
Betel quid with smoking	15	42.9
Total	35	100.0

Table 2: Distribution of the patients according to personal habit (n = 35).

Table 2 shows that the patients of OSCC have the habit of taking betel quid 18(51.4%), betel quid with smoking 15(42.9%) and tobacco 5.7%. No patient was found without any habit during the study period.

Figure-2 shows that the co-morbid disease of OSCC patients, 34.3% respondents had hypertension, 20.0% patients had diabetes mellitus and 5.7% patients had long term steroid therapy.

Size of tumour	No of patients	Percentage (%)
T1 (< 2 cm in greatest dimension)	0	0.0
T2 (2 cm -4 cm in greatest dimension)	19	54.3
T3 (> 4 cm in greatest dimension)	16	45.7
Total	35	100.0

Table 3: Distribution of the patients according to size of tumour (n = 35).

Table 3 shows that maximum tumour size was T2 (54.3%) followed by T3 (45.7%).

Figure 3 shows the clinical stage of the study subjects. Maximum patients had clinical stage III (60%) followed by stage IV (25.7%) cases.

Figure 4 shows that the majority of the patients received postoperative adjuvant radiotherapy alone was 45.7% followed by chemo-radiotherapy 22.9% of the patients.

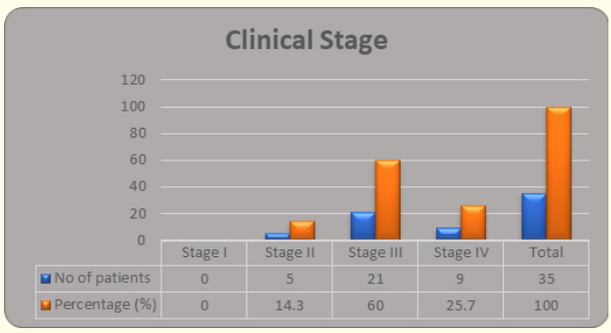

Figure 3: Distribution of the patients according to clinical stage (n = 35).

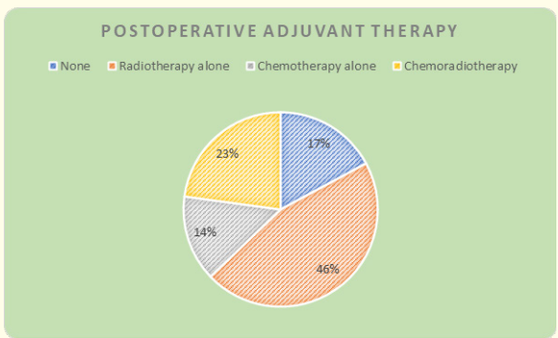

Figure 4: Distribution of the patients according to clinical stage (n = 35).

Risk factors	Recurrence		p-value
	No (n = 24) No. (%)	Yes (n = 11) No. (%)	
Clinical stage			
Stage II Stage III	4(16.7%) 17(70.8%)	1(9.1%) 4(36.4%)	0.030[s]
Stage IV	3(12.5%)	6(54.5%)	
Postoperative adjuvant therapy			
None	1(4.2%)	5(45.5%)	
Radiotherapy alone Chemotherapy alone	14(58.3%) 3(12.5%)	2(18.2%) 2(18.2%)	0.015[s]
Chemoradiotherapy	6(25.0%)	2(18.2%)	

Table 4: Association of clinical risk factors for local recurrence of oral cell carcinoma in retro-molar trigone between recurrence and non-recurrence study subjects (n = 35).

Chi-square test, s= significant

Table 4 shows Clinical stage IV was significantly higher in recurrence group (p = 0.03), No postoperative adjuvant therapy in recurrence group and non-recurrence group were 45.5% and 4.2% respectively which is statistically significant (p = 0.015).

Discussion

The study, focused on the "Clinical Risk Factors for Local Recurrence of Oral Squamous Cell Carcinoma (OSCC) in Retro-Molar Trigone at a Tertiary Level Hospital," provides critical insights into the multifaceted landscape of factors influencing local recurrence in this specific cohort. Leveraging a prospective observational design and robust methodology [1-16], we have uncovered valuable findings that have significant implications for both clinical practice and future research.

Demographic and Clinical Characteristics: The demographic profile of our study population, with a mean age of 50.37 ± 9.49 years and a substantial proportion (37.1%) falling within the 41-50 age group, underscores the vulnerability of individuals in their fifth and sixth decades to OSCC in the retro-molar trigone. This finding aligns with existing literature and emphasizes the need for targeted screening and awareness campaigns for this age group. Gender distribution revealed a balanced male-to-female ratio of 1:1.5 [1]. This indicates that OSCC in the retro-molar trigone does not exhibit a gender predilection, necessitating gender-neutral approaches in clinical management.

Habits and Co-Morbidities: The high prevalence of betel quid consumption (51.4%) and its combination with smoking (42.9%) within our cohort aligns with established risk factors for OSCC [11]. These findings underscore the importance of public health efforts to curb these high-risk habits and promote cessation among susceptible populations. Additionally, the presence of co-morbid diseases, such as hypertension (34.3%) and diabetes mellitus (20.0%), emphasizes the need for comprehensive preoperative assessment and management of these conditions in OSCC patients [9,10]. Further investigation is warranted to explore the interplay between these co-morbidities and OSCC pathogenesis.

Tumor Characteristics and Clinical Staging: Our study's tumor characteristics revealed a predominance of T2 tumors (54.3%) in the retro-molar trigone, followed closely by T3 tumors (45.7%) [3]. This staging distribution reflects the complexity of tumor presentation and underscores the importance of individualized treatment planning based on tumor size and extent. Clinical staging data [2] revealed that a significant majority of patients presented with advanced disease, with 60% classified as clinical stage III and 25.7% as stage IV. This emphasizes the challenges associated with early diagnosis and highlights the urgent need for improved screening methods and early intervention strategies.

- **Treatment Modalities:** The study showcases diverse treatment approaches within the cohort. A substantial proportion of patients received postoperative adjuvant radiotherapy alone (45.7%), while 22.9% underwent chemoradiotherapy [4]. These findings reflect the multifaceted nature of treatment decisions in managing OSCC and highlight the importance of tailored therapeutic strategies.

- **Association with Recurrence:** The analysis presented in Table 5 demonstrates a significant correlation between clinical stage IV and local recurrence (p = 0.03), emphasizing the importance of early diagnosis and intervention for advanced-stage disease. Furthermore, the absence of post-operative adjuvant therapy was significantly more common in the recurrence group (45.5% vs. 4.2%, p = 0.015), underscoring the pivotal role of adjuvant therapy in preventing local recurrence [5].

This study offers valuable insights into the clinical risk factors associated with local recurrence of OSCC in the retro-molar trigone. These findings have significant implications for improving patient care and guiding future research efforts in this challenging anatomical site. Further investigation is needed to validate our results and refine clinical guidelines for the management of OSCC within the retro-molar trigone.

Limitations

- **Limited Sample Size:** The study's sample size of 35 participants could limit the findings' robustness and generalizability. A larger sample size might provide a more comprehensive understanding of the clinical risk factors associated with recurrence in retro-molar trigone squamous cell carcinoma.
- **Single-Center Study:** The study's confinement to a single tertiary-level hospital, while aiding in focused research, may present selection bias and limit the external validity of the results. Variations in patient demographics, treatment protocols, and healthcare practices across different institutions could impact the applicability of the findings to a broader population.
- **Observational Design:** While suitable for exploring associations, the prospective observational design might not establish causality between identified clinical risk factors and recurrence. Uncontrolled confounding variables could impact the observed associations, potentially resulting in misinterpretations.
- **Limited Follow-Up Period:** The study's one-year and six-month duration might not capture longer-term recurrence patterns. Oral squamous cell carcinoma recurrences often manifest over extended periods, and a longer follow-up could provide a more accurate understanding of the clinical risk factors influencing recurrence rates in the retro-molar trigone region.

Conclusion

This study reveals crucial clinical factors influencing oral squamous cell carcinoma recurrence in the retro-molar trigone. The findings underscore the significance of variables like clinical stage, histological grade, lymph node involvement, resection margins, and adjuvant therapy. These insights provide a foundation for refining treatment strategies, optimizing patient selection, and improving outcomes. Further research with larger cohorts and extended follow-up periods can enhance our understanding and contribute to more effective management protocols for retro-molar trigone squamous cell carcinoma.

Funding

There was no funding from any external authority. Furthermore, it is imperative to highlight that the research obtained financial support through the personal initiatives of the authors, without any contributions from other sources.

Disclaimer

The article utilized in this research is widely recognized and prevalent within our field and region. There is no potential conflict of interest, as we intend to use it solely for knowledge enhancement rather than legal proceedings.

Conflict of Interest

The authors have stated that here are no conflicts of interest to disclose.

Ethical Approval

We have obtained ethical clearance from the relevant authorities and informed consent from all patients.

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