Galaxy Publication

Clinicopathological Features and Staging of Oral Cancer in Patients Seeking Oral & Maxillofacial Surgery in Saudi Arabia

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ABSTRACT

Oral cancer (OC), the most common type of head and neck cancer, ranks as the 16th most common malignancy and the 15th leading cause of cancer-related mortality worldwide. In recent years, Saudi Arabia has seen a rise in OC incidence. Despite its prevalence, OC has one of the lowest survival rates globally, with many cases still being diagnosed at advanced stages. This study aims to evaluate the frequency of late-stage OC cases in maxillofacial surgical oncology settings in Saudi Arabia. Data were collected from patients diagnosed with OC who were treated at two institutions where the author practices. Key variables collected included patient age, gender, tumor histology, location, and TNM staging. Analysis of 156 histologically confirmed cases showed a mean patient age of 59.2 years. A significant majority (79%) presented with advanced-stage disease, distributed as follows: 11% in stage I, 10% in stage II, 16% in stage III, and 63% in stage IV. In addition, 58% of the tumors showed nodal involvement. These findings highlight the high incidence of advanced OC in Saudi Arabia and emphasize the importance of enhanced inter-institutional collaboration for earlier detection and referral of OC patients.

Keywords: Advanced stages, Oral cancer, Maxillofacial surgery, Saudi Arabia

Introduction

Oral cancer (OC), the most prevalent form of head and neck malignancy, ranks as the 16th most commonly diagnosed cancer globally and the 15th leading cause of cancer-related mortality. However, its incidence varies significantly across different regions due to factors such as cultural practices, healthcare accessibility, and economic conditions. In 2020 alone, there were approximately 377,713 new cases and 177,757 deaths related to lip and oral cancer worldwide. Overall, more than 450,000 people are diagnosed with OC each year, with a global five-year survival rate below 50% [1-5].

Although OC is relatively rare in the Gulf region, Saudi Arabia stands out as an exception. Recent data indicate a rising trend in OC cases across the country. According to the Tumor Registry at King Faisal Specialist Hospital & Research Center in Riyadh, OC accounts for about 4% of all cancer diagnoses in the nation. It is the fifth most common cancer among Saudi men and ranks eleventh among women [6-8]. Compared to neighboring Gulf countries like Kuwait and the UAE, Saudi Arabia reports significantly higher OC incidence, despite similar cultural and geographic profiles. About 26% of all head and neck cancers in the Kingdom are oral cancers, most of which present at late stages and often require palliative treatment. One major contributing factor appears to be the widespread use of *Shamma*, a smokeless tobacco product linked to increased OC risk [9-15].

Despite the oral cavity being easily accessible for clinical examination, many OC cases continue to be identified at late stages. Delayed diagnosis has been highlighted as a major contributor to poor outcomes and high mortality.

Advances in imaging, surgical techniques, and cancer therapies have led to only minimal improvements in survival rates for oral squamous cell carcinoma. Moreover, even patients who survive OC often suffer from significant long-term effects such as impaired speech, swallowing difficulties, facial disfigurement, and diminished quality of life [16-20].

Early diagnosis is crucial for improving outcomes and reducing complications. Globally, between 55% and 75% of OC cases are detected at advanced stages (stage III-IV), with five-year survival rates ranging from 33% to 63%. A systematic review on OC in Saudi Arabia reported that all patients included in the study had presented at advanced stages, with five-year survival ranging from 12.9% to 24.4% [21-28].

In general, early detection can push survival rates above 80%, whereas late-stage diagnosis is associated with rates below 20%. Given this context, the current study aims to evaluate how frequently patients present with advanced-stage oral cancer in maxillofacial surgical oncology settings in Saudi Arabia.

Materials and Methods

This retrospective study analyzed clinical records of oral cancer patients treated in the oral and maxillofacial surgery departments at King Abdulaziz University Hospital and King Abdullah Medical City in Saudi Arabia. The timeframe for data collection spanned from 2015 to 2022.

Only cases confirmed as oral squamous cell carcinoma through histopathological examination were included in the analysis. Other oral malignancies—such as salivary gland tumors, melanomas, sarcomas, and verrucous carcinomas—were excluded to maintain diagnostic consistency.

Data points gathered included demographic details (age and sex), tumor characteristics (histological type, location), and clinical stage based on the 8th edition of the American Joint Committee on Cancer (AJCC) TNM system. Age was evaluated as a continuous variable. Tumor locations were categorized into seven anatomical sites: lip, tongue, floor of the mouth, buccal mucosa (cheek), mandible, retromolar area, and maxilla or palate.

The main objective was to determine how frequently patients presented with advanced-stage disease (stages III and IV) versus early-stage (stages I and II) in a surgical oncology setting. In total, 156 patient records meeting the study criteria were reviewed.

Results and Discussion

A total of 156 patients were confirmed to have oral and maxillofacial squamous cell carcinoma through histopathological analysis. Of these, 55% were male and 45% female. The average age of the patients was 59.2 years (± 15.2), with ages ranging from 21 to 93 years. The median age at diagnosis was 60.5 years.

When analyzing the anatomical distribution of the tumors, the tongue emerged as the most frequently affected site, accounting for 40.5% of cases. This was followed by the cheek (buccal mucosa) at 25.5%, the mandible at 17%, and the maxilla at 7%. Tumors involving the lower lip and floor of the mouth each represented 4% of cases, while the retromolar area was the least affected, with only 2% of tumors located there. A visual representation of site-specific prevalence is provided in **Figure 1**.
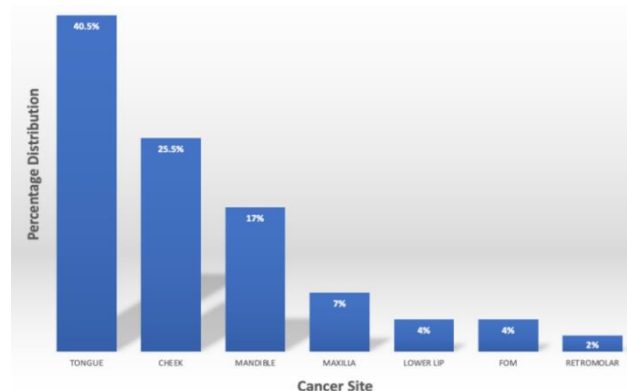

Figure 1. Frequency of distribution among the oral anatomical sites

A significant proportion of patients—79%—were diagnosed at advanced stages of the disease. Stage distribution revealed that 11% were in stage I, 10% in stage II, 16% in stage III, and the largest group, 63%, in stage IV **(Figure 2)**. Additionally, nodal involvement was present in 58% of cases, with the majority exhibiting extranodal extension (ENE), indicating a more aggressive disease pattern. The prevalence of nodal metastasis is illustrated in **Figure 3**.
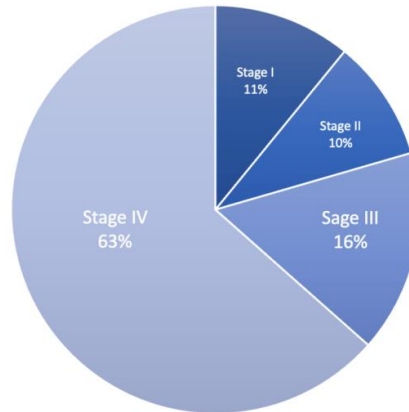
Figure 2. Oral cancer staging

More than 75% of the patients in the study cohort were diagnosed with advanced-stage oral cancer, with a higher prevalence observed among male patients. Additionally, individuals presenting with advanced-stage disease tended to be older compared to those diagnosed at earlier stages.
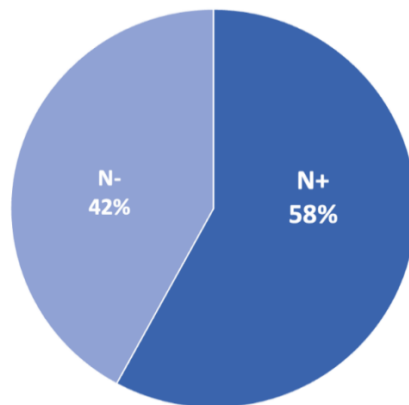
Figure 3. Nodal disease among the cohort of patients

Despite advancements in both diagnostic imaging and treatment modalities, oral cancer still carries a poor prognosis—primarily due to delays in diagnosis, often until the disease reaches an advanced stage. A study using data from the U.S. National Cancer Database (1998–2006) reported that 32.5% to 36% of oral cancer cases were diagnosed at a late stage [29]. Similarly, a long-term study at Memorial Sloan Kettering Cancer Center involving over 2,000 patients (1985–2015) found that only 25% presented with advanced-stage disease, which was associated with a 5-year overall survival rate of 64.4% [12]. However, survival outcomes are not uniform across the U.S., as shown in the SEER database, where the 5-year survival rate varies between 42.7% and 52% [30].

The stage at which oral cancer is diagnosed remains one of the strongest prognostic indicators [31, 32]. When detected early and treated with a single modality approach, the chances of survival significantly increase. Yet, approximately two-thirds of cases are still diagnosed at stage III or IV, where the 5-year survival rate drops to 50% or lower [33]. In contrast, localized-stage cancers boast survival rates of around 80%, underscoring the major impact of early detection on outcomes [34].

In Brazil, Kowalski *et al*. [35] highlighted the impact of clinical upstaging before treatment, showing that patients who experienced delays had a median survival of only 17.2 months, compared to 32.7 months in those treated

within 1–3 weeks. Similarly, in Taiwan, Tsai *et al*. [36] observed that initiating treatment more than 30 days after diagnosis was associated with significantly reduced survival, regardless of cancer stage at diagnosis. Van Harten *et al*. [37] also reported that extended treatment delays were linked to poorer overall survival in head and neck cancer patients in the Netherlands.

Our study reveals a concerning nearly 80% prevalence of advanced-stage oral cancer cases, with 63% of those being diagnosed at Stage IV. A further breakdown of cases post-COVID pandemic, starting in March 2020 at one of the centers included in this study, shows an even higher prevalence of advanced stages, reaching 88%. This high rate of advanced cases is mirrored in the notable prevalence of positive nodal disease, which was present in 58% of the patients in our cohort, compared to only 29% in the Memorial Sloan Kettering Cancer Center cohort [12].

Across Saudi Arabia, the prevalence of oral cancer shows significant regional variation, with some areas reporting much higher incidences than others. For example, Jazan (Gizan) has the highest rates of head and neck cancers in the country, with oral cancer ranking as the leading cancer among females and second among males [38]. Several studies have explored the factors contributing to this high incidence in Jazan, with one major cause being the widespread use of Shamma, a smokeless tobacco product, which was found to increase the risk of oral cancer by 29-fold [9, 39, 40].

The high incidence of advanced oral cancer at specialized centers is influenced by several factors. One key issue is delayed consultations, as many patients dismiss early signs and symptoms as minor or self-resolving. Additionally, the lack of centralization in cancer care means that decisions about which cancers to treat or refer are often made at local centers. This creates a problematic situation where specialized centers handle mostly advanced cases with poor prognoses, while simpler cases are often treated in non-specialized centers by practitioners without oncology expertise. As a result, these patients may not receive optimal care, leading to lower cure rates and higher recurrence, ultimately impacting the region's overall cancer care outcomes. Centers without oral cancer specialists or comprehensive treatment capabilities must adopt a policy of referring all oral cancer patients to centers that can provide specialized care.

Early detection of oral cancer can be achieved through various approaches, such as targeted screening for high-risk populations, opportunistic screenings by general practitioners, and minimizing the time between diagnosis and treatment [41]. The UK's introduction of fast-track referral systems for suspected cancer cases in 2005 has demonstrated success in shortening diagnostic delays for several types of cancer. For head and neck cancer patients, these policies have reduced the diagnostic time by 21 days [42].

Conclusion

This study highlights the concerning prevalence of advanced-stage oral cancer in Saudi Arabia, as observed in oral and maxillofacial surgical practices. It calls for stronger collaboration between medical centers to facilitate early detection, diagnosis, and timely referral of patients to appropriate treatment centers.

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