Incidence, Clinical Presentation, and Demographic Factors Associated with Oral Cancer Patients in the Southern Region of Saudi Arabia: A 10-year Retrospective Study

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Abstract

Background: This is a retrospective study design to assess the incidence of oral cancer in the southern region of Saudi Arabia. The study involves three tertiary care centers primarily involved in oral cancer care. Incidence, type, distribution of oral cancer among age group, gender, region, and site are assessed. Materials and Methods: A self-designed questionnaire assessed the incidence of oral cancer over 10 years among patients visiting tertiary care centers in Southern Saudi Arabia. A total of 2850 files were screened. Demographic data included gender, age group, and the region from where the patient represented. The clinical presentation of the lesion, site, bilateral involvement, and histopathological variant was included in the study. Data are presented as frequency tables and percentages. Results: A total of 94 patients presented with oral cancer. The incidence of oral cancer in Southern Saudi Arabia is 3.29%; 44 (46.8%) were female and rest 50 were male (53.2%). Patients from 8 regions of Southern Saudi Arabia presented with oral cancer. Of the 8 regions, patients from Abha had the highest incidence of oral cancer (20.2%). Clinical presentation varied from the ulcer (59.3%), swelling (19%), ulcer and swelling (12%), and swelling of the neck along with ulcer in primary site (9.6%) in descending order. 37.2% of the patients presented with a lesion in the tongue making it the highest prone site. 91.5% of the patients were diagnosed as squamous cell carcinoma followed by 5.3% as verrucous carcinoma and 3.5% as sarcoma. The mean follow was 5.3 years. Conclusion: The incidence of oral cancer in Southern Saudi Arabia is 3.29% over 10 years. This is significantly low when compared to similar studies conducted elsewhere. The lower incidence might be attributed to the absence of habits such as betel chewing, pan masala, and gutkha habits normally seen in India and regions around. The presentation of oral cancer is similar to other regions of the world. Surprisingly, females have an almost similar rate of incidence as males though slightly less. This makes it mandatory to assess the habits such as smoking among females more thoroughly. Tongue remains to be the site with the highest incidence which correlates with similar findings in other regions of the world.

Keywords: Incidence, oral cancer, Saudi Arabia

Introduction

Head and neck cancer comprises malignancies arising in the upper respiratory and digestive tracts and is the fifth and eight most common cancer worldwide (in 2002), for males and females, respectively.[1] Head and neck cancer is a major cause of morbidity and mortality worldwide.[2] Squamous cell carcinoma represents the most common histological subtype of cancers originating from the region.[3,4] Among the varied etiological factors associated with oral cancer, tobacco, and alcohol have long been implicated as the traditional risk factors for oral cancer in adults of any age.[5] The incidence of tobacco consumption in the form of cigarette smoking is prevalent worldwide, the use of snuff, reverse smoking is restricted to certain parts of the world such as India. Betel quit chewing and betel nut with lime is another important etiological factor associated with oral squamous cell carcinoma in India and...
Sri Lanka. Use of Shemma is another factor in Yemen and Southern part of Saudi Arabia for increased incidence. Relation of occupation in the development of oral squamous cell carcinoma is also reported in the literature. Epidemiological evidence exists for an association between workers exposed to formaldehyde and other manual workers such as printers, electronic workers, and textile workers with an increased risk of oral cancer.\textsuperscript{[5,6]} Chronic immunodeficiency states and individuals under immunosuppression regimes following organ transplantation are also at increased risk of oral cancer.\textsuperscript{[7]}

Viral infections along with the role of Epstein–Barr virus and human papillomavirus (HPV) have been implicated in the etiopathogenesis of oral cancer though controversially. Genetic influence on oral cancer is also stated in the literature. Mutation at the p53 tumor suppressor gene has been found to be the single most frequent genetic alteration observed in carcinomas.\textsuperscript{[8]}

Epidemiological research into oral cancer is complicated by the variety of anatomical subsites which leads to diversity in reporting.\textsuperscript{[9]} There is a variability in classifying and grouping the head and neck sites making comparative evaluation between populations and studies challenging.\textsuperscript{[10]} Epidemiology, site-specific incidence, and long-term survival are essential to establish the outcome of treatment in oral cancer. Continued monitoring of head and neck cancer incidence trends is warranted as many countries undergo economic transition that may be associated with the acquisition of risk factors such as tobacco and alcohol use as well as HPV exposure.\textsuperscript{[11]}

Incidence and survival trends of head and neck squamous cell carcinoma are essential for guiding policy making and research.\textsuperscript{[12]} Geographic variations exist, especially with respect to subsites and this tends to be associated with various risk factors found to be different in different regions of the world.\textsuperscript{[13]} The suffering, disfigurement, and death associated with oral cancers are definitely avoidable, due to easy surgical accessibility of the site, well-recognized causative factors, and the precedence by precancerous lesions, providing an excellent opportunity for early detection and control.\textsuperscript{[14]} Contrary to the above fact, the rate of spread of oral cancer in head and neck region, the lymphatic drainage, the complex anatomy, and micro-metastasis are some of the factors which need to be specifically addressed in terms of low survival rates. When oral cancer develops in minor salivary glands involving head and neck region, the issue becomes more complex. The minor salivary gland tumors deviate from other malignant tumors being classically slow growing, with patients being aware of its presence late. They are innocuous, asymptomatic, and do not interfere with function.\textsuperscript{[15]}

This study aims to assess the incidence of oral cancer among Saudi population in the Asir province which represents the southern region. Asir region has a projected population of about 2,242,100 according to the official census cited in the website. This province is represented by different cities among which Abha is the capital.

A retrospective study over 10 years was conducted to assess the clinical presentation of the lesion, site, bilateral involvement, and histopathological variant. The results are compared with similar studies conducted elsewhere in other geographic regions.

Materials and Methods

A retrospective study was conducted in tertiary care referral maxillofacial centers over 10 years. This is a randomized, cross-sectional study with descriptive analysis of the data. The study includes three hospitals: (1) Asir Central Hospital, Ministry of Health, Abha, KSA (2) Armed Forces Hospital, Khamis Mushyt, KSA (3) Madani Hospital, Ministry of Health, Khamis Mushyt, KSA, which are actively involved in maxillofacial surgeries. The three referral centers included in this study are tertiary care centers. These referral centers are government funded and under the Ministry of Health and Defense, Government of Saudi Arabia. They have adequate facilities to treat oral cancer patients. As per the protocol, the primary care centers refer all in-patient care patient’s to these centers.

Cases of oral cancer were retrieved from electronic database of the medical records department. The institutional ethics committee cleared the protocol and the data pertaining to these patients were entered in a standardized questionnaire. Appropriate cases of oral cancer (sample size) were identified in the electronic database by entering the keywords: Oral Cancer, Surgery – Oral Cancer, Maxillofacial Surgery, Plastic and Reconstructive Surgery. Since oral cancer cases are registered under these departments, almost all of the case records were retrieved. Patients of all nationalities who underwent oral cancer care were included in this study without bias. The institutional clearance obtained for this study was submitted to these centers before retrieving the data. An undertaking was submitted for maintaining the confidentiality of the data. Patients at the time of registration sign an informed consent in the case file submitting their willingness regarding their disease illness for treatment and research purposes. All the case records were decoded and confidentiality maintained and then the details were entered into the master sheet. Demographic data included gender, age group, and the region from where the patient represented. The clinical presentation of the lesion, site, bilateral involvement, and histopathological variant was included in the study. Data are presented as frequency tables and percentages.

Results

A total of 2850 patient files were screened over 10 years. Ninety-four patients presented with oral cancer. The incidence of oral cancer in Southern Saudi Arabia is 3.29% (94 patients with oral cancer out of 2850 patients).

Of the 94 patients, 44 (46.8%) were female and rest 50 were male (53.2%). Table 1 shows the distribution of oral cancer
patients according to gender and age group. 44.6% of the patients were in the age group of 51–70 years. As shown in Graph 1, 47% of the patients presented with a lesion in the tongue making it the highest prone site in this region followed by buccal mucosa (20%), mandible (20%), and lower lip (13%). Patients from 8 regions of Southern Saudi Arabia presented with oral cancer. Of the 8 regions, patients from Abha had the highest incidence of oral cancer (20.2%) as shown in Graph 2.

Graph 3 compares the distribution of oral cancer on the left versus right side. 61.01% of the lesions were localized on the left followed by 37.2% on the right side. Nearly 1.6% of the patients had bilateral involvement. Graph 4 shows the distribution of oral cancer according to the clinical presentation which varied from the ulcer (59.57%), swelling (19.1%), ulcer and swelling (11.7%), and swelling of the neck along with ulcer in primary site (9.5%) in descending order. Graph 5 shows that 92% of the patients were diagnosed as squamous cell carcinoma followed by 5% as verrucous carcinoma and 3% as sarcoma. The mean follow period was 5.3 years.

**DISCUSSION**

Oral cancer remains one of the most life-threatening oral diseases in the world.[18] Majority of the oral cancers are squamous cell carcinoma and are linked with preventable risk factors.[19,20] Smoking, betel nut chewing, and excessive alcohol consumption are few of the factors which can be definitely avoided. Head and neck squamous cell carcinomas have a distinct geographical predilection.[21] According to de Souza et al., the highest incidence rates for oral cavity and oropharyngeal cancers were registered in Pakistan, India, France, Slovakia and Brazil.[22] Among these countries with higher rates of incidence of oral cancer, India is one among the countries with the highest incidence due to lifestyle related habits.[23] There are changing trends in the incidence of oral cancer over a period. These may be related to etiological factors, gender variability, age group, and survival rates among oral cancer patients. Conventionally, oral cancer was linked exclusively to old age subjects, male gender, and tobacco-related habits. Sherin et al., in their retrospective study over 5 years observed a higher incidence of oral cancer among young adults in North Kerala, India.[24] Garavello et al., in their study stated that cancer in younger individuals are more frequently anaplastic with a more aggressive behavior and declining survival rate.[25] This would certainly make the loco-regional control of the lesion more challenging and makes it mandatory for long-term follow up. In the present study, we found a higher incidence among patients in the age group of 51–70 years.

Oral cancer also has been conventionally linked to lower socioeconomic status with an impression that subjects from lower income group are more prone to habits such as chewing

| Table 1: Distribution of oral cancer according to age group and gender |
|-------------------------|-------------------------|-------------------------|-------------------------|
| Age         | Male N(%) | Female N(%) | Total N(%) |
|<10 year    | 1 (1.1)   | 1 (1.1)     | 2 (2.1)     |
|10-30 year  | 2 (2.1)   | 2 (2.1)     | 4 (4.3)     |
|31-51 year  | 7 (8.5)   | 8 (7.4)     | 15 (16.0)   |
|51-70 year  | 23 (20.2) | 19 (24.5)   | 42 (44.7)   |
|<70 year    | 17 (14.9) | 14 (18.1)   | 31 (33.0)   |
|Total       | 50 (53.2) | 44 (46.8)   | 94 (100)    |

**Graph 1:** Occurrence of oral cancer according to site

**Graph 2:** Distribution of oral cancer according to region

**Graph 3:** Distribution of oral cancer – left side versus right side (N)
of tobacco and smoking. With respect to gender, there is an impression that oral cancer is linked to males. However, with changing habits and lifestyle, there is an increase in the incidence of oral cancer among females. However, this varies also with the geographic distribution. Shenoi et al., in their retrospective study to assess the demographic and clinical profile of oral squamous cell carcinoma patients found a 4.18:1 male to female ratio. In the present study, the ratio of male to female with oral cancer was 1.1:1.3. This is consistent with the findings of other studies in the literature who have stated higher incidence for males. However, a study conducted by Périé et al., to assess the epidemiology and anatomy of head and neck cancers stated that the incidence of oral cavity and pharyngeal cancers has decreased in men since 1980 and has increased in women. This may be linked to life-style changes among women such as smoking and alcohol intoxication. In this study, the tongue was the most common site of presentation with oral squamous cell carcinoma. The incidence of oral cancer with the site again varies with geographic region due to variation in habits. Tongue and floor of the mouth are common sites of oral cancer presentation among western countries. This is due to higher consumption of alcohol and smoking in these regions than smokeless tobacco such as betel quid, khaini, gutkha, and pan masala. In countries such as India, tongue, and gingivobuccal sulcus is a common site for presentation of oral cancer. This is because tobacco quid is placed in the gingiva-buccal sulcus for a long duration while working. Singh et al. in their retrospective study involving 611 oral squamous cell carcinoma Indian patients found a higher incidence in tongue and gingiva-buccal sulcus.

Simard et al. stated that there was substantial global variation in head and neck cancer incidence by cancer site, country/registry, and sex. According to them, oral cavity cancer rates increased among both men and women in Europe but were stable or decreased in a number of Asian countries. Braakhuis et al. determined the incidence trends of head and neck squamous cell carcinoma by collecting data from the Netherlands cancer registry and found that the age incidence trends showed a significant decrease of 0.6% for males and a significant increase of 1.8% for females. They also noticed that the incidence of oral carcinoma increased significantly for females than males (2.0% vs. 0.5% per year). Different studies conducted across the European countries have shown an increase in the incidence of oral cancer.

Occupational exposures, immune defense, viral infections, the protective function of diet, genetic and familial factors, and mutational changes are other etiological factors implicated toward oral cancer. There is an increase in the incidence of oral cancer among younger individuals and females in some geographic regions. The incidence of oral cancer has increased among European countries and has stabilized in some countries such as India. Presentation at various sites in the oral cavity varies with the etiological factors.

**Conclusion**

The incidence of oral cancer in Southern Saudi Arabia is 3.29% over a period of 10 years. This is significantly low when compared to similar studies conducted elsewhere. The lower incidence might be attributed to the absence of habits such as betel chewing, pan masala, and gutkha habits normally seen in India and regions around. The presentation of oral cancer is similar to other regions of the world. Surprisingly, females have an almost similar rate of incidence as males though slightly less. This makes it mandatory to assess the habits such as smoking among females more thoroughly. Tongue remains to be the site with highest incidence and age group 51–70 represented the highest incidence which correlates with similar findings in other regions of the world.

Although this is a retrospective study which can be considered as a limitation, no similar studies are conducted in this region. This study involves assessment of oral cancer patients over 10 years which is quite significant. A prospective long-term study is suggested by the authors to assess the incidence, etiological factor, and the survival rate in this part of the world.

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There are no conflicts of interest.

REFERENCES