

Demographical analysis on the effects of smoking and reverse smoking on oral lesions and their histopathological study – An Institutional Experience.

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ABSTRACT

Context: Oral cavity is one of the most common sites for both neoplastic and non-neoplastic lesions especially in India.

Aims: The aim of the study is to analyze the demographics and various patterns of different oral lesions and its association with tobacco chewing and reverse smoking in a Tertiary care hospital in Srikakulam, Andhra Pradesh.

Materials & Methods: A prospective cross-sectional study was carried out for a period of 2 years in the Department of Pathology, Government Medical College, Srikakulam. The study included 92 cases of oral lesions.

Statistical Analysis:A descriptive analysis was made from the data obtained. The information was analysed in data spreadsheets using Microsoft Office Excel 2010.

Results: Neoplastic lesions(65%) were more common than non-neoplastic lesions(35%). Most of the non-neoplastic lesions were seen in the age group of 11-20 years while the neoplastic lesions were seen in the age group of 41-50 years. There was increased preponderance of males(69%) compared to females(31%). Tongue(30%) was the most commonly affected site

followed by buccal mucosa(19%). Squamous cell carcinoma was the most common malignant lesion seen in 38% of total cases. Significant association with tobacco and reverse smoking was observed in majority of patients.

Conclusion:Despite the increased incidence of oral cavity cancers, their metastasis and recurrence, the prognosis of these tumors are still not well determined. Preventive measures and early detection of premalignant lesions can impede further complications. Hence not only accurate clinical examination, but also histopathological examination is considered as gold standard.

Keywords: Neoplastic, Non-Neoplastic, Oral cavity, Reverse smoking, Squamous cell carcinoma, Tobacco.

Key Messages:

1. Oral health is an important aspect contributing its role to influence the quality of life.
2. Significant association with smoking and reverse smoking which is the most common local habit in Srikakulam has been reported in patients presented with oral lesions.
3. Efforts in the form of primary and secondary preventive measures must be expanded widely to reverse the high morbidity and mortality rates associated with the disease.
4. Accurate clinical examination with timely diagnosis by histopathological examination is still considered to be gold standard.

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INTRODUCTION:

The oral cavity and oropharynx are one of the most common sites for numerous diseases, both congenital and acquired. Topographically, the oral cavity and oropharyngeal region is divided into the following regions: (1) lip along with oral commissures, (2) floor of the mouth, (3) tongue, (4) buccal mucosa, (5) gingiva, (6) retromolar trigone, (7) hard palate (8) base of the tongue, (9) tonsillar area, (10) soft palate, and (11) pharyngeal walls.¹ The surface epithelium of this region is of stratified squamous type. It lacks hair follicles and sweat glands but may often contain scattered sebaceous glands, melanocytes, and Merkel cells. Keratinisation occurs in the areas that are most exposed to mastication which are the gingivae, hard palate, and dorsum of tongue.¹ The lamina propria is composed of loose connective tissue and it contains plenty of serous and mucous glands of minor salivary gland.¹

Oral health is an important aspect contributing its role to influence the quality of life. The *Global Burden of Disease Study 2017* estimated that oral diseases affect close to 3.5 billion people every year worldwide.² The global incidence of cancers of the lip and oral cavity is estimated at 4 cases per 1 lakh population. India has the largest number of oral cancer cases and constituting nearly one-third of the total burden of oral cancers globally.³ Around 77,000 new cases and 52,000 deaths are reported in this country annually, which is approximately one-fourth of global incidences.⁴

Most of the oral cavity lesions are non neoplastic with the commonest being non specific inflammation, retention cyst, etc.⁵ Among malignancies, squamous cell carcinoma is the most

common cancer contributing remarkably i.e. 84-97% of all oral cancers.⁴ Oral cancers are mainly related to smoking, and some form of tobacco chewing i.e beedi, gutkha, khaini, slaked lime, areca nut mixture, and are synergistic with consumption of alcohol. Nearly, 42.4% of men, 14.2% of women and 28.6% (266.8 million) of all adults in India currently use tobacco.⁶ The significant association between tobacco chewing and cigarette smoking with various oral pathological lesions, both pre-malignant and malignant has already been proven in various studies. Low socioeconomic status is commonly associated with higher risks of tobacco-related cancers, probably due to differences in smoking habits. For example, reverse smoking is one of the most common smoking habit in rural areas of Andhra Pradesh. In reverse smoking, the burnt end of a hand rolled tobacco leaf, called as *chutta* locally, is put inside the mouth rather than the unlit end of the cigar, thus making it an important predisposing factor to oral cancer. There are also additional predisposing factors causing constant irritation to oral mucosa like poor oral hygiene, vitamin deficiencies, ill-fitting dentures, sharp broken teeth and sustained viral infections like HPV.⁴

Since oral cavity is easily accessible to examine, early diagnosis of pre-malignant and malignant lesions can be detected much easily. Oral cavity cancers are the most debilitating and disfiguring, as their treatment and surgery can often affect the quality of life. The World Health Organization predicts a continuous increasing trend in the number of patients with oral cancer every year. Early stage of disease detection is a significant key to survival from oral cancers. Proper management with an accurate clinical evaluation and histopathological examination is considered as gold standard. Hence, the main objective of the present study is to analyse the incidence and patterns of various oral lesions comprehensively with respect to the

patient's age, gender, distribution and its association with smoking/reverse smoking presented at a tertiary care centre in Srikakulam, Andhra Pradesh.

MATERIALS AND METHODS:

A prospective cross-sectional study was carried out for a period of 20 months from May 2019 to January 2021. The study was conducted in Department of Pathology in Government Medical College, Srikakulam, Andhra Pradesh. Sample size included the incisional and excisional biopsies from the in-patient and out-patient departments of ENT. The specimens were received in 10% formalin and the tissues were adequately fixed, processed and embedded in paraffin wax. Multiple sections were obtained from the paraffin block and stained with Hematoxylin and Eosin stain and the slides then were reviewed. A detailed history regarding the onset, duration and progression of the disease along with past and personal history was obtained. More than 50% of the patients reported history of some form of smoking. The reverse smoking people reported smoking atleast one chutta per day.

STATISTICAL ANALYSIS:

A descriptive analysis was made from the data obtained. The information was analysed in data spreadsheets using Microsoft Office Excel 2010. The parameters analyzed in this study

were age, sex, site of distribution, pre-disposing factors and histopathological diagnosis of the lesions.

RESULTS:

A total of 92 cases of oral lesions were included and analysed in this study, out of which 32 cases were non-neoplastic (35%) and 60 cases were neoplastic (65%).

In the non-neoplastic lesions, the majority of cases reported were pseudo-epithelomatous hyperplasia followed by submucosal retention cyst. The neoplastic lesions were further again divided into benign, premalignant and malignant lesions. Out of the 60 neoplastic lesions, 16 cases were benign lesions followed by 6 cases of premalignant lesions and 38 cases of malignant lesions.(Table 1)

The youngest patient encountered was a 1½ year old male child diagnosed with capillary hemangioma on the buccal mucosa and the oldest patient reported was a 75-year-old female diagnosed with well differentiated squamous cell carcinoma on hard palate. (Table 2)

The non-neoplastic lesions were most commonly seen on the lip and buccal mucosa. In the neoplastic lesions, tongue was the common site for both benign and malignant lesions. (Fig. 1)

In all the lesions, there was significant predominance of males(69%) compared to females(31%), substantiating the custom of increased consumption of smoking and tobacco chewing in males. (Fig.2).

In our study, 59(64%) patients are smokers. Among them, 38(43%) members have the habit of reverse smoking. (Table 3)

DISCUSSION:

Oral cavity is one of the most common sites for neoplasm in India, especially in males, due to the higher propensity of tobacco chewing or smoking in males.

In the present study, the age range varied from 18 months to 75 years, whereas Gohel et al⁷ reported in a similar study of 162 cases with the age group of the patients was ranging from 11 months to 80 years.

In our study, the most common age group presented with oral cavity lesions is in 5th decade accounting to 18% of the total cases, which is in concordance with the study made by Kosam et al⁸. In the non-neoplastic lesions, majority of the cases were seen in the age group between 11-20 years, while the peak incidence of neoplastic lesions was seen in the age group of 41-60 years. However, in the study made by Prabhakar Patro et al⁹, the most common age groups for non neoplastic lesions and neoplastic lesions are 1-10 years and 41-60 years, respectively.

There is higher predominance of oral lesions in males (69%) compared to females (31%) in our study, which is similar to many studies including Gohel et al⁷, Nikunj et al⁸, and Ranjan et al¹¹. This may be explained by increased association of smoking, chewing tobacco and alcohol consumption in males.

In the present study, the most common site involved is tongue (30%) followed by buccal mucosa (19%), palate (16%) and lip (11%). This result was correlated well with Ranjan Agarwal et al¹¹ who also observed tongue as the most commonly involved site. However, in contrast Gohel et al⁷, and Kosam et al⁸ reported buccal mucosa as the most common site involved followed by tongue. The other sites involved in our study were tonsil (10%), pyriform fossa (6%), oral commissure(3%), retromolar trigone(3%) and floor of the mouth (2%).

With regard to histopathological diagnoses, in the present study, pseudoepithelimatous hyperplasia(11%) was the most commonly observed lesion in non neoplastic entity followed by submucosal retention cyst(10%) and tonsillitis(8%). Prabhakar Patro et al⁹ reported tonsillitis as the most common neoplastic lesion followed by pseudoepithelimatous hyperplasia. Other lesions like tonsillitis, mucocele, infected cyst and non specific abscess were accounted to a minor part. In the benign lesions category, squamous papilloma(9%) was reported with higher incidence. Thomas et al⁵ and Prabhakar Patro et al⁹ also reported hemangioma as the most common benign lesion. One case each of pyogenic granuloma and inverted Papilloma were also reported in our study.

Schwannoma is a benign nerve sheath tumor of schwann cell origin. Intra oral schwannomas constitute only 1%. Schwannoma is generally an asymptomatic, slow growing and present as solitary nodules with no gender predilection. The common presenting age ranges between 20-50 years. Though intra oral presentation of schwannoma is rare, tongue is the most common site for schwannoma, but it can occur anywhere in the mouth. In our study, there was one case of Schwannoma on the upper lip in a 20 year old female. Kosam et al⁸ and Ranjan Agarwal et al¹¹ also observed one and two cases of schwannoma in their studies, respectively.

Further, a tonsillar teratoma was also reported in a 2 years old male child in our study. Teratomas in the cervical-cephalic regions have low incidence with approximately 2% of reported cases. The most common locations for teratomas in childhood includes sacrococcygeal region, gonads and mediastinum.¹² Teratomas of the head and neck region include central nervous system, orbit, infratemporal fossa, oropharynx, nasopharynx, nasal cavity, and palatine bone or palatine tonsil.¹³

Among the malignant lesions, squamous cell carcinoma (38%) was the most common neoplasm encountered in our study. This result was in concordance with the study conducted by Thomas et al⁵, Prabhakar Patro et al⁹ and Nikunj et al¹⁰. With regard to histopathological aspect, the squamous cell carcinoma is differentiated into 3 types. We reported 21 cases of well differentiated squamous cell carcinoma, 9 cases of moderately differentiated squamous cell carcinoma, and 5 cases of poorly differentiated squamous cell carcinoma. Well differentiated squamous cell carcinomas are composed of distinguished ovoid to polyhedral squamous cells, which are arranged in nests and islands. There is plenty of keratin, explaining the process of “neoplastic maturation”. Moderately differentiated squamous cell carcinoma is composed of atypical epithelial cells which are round to oval in shape with prominent inter-cellular bridges. There is infiltration of tumor cells into the adjacent stroma. The individual cells are showing mild to moderate nuclear atypia, most of them being hypochromatic with large nucleoli. There are few atypical and bizarre cells along with multiple atypical mitosis. Poorly differentiated squamous cell carcinomas are difficult to establish squamous differentiation. They consist of high grade pleomorphic cells with marked nuclear atypia and minimal or no keratinsation. Since

the squamous cell carcinoma accounts for major percentage of all oral cancers, they can thus be considered as an emerging threat to the community.

Incidentally, one case of lymphoepithelial carcinoma was identified in a 45 year old female on tonsil. Histopathology showed malignant epithelial islands of large non-keratinizing round to oval cells with vesicular nuclei and prominent nucleoli along with diffuse areas of lymphoplasmocytic infiltrate and lymphoid follicles with germinal centers (Fig.3). Lymphoepithelial carcinoma is a rare and high-grade malignant tumor and variant of anaplastic carcinoma with a dense lymphoid stroma.¹⁴ The World Health Organisation defined it as “A poorly differentiated squamous cell carcinoma or undifferentiated carcinoma which is morphologically similar to nasopharyngeal carcinoma and is associated with prominent lymphoplasmacytic infiltration.”¹⁴

One case of small cell carcinoma was also observed in 70year old male on buccal mucosa. Histopathology showed clusters and sheets of round to oval cells with scant cytoplasm and hyperchromatic nuclei with indistinct nucleoli and plenty of mitotic figures along with sheets of macrophages and extensive areas of necrosis (Fig.4). Small cell carcinoma of oral cavity is extremely rare and is very aggressive and is frequently presented as metastasis from lung.¹⁵

Besides, one case of polymorphous low grade adenocarcinoma was seen in a 55 year old female on hard palate. Histopathology from multiple sections showed subepithelial diffuse tumor composed of cells arranged in lobules, tubular, fascicular, cribriform and glandular pattern. The individual cells are small to medium sized ovoid cells of bland appearance and uniform nuclear pattern with infiltration into adjacent stroma (Fig.5). Polymorphous low grade

adenocarcinoma is second most common tumor of salivary gland. It rarely occurs in the palate.¹⁶ From the past literature, it is seen that polymorphous low grade adenocarcinoma is more frequent in females than in males with the female to male ratio being 3:1 with the peak prevalence being in the 5th and 6th decades.¹⁶ In accordance with the prevalence of polymorphous low grade adenocarcinoma, in our study patient was also a female in her 6th decade.

In the few rural areas of Andhra Pradesh, the proportion of smokers associated with reverse smoking habit is relatively high. Many cases from our study including few females also gave the history of reverse smoking. The habit of reverse smoking is a specific and peculiar custom in groups with low economical resources. There are various factors that could influence an individual to take up this peculiar habit of reverse smoking such as peer pressure, friendship, and cold climatic conditions. In Andhra Pradesh, it is highly prevalent in the coastal areas of Visakhapatnam, Vizianagaram, and Srikakulam districts. A *chutta* is a coarsely prepared tobacco varying in length from 5 to 9 cm which could be either hand rolled or factory produced. The intraoral temperatures of the *chutta* can reach up to 760°C.¹⁷ The lips keep the *chutta* wet, which increases its time of consumption from 2 to 18 minutes, which brings a definite change in the oral mucosa. The most prominent changes associated with reverse smoking were majorly seen on the palate and tongue because of its close proximity of heat during smoking.¹⁷

CONCLUSION:

From our present study, we concluded that the majority of oral cavity lesions were malignant; however, non neoplastic lesions were also reported in greater frequency. In this

context, it should be noted that the data from single institution reflects the patient population to that hospital rather than the community as a whole. Though the oral cavity cancer is considered as a regional disease with tendency of metastatic spread restricted to the regional lymphatics, at the same time the possibility of distant and systemic metastasis should not be overlooked. Early recognition of oral cancer greatly increases the probability of cure with minimum impairment.

Owing to the increasing incidence and prevalence of oral lesions, importance must be given to the predisposing factors as well as to oral hygiene. Primary preventive measures like limiting the usage of alcohol, reducing the exposure to tobacco and its products by various methods like health awareness programmes has been shown to play an important role in bringing down the incidence of oral cavity cancers. Secondary preventive measures involve screening for early detection of oral cancer. Irrespective of the screening method used, a positive screening result must always be confirmed by a biopsy. Highlighting the need to increase the public awareness by encouraging frequent physical oral examination, identification of warning signs of oral cancer, and acknowledging the hazards of tobacco and alcohol use plays a vital role in this context and should be exercised by health professionals. Various tobacco control programmes have already been addressed in many comprehensive cancer control plans and are being implemented effectively. But the efforts must be expanded widely to reverse the high morbidity and mortality rates associated with the disease. Future changes in tobacco-related cancer incidence rates should be reflected in the effect of tobacco control programs.

The ideal time to detect any cancer is when it is small and has not spread. Despite the increased incidence of oral cavity cancers, their metastasis and recurrence, the prognosis of

these tumors are still not well determined. This augments the necessity of early detection of the disease because the survival of the individual is influenced by the extent of the disease at the time of diagnosis. Thus, accurate clinical examination with timely diagnosis of the lesion by histopathological examination is still considered to be gold standard.

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