RESEARCH ARTICLE

ORAL CANCER PROFILE AMONG PATIENTS WHO UNDERWENT ORAL BIOPSY IN A TERTIARY REFERRAL CENTRE IN CENTRAL KERALA INDIA

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ABSTRACT

Oral cavity is one of the commonest site for cancer in our population due to a high prevalence of tobacco use in the country.

Aim: The aim of this study was to retrospectively assess the oral cancer profile among patients who underwent biopsy in a tertiary centre in Central Kerala and there by implement the preventive measures for controlling it.

Materials and Methods: This retrospective study was conducted by analyzing the histopathological records in the Department of Oral and Maxillofacial Surgery, Government Dental College Kottayam from June 2008 to May 2014.

Results: The study showed that among 1270 patients who underwent biopsy as a part of the diagnostic procedures during the study period, 570 (44.8%) patients were diagnosed as having dysplasia, premalignant and malignant lesions .Out of this, 361 patients were diagnosed with oral squamous cell carcinoma. There was an increased predilection of oral cancer among males and the predominant age group affected was between 61-70 years of age followed by 30-40 year age group. Buccal mucosa was the most common site accounting for 42.6% of the total cases. The most prevalent histopathological pattern was moderately differentiated squamous cell carcinoma. Statistically significant association was found between age group and histopathological grading, sub site and histopathological grading with p value <0.005.

Conclusion: The increased prevalence and younger age group involvement of oral SCC in the study suggests that preventive measures should be implemented in our society at the earliest.The data found in the study can be used to make public awareness of the harmful effects tobacco and alcohol.

INTRODUCTION

Oral and Pharyngeal Cancer (OPC) is considered as a major global burden of cancer, mainly due to the widespread use of tobacco and alcohol. Oral cancer is the eleventh most common cancer globally (Ferlay *et al*., 2010). The World Health Organization estimates that 7.6 million people died of cancer in 2005 and 84 million people will die in the next 10 years if action is not taken (Diagnosis and Treatment, 2005). There is a wide geographical variation in the incidence of oral cancer, with approximately two-thirds of patients in the developing countries. More than 70% of all cancer deaths occur in low- and middle-income countries, where resources available for prevention, diagnosis and treatment of cancer are limited or nonexistent.[2] In Southeast Asia, cancer of the oral cavity ranks among the three most common types of cancer. (Sigurds O Krolls and Hoffman, 1939) Oral cancer is a major problem in

India where the incidence is 12.6 per 100000 population (Sigurds O Krolls and Hoffman, 1939). This accounts for 50 - 70% of all the cancers diagnosed. Ninety percent (90%) of oral cancers in South East Asia including India are linked to tobacco chewing and tobacco smoking. (Kapil *et al*., 2012)

Aims and Objectives

Aim: To assess the oral cancer profile and there by implement the preventive measures for controlling oral cancer.

Objectives:

1. Study the pattern of distribution of oral squamous cell carcinoma and other oral lesions among the patients who underwent biopsy.
2. To find out the common age groups affected with oral cancer.
3. Assess the sex predilection of oral cancer.
4. Evaluate the histopathological pattern among the cases.

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MATERIALS AND METHODS

Retrospective evaluation of the histopathological records of patients who underwent biopsy in the Department of Oral and Maxillofacial Surgery, Government Dental College, Kottayam, Kerala, India for a six year period from *June 2008 to May 2014* was done. The inclusion criteria were all histopathologically proven cases of oral squamous cell carcinoma. Exclusion criteria involved cases with incomplete records, all the non malignant lesions and other malignant lesions of non epidermal origin.

RESULTS

Among the total number of cases identified, number of males and females were analyzed. The site wise distribution was calculated to find the most predominant site of oral cancer among the cases attending the hospital .The histopathological staging was based on Broder's Grading System. All parameters of each patient according to the histopathologic reports were compiled in the datasheet and statistical analysis was done using Microsoft excel and Pearson Chi-Square test. 1270 patients underwent biopsy as a part of the diagnostic procedures in the center during the study period. 570 (44.8%) patients were diagnosed as having various types of dysplasia's, premalignant lesions and malignancies [(Table I) and (Fig 1)]. The remaining cases which included benign tumors, cystic lesions, polyps, fibro osseous lesions, vascular lesions etc, were not evaluated in the study.

Table 1. Total number of premalignant and malignant lesions

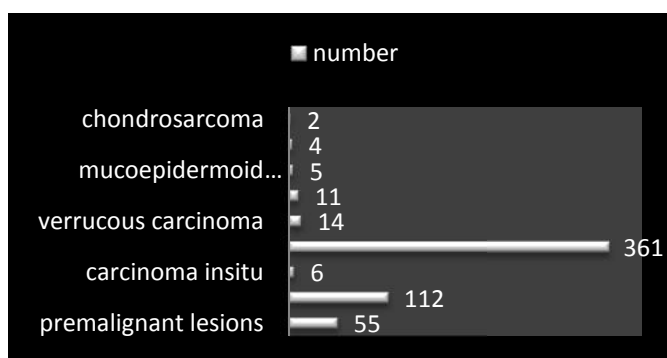|	Number of cases
Premalignant lesions	55
Dysplasia	112
Carcinoma in situ	6
Squamous cell carcinoma	361
Verrucous carcinoma	14
Adenocarcinoma	11
Mucoepidermoid carcinoma	5
Osteosarcoma	4
Chondrosarcoma	2
Total	570

Fig.1. Total number of premalignant and malignant lesions

Dysplasia of different types, mild moderate or severe, were found in 112 patients. 55 patients had premalignant lesions such as leukoplakia, erythroplakia, lichen planus, and oral submucous fibrosis. Sarcomas were less frequent in the maxillofacial region with only four cases of Osteosarcoma and two cases of Chondrosarcoma noted during the study period. Squamous cell carcinoma was most common form of oral

cancer with a total of 361 patients. Among this there were 247 males (68.42%) and 114 females (31.57%) (Fig.2). Mean age group affected was 63.41 years (ranging between 31 to 92 years). The maximum numbers of cases were between 61-70 yrs of age followed by the 30-40 age groups (Table II) and (Fig. 3).
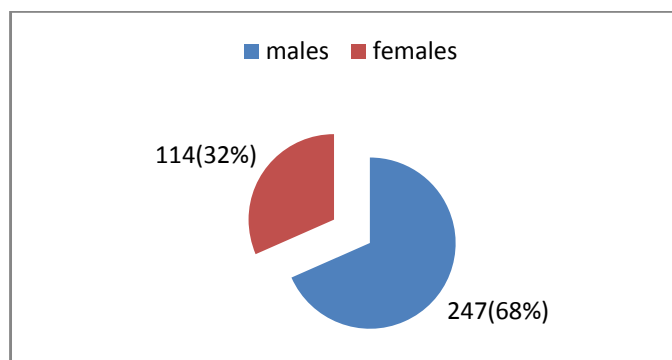

Fig.2. Sex distribution of patients with oral squamous cell carcinoma

Table II. Age group distribution of patients

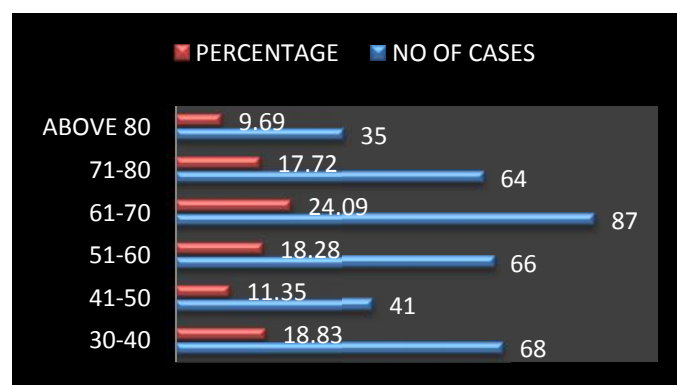|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30-40	68	18.8	18.8	18.8
	41-50	41	11.4	11.4	30.2
	51-60	66	18.3	18.3	48.5
	61-70	87	24.1	24.1	72.6
	71-80	64	17.7	17.7	90.3
	above 80	35	9.7	9.7	100.0
	Total	361	100.0	100.0	

Fig.3. Age group distribution of patients

The most common site of oral cancer was buccal mucosa (42.6%) followed by the lower alveolus (22.9%), tongue (18.5%), floor of mouth [FOM] (6.9%), palate (4.4%), retro molar trigone [RMT] (3%), lip (1.1%), upper alveolus (0.2%) (Fig. 4) Histopathological grading was based on Broder's Grading System. Moderately differentiated squamous cell carcinoma was the most prevalent histopathological pattern with 52% of the total cases (Table. III) and (Fig. 5 to 12). Association between the age group and histopathological grading was done using Pearson Chi-Square test. The predominant histopathological pattern found in the younger age group was well differentiated squamous cell carcinoma. As age advances there was an increased prevalence of poorly differentiated squamous cell carcinoma. The association between age group and histopathological differentiation was statistically significant with p value < 0.05. (Table IV).

Table III. Histopathological grading with sub site distribution of number of patients

		Histopathological grading			Total
		moderately differentiated	poorly differentiated	well differentiated	
Sub site distribution	Buccal mucosa	80	8	66	154
	Floor of mouth	17	0	8	25
	Lower alveolus	45	1	37	83
	Lip	0	2	2	4
	Palate	9	1	6	16
	Retro molar trigone	7	1	3	11
	Tongue	30	3	34	67
	Upper alveolus	1	0	0	1
Total		189	16	156	361

Table IV. Association between age group and histopathological grading

			Histopathological grading			Total
			well differentiated	moderately differentiated	poorly differentiated	
Age group	30-40	Count	56	12	0	68
		% within age group	82.4%	17.6%	0.0%	100.0%
		% within Histopathological grading	35.9%	6.3%	0.0%	18.8%
	41-50	Count	0	41	0	41
		% within age group	0.0%	100.0%	0.0%	100.0%
		% within Histopathological grading	0.0%	21.7%	0.0%	11.4%
	51-60	Count	26	32	8	66
		% within age group	39.4%	48.5%	12.1%	100.0%
		% within Histopathological grading	16.7%	16.9%	50.0%	18.3%
	61-70	Count	35	48	4	87
		% within age group	40.2%	55.2%	4.6%	100.0%
		% within Histopathological grading	22.4%	25.4%	25.0%	24.1%
	71-80	Count	21	39	4	64
		% within age group	32.8%	60.9%	6.2%	100.0%
		% within Histopathological grading	13.5%	20.6%	25.0%	17.7%
	above 80	Count	18	17	0	35
		% within age group	51.4%	48.6%	0.0%	100.0%
		% within Histopathological grading	11.5%	9.0%	0.0%	9.7%
Total		Count	156	189	16	361
		% within age group	43.2%	52.4%	4.4%	100.0%
		% within Histopathological grading	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square Value 94.783a   df 10   p value 0.001

Table V. Association between age group and histopathological grading

Sub site distribution * Histopathological grading Cross tabulation.						
			Histopathological grading			Total
			well differentiated	moderately differentiated	poorly differentiated	
Sub site distribution	Buccal mucosa	Count	66	80	8	154
		% within Sub site distribution	42.9%	51.9%	5.2%	100.0%
		% within Histopathological grading	42.3%	42.3%	50.0%	42.7%
	Tongue	Count	34	30	3	67
		% within Sub site distribution	50.7%	44.8%	4.5%	100.0%
		% within Histopathological grading	21.8%	15.9%	18.8%	18.6%
	Lower alveolus	Count	37	45	1	83
		% within Sub site distribution	44.6%	54.2%	1.2%	100.0%
		% within Histopathological grading	23.7%	23.8%	6.2%	23.0%
	Floor of mouth	Count	8	17	0	25
		% within Sub site distribution	32.0%	68.0%	0.0%	100.0%
		% within Histopathological grading	5.1%	9.0%	0.0%	6.9%
	Palate	Count	6	9	1	16
		% within Sub site distribution	37.5%	56.2%	6.2%	100.0%
		% within Histopathological grading	3.8%	4.8%	6.2%	4.4%
	Retro molar trigone	Count	3	7	1	11
		% within Sub site distribution	27.3%	63.6%	9.1%	100.0%
		% within Histopathological grading	1.9%	3.7%	6.2%	3.0%
	Lip	Count	2	0	2	4
		% within Sub site distribution	50.0%	0.0%	50.0%	100.0%
		% within Histopathological grading	1.3%	0.0%	12.5%	1.1%
	Upper alveolus	Count	0	1	0	1
		% within Sub site distribution	0.0%	100.0%	0.0%	100.0%
		% within Histopathological grading	0.0%	0.5%	0.0%	0.3%
Total		Count	156	189	16	361
		% within Sub site distribution	43.2%	52.4%	4.4%	100.0%
		% within Histopathological grading	100.0%	100.0%	100.0%	100.0%

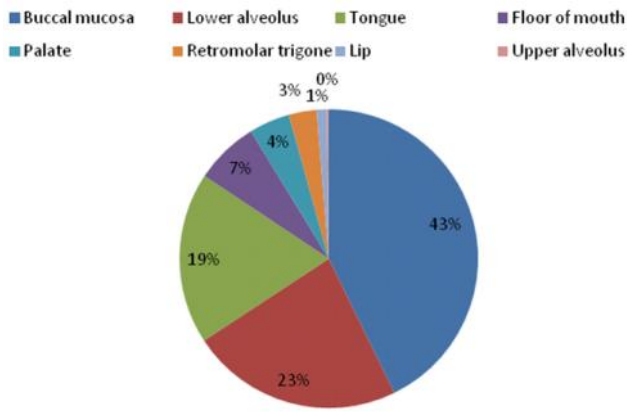Pearson Chi-Square Value 30.398a   df 14   p value 0.007

Fig.4. Sub site distribution percentage of oral squamous cell carcinoma

Association between the sub site distribution and histopathological grading was also done using Pearson Chi-Square test. Moderately differentiated squamous cell carcinoma was predominant in all the sub sites except lip, where all the lesions were well differentiated and poorly differentiated squamous cell carcinoma. There was a significant association between the histopathological grading and site of occurrence of squamous cell carcinoma with a p value <0.05. (Table V).

Fig 5. Epithelial hyperplasia with severe dysplasia involving lower alveolus

Fig.6. Moderately differentiated squamous cell carcinoma involving buccal mucosa

Fig.7. Well differentiated squamous cell carcinoma involving lower alveolus

Fig.8. Moderately differentiated squamous cell carcinoma involving tongue

Fig.9. Moderately differentiated squamous cell carcinoma involving upper alveolus
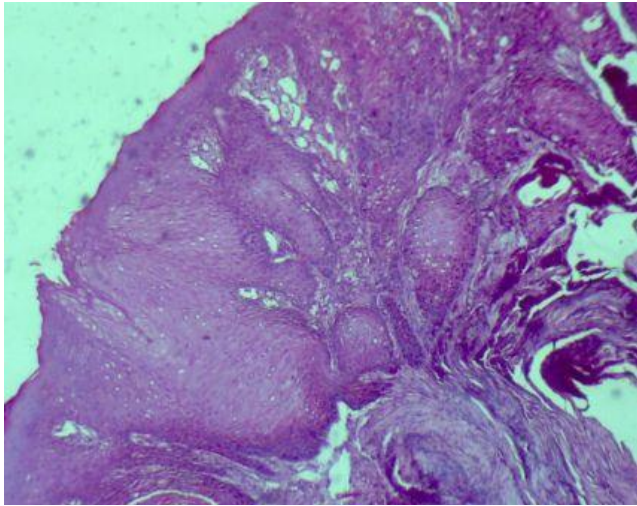
Fig.10. Histopathological slide of well differentiated squamous cell carcinoma
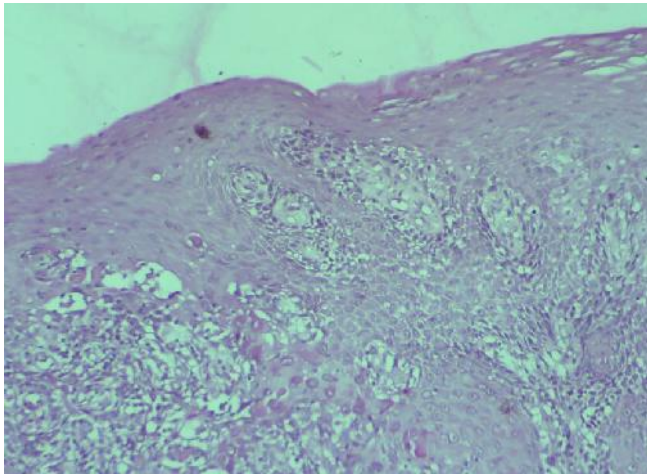

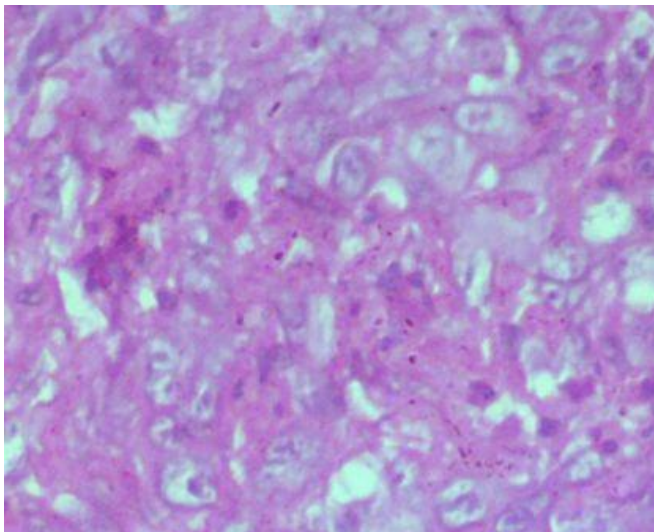**Fig. 11. Histopathological slide of moderately differentiated squamous cell carcinoma**

Fig.12. Histopathological slide of poorly differentiated squamous cell carcinoma

DISCUSSION

Oral cancer is the commonest cancer in India accounting for 50-70% of total cancer mortality (Khandekar *et al*., 2006).

Approximately 85 to 95% of all oral cancer is squamous cell carcinoma (Sigurds O Krolls and Hoffman, 1939) (SCC). In the present study out of the total histopathological reports 49% of patients were diagnosed as have malignant, premalignant lesions and various forms of dysplasia. Among this 392 cases (70%) were malignant, 55 (9.8%) premalignant and 112 (20%) with dysplasia. Premalignant squamous lesions of the oral cavity are areas of altered epithelium that are at an increased risk for progression to SCC. (Gale *et al*., 2005) Napier *et al*. (2008) reported that prevalence of premalignant oral lesions is approximately 1%-5%. Pai SI reported that, the rates of oral squamous dysplasia and subsequent SCC are decreasing, closely paralleling the decrease in cigarette smoking (Pai and Westra, 2009). In the present study a high percentage of premalignant and dysplastic lesions (29%) were observed. This proportion is much higher compared to other malignancies (7.5%) excluding SCC. The ultimate goal of accurately recognizing and grading dysplasia and premalignant lesions of the oral cavity is to understand the expected biologic behaviour of the lesion and to guide management. Follow-up studies examining the progression of dysplasia to carcinoma have found that patients with any dysplasia progress to cancer in 5% to 36% of cases (Silverman *et al*., 1984; Arduino *et al*., 2009; Hogewind *et al*., 1989). Hence this group of patients should be recalled on regular basis, evaluated and surgical intervention planned at the earliest. Verrucous carcinoma cases were comparatively less with only 14 cases reported during the study period. Squamous cell carcinoma is the most common type of oral cancer. Along with the results in this study various literatures also strongly support this finding (Ferlay *et al*., 2010; Diagnosis and Treatment, 2005; Akhter *et al*., 2011; Khandekar *et al*., 2006) High proportion of cases among males is due to high prevalence of tobacco consumption habits (Jatin P. Shah, 2001). Agrawal *et al*. (2012) have shown similar findings in their study. In 2004, Nair *et al* reported that in India, oral cancer is the most common type of cancer in males and fifth most common cancer in females. (Jatin P. Shah, 2001) Literatures (Gale *et al*., 2005; Napier and Speight, 2008; Pai and Westra, 2009) report that the major risk factors for oral squamous dysplasia and for SCC are tobacco smoking and alcohol consumption. Although these are independent risk factors, they are also synergistic with each other. The age group most commonly affected with oral SCC in the study is between 61- 70 years (24%). The second highest age group involved was between 30- 40 years (18%). Previously it was considered that elderly age groups were commonly affected by oral cancer. This is supported by various studies (Ferlay *et al*., 2010; Khandekar *et al*., 2006) suggesting an increased prevalence of oral cancer among elderly (greater than 40 years of age).

In our study along with this observation a high incidence of oral cancer is noted among the younger age groups. This is a matter of serious concern. Literature suggests that oral cancers in young patients show a general trend of aggressive course and poor prognosis. (Iype *et al*., 2001) Hence preventive measures in oral cancer must be aimed mainly at this young age group, especially discouraging the use of tobacco. Khandekar *et al* reported that alveolus was the most common site of oral cancer (2006). Whereas Agrawal *et al*. (2012) reported that common site of oral cancer observed was tongue followed by buccal mucosa. In the present study the most common site observed was buccal mucosa (41%) followed by lower alveolus (21%). This variation may be due to the difference in tobacco, pan chewing and smoking habits among different populations. In our study group population in central Kerala tobacco and pan

chewing habit is more common. This accounts for the increased prevalence of cases in the buccal mucosa and lower alveolus.

Histological grading is an important diagnostic tool to predict the clinical and biological behaviour of cancer. The biological activity of oral SCC is evaluated and categorized as highly, moderately and poorly differentiated. Broder primarily developed this quantitative grading of cancer in 1920. Akhter (2011) reported that moderately differentiated variant of squamous cell carcinoma is more common and that there is also an increased prevalence of lymph node metastasis in this group. In the present study also there is an increased prevalence (44.5%) of moderately differentiated variant of SCC. The presence or absence of increased lymph node metastasis in this group should be taken into consideration during treatment planning and further follow up. Well differentiated SCC was predominantly found in the younger age group (35.9%). This suggests that a better prognosis can be obtained if this age group affected is recognised at an early stage. The study shows that the histopathological pattern among the older age group was poorly differentiated squamous cell carcinoma. Significant association between the site distribution and histopathological grading was also obtained. This shows that moderately differentiated squamous cell carcinoma was more common type with an exception of lip as noted in the study.

Summary and Conclusion

Oral cancer is considered a preventable condition to a large extent, due to the possibility of early detection and treatment (Dissanayaka *et al.*, 2012). The early detection of cancer is of critical importance as survival rates markedly improve when the oral lesions are identified at early stage. The increased prevalence and younger age group involvement of oral SCC in the study suggests that preventive measures should be implemented in our society at the earliest. More number of cases involving buccal mucosa shows the tobacco and pan chewing habit of our population. Younger age groups affected in the study show an increased prevalence of well differentiated variant of SCC. Significant association was also found between the site distibution and histopathological variant. Further studies and analysis may be necssary to generalize the findings of the study to a larger population. This data can also be used to make the public aware of the harmful effects of tobacco and alcohol and promote them to seek medical care at the earliest in case of any suspicious lesions found in the oral cavity.

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