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Research Article

Cellular Differentiation in Squamous Cell Carcinoma of Oral Cavity

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A B S T R A C T

Background: Oral cancer is ordinary cancer which includes the lips, buccal mucosa, gingiva, anterior, two-thirds of the tongue, the floor of the mouth and hard palate. The incidence of oral squamous cell carcinoma globally were approximately 354,864 new cases and 177, 384 deaths in 2018. Developing countries have the world's highest reported incidence of oral cancer. The oral cancers incidence 90-95% of is squamous cell carcinoma in India.

Materials and Methods: All the cases of oral cancer, which were diagnosed in the department of pathology during the period of 1st January 2019 to July 2022, were registered for the study. There were 37 cases of oral squamous cell carcinoma of various grades and different morphology details. Wherever required, the paraffin blocks were studied. The 37 cases were grouped into four categories, Carcinoma in-Situ, Well differentiated, moderately differentiated, poorly differentiated.

Results: Out of 37 cases, there were four cases of carcinoma in situ, 16 cases of well-differentiated squamous cell carcinoma, 12 cases of moderately differentiated squamous cell carcinoma, and 5 cases of poorly differentiated squamous cell carcinoma. The mean age of Carcinoma in Situ was 49.5, well differentiated carcinoma was 46.56, moderately differentiated carcinoma was 44.00 and poorly differentiated was 53.00 years respectively. The mean age of buccal mucosa was 41.63 and mean age of tongue was 52.50 year. When the mean age of buccal mucosa was compared with tongue, the t value was 2.3739 however, those differences were not statistically significant (P=0.0232).

Conclusion: in the present study, high incidence of oral squamous cell carcinoma were seen in the 31-40 years age group. The incidence was high in male compared to females (M:F = 3.6:1). The 4 cellular differentiation was distinctly different from each other (coefficient of correlation = 0.01). The well-differentiated type 43.2% followed by moderately differentiated 38.2%, and then poorly differentiated 31.5% and least was carcinoma in situ 10.5%.

Keywords: Oral Carcinoma, Squamous Cell, Carcinoma in Situ

Introduction

Oral cancer is an international ordinary cancer in which malignant cells form on the lip or oral cavity.[1] It includes the lips, buccal mucosa, gingiva, anterior, two-thirds of the tongue, the floor of the mouth and hard palate, etc.[2] The incidence of oral squamous cell carcinoma globally were approximately 354,864 new cases and 177,384 deaths in 2018.[3]

Developing countries have the world's highest reported incidence of oral cancer.[4] The oral cancer incidence of squamous cell carcinoma in India is 90-95%.[5]

The gender prevalence of oropharyngeal carcinoma in males is higher than females. In the male, 4,238 cases were reported and a total of 1,911 cases were reported in females. It showed that the ratio of male: female is 2.22:1.[6]

The maximum incidence of Oral cancer is in the age group of 50-60 years.[7] However, the incidence of oral cancer in younger age and in females is increasing over the last decade. This is so due to the increase in use of all forms of tobacco and alcohol in young age groups. There are various causative agents, however, tobacco use in various forms and alcohol are considered major factors in the aetiology of oral cancer.[8]

Materials and Methods

All the cases of oral cancer which were diagnosed in the department of pathology during the period of 1st January 2019 to July 2022 were registered for the study. Their clinical details, including age, gender, site were noted. The histopathology slides were reviewed and the final diagnosis was confirmed.

There were 37 cases of oral squamous cell carcinoma of various grades and different morphology details. Wherever required, the paraffin blocks were studied. The 37 cases were grouped into four categories:

Group 1 - Carcinoma in-Situ

Group 2 - Well differentiated

Group 3 - Moderately differentiated

Group 4 - Poorly differentiated

Statistical analysing of data was done by the help of SPSS v-21, using student t test and get the p value wherever applicable.

Results

Out of 37 cases, there were 4 cases of carcinoma in situ, 16 cases of well differentiated squamous cell carcinoma, 12 cases of moderately differentiated squamous cell carcinoma, 5 cases of poorly differentiated squamous cell carcinoma (Figure 1).

The Pearson-correlation in the four categories were compared with each other (Table 1) to find whether they were distinctly different and independent categories. The correlation was found to be significant (0.01).

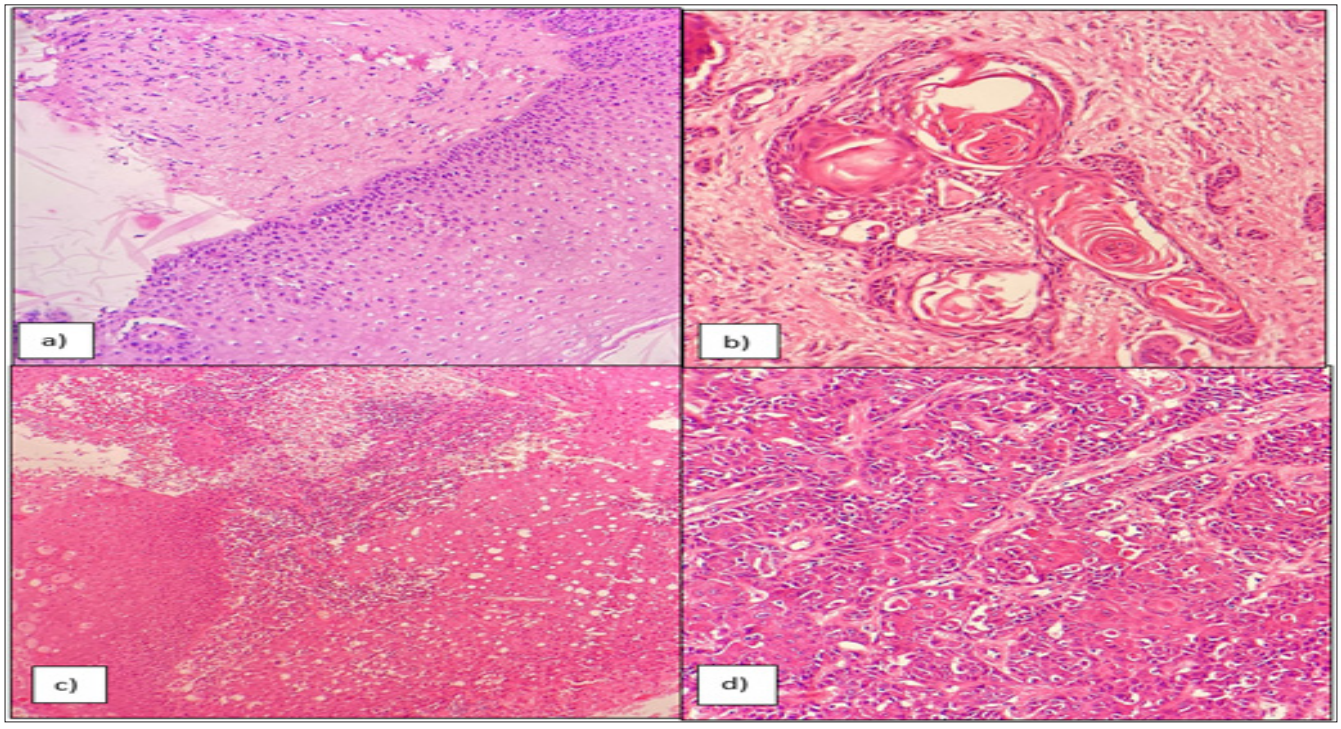

Figure 1.Carcinoma in-Situ; b) Well Differentiated Squamous Cell Carcinoma; c) Moderately Differentiated Squamous Cell Carcinoma; d) Poorly Differentiated Squamous Cell C arcinoma

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Table 1.Correlations Between Different Types of Differentiation of Oral Squamous Cell Carcinoma

		Carcinoma in situ	Squamous cell carcinoma-moderately differentiated	Squamous cell carcinoma-poorly differentiated	Squamous cell carcinoma-well differentiated
Carcinoma in situ	Pearson correlation	1	0.588	0.997**	-0.614
	Sig. (2-tailed)		0.412	0.003	0.386
	N	4	4	4	4
Squamous cell carcinoma-mode-rately differentiated	Pearson correlation	0.588	1	0.564	0.053
	Sig. (2-tailed)	0.412		0.322	0.869
	N	4	12	5	12
Squamous cell carcinoma-poorly differentiated	Pearson correlation	0.997**	0.564	1	-0.624
	Sig. (2-tailed)	0.003	0.322		0.260
	N	4	5	5	5
Squamous cell carcinoma-well differentiated	Pearson correlation	-0.614	0.053	-0.624	1
	Sig. (2-tailed)	0.386	0.869	0.260	
	N	4	12	5	16
**Correlation is significant at the 0.01 level (2-tailed)					

Table 2.Age Incidence and Differentiation of Squamous Cell Carcinoma

Cellular Differentiation of Squamous Cell Carcinoma	Age	
	Mean	S.D
Carcinoma in situ	49.50	9.950
Squamous cell carcinoma-moderately differentiated	44.00	15.345
Squamous cell carcinoma-poorly differentiated	53.00	25.642
Squamous cell carcinoma-well differentiated	46.56	11.667

The mean age of carcinoma in situ was 49.5, well-differentiated carcinoma was 46.56, moderately differentiated carcinoma was 44.00 and poorly differentiated was 53.00 years respectively. When the mean age of carcinoma in situ was compared with well differentiated squamous cell carcinoma, the t value was 0.461 (P=0.65); when the mean age of carcinoma in situ was compared with poorly differentiated squamous cell carcinoma, the t value was 0.255 (P=0.8059); the mean age of carcinoma in situ compared with moderately differentiated, the t values was 0.663 (P=0.5179, Table 2). Farther, when the squamous cell carcinoma-moderately differentiated was compared with poorly differentiated, the t value was 0.906 (P=0.3791); and mean of moderately differentiated was compared with well differentiated, the t value was 0.502(P=0.6197). Lastly, when the squamous cell carcinoma-poorly differentiated was compared with well differentiated, the t value was 0.802 (P=0.4327). Thus, the mean age in different types of cellular differentiation was similar and there was no statistically significant difference.

Table 3.Age Incidence and Site of Oral Squamous Cell Carcinoma

Site	Age			
	Mean	S.D	t-value	p-value
Buccal Mucosa	41.63	13.793	2.3739	0.0232
Tongue	52.50	14.056		

These cases were then divided according to the site into buccal mucosa and tongue, there was 18 (48.6%) case in buccal mucosa and 19 (51.4%) in tongue. The mean age of buccal mucosa was 41.63 and mean age of tongue was 52.50 year (Table 3). When the mean age of buccal

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mucosa was compared with tongue, the t value was 2.3739 however, these differences were not statistically significant (P=0.0232).

Table 4.Age Incidence and Gender of Oral Squamous Cell Carcinoma

Gender	Age			
	Mean	S.D	t-Value	p-value
Male	45.45	15.089	1.1567	0.2552
Female	52.25	13.145		

The distribution of cases was further done according to gender (Table 4). Out of 37 cases there were 8 cases in females and 29 cases in males. The mean age of males was 45.45 and the mean age of females was 52.25. When the mean age of males was compared with females, the t value was 1.1567 (P=0.2552) which was statistically insignificant.

Discussion

The oral cavity is considered a major health problem representing up to 40% of all cancers in India. It is the most common cancer in males and the third most common in females. Even within one geographic location, the incidence varies among groups categorized by age, sex, site or race.[9] There were approximately 354,864 new cases of squamous cell carcinoma globally and 177,384 deaths in 2018.[3] Moreover, most head and neck cancer is constituted as oral squamous cell carcinoma and its incidence is increasing over the past years. Oral carcinogenesis is a multistage process, brought about by various habits of tobacco use such as, chewing, sniffing or smoking.[10]

Knudson's two-hit model of carcinogenesis considers each mutation occurring in each of the two alleles of the gene, which are hit at two different points. There is biallelic disruption and truncating point mutations which is brought about by tobacco. Despite changes in our concept of cancer genes, two inactivating point mutations of the suppressor gene is considered the hallmark of tumour formation.[11]

The loss of control mechanisms of mutation of the suppressor of genes cause the degradation of the cell cycle and proliferation of malignant cells.

In Oral squamous cell carcinoma, cancer appears from the accumulation of genetic changes and epigenetic anomalies in the signalling pathways that first causes dysplasia which differentiate into carcinoma in situ, which then progresses from cancer formation though different types of differentiation with cancer, resulting in phenotypes that facilitate Oral squamous cell carcinoma development.[12]

In the present study, the highest incidence of oral squamous cell carcinoma, age group is 31-40 followed by 51-60 in male and 41-50 in female followed by 51-60. There was a higher incidence rate in the younger age group when it's compared with older age groups in male and in female, in the older age group has higher incidence rate of oral squamous cell carcinoma then the younger group as following the data.

The study done by Effiom OA, et al., the oral squamous cell carcinoma represented 10.8% (n=233) out of the 5,124 biopsy cases during the study period. The mean age of patients in the study was 45.3 ±19.6 years, with a male: female ratio of 1.4:1; 40% of these patients were under age 40 years. Peak incidence of age group was found in the 20 - 29 in Male and 40 - 49 in female.[14] Female age groups were outstandingly older than males. However, in a study done by Almangush A, et al., there were no significant differences observed in the tumour stage or grade in study that compared the characteristics of oral squamous cell carcinoma in young and old patients.[13]

In our study, the incidence rate of oral squamous cell carcinoma in well-differentiated form was ranked highest (16 cases/43.2%), followed by moderately differentiated (12 cases/32.4%), poorly differentiated (5 cases/13.5%), and lastly carcinoma in situ (4 cases/10.8%).

From the study done by Stenman C et al., 198 (38%) cases was carcinoma in situ out of the 515 cases of oral squamous cell carcinoma, and well differentiated of 179 cases (69.4%), and 22 cases (8.5%) was poorly differentiated and, 57 cases (22.1%) were moderately differentiated.[14] The result was similar to our study result, the well differentiated squamous cell carcinoma had the highest incidence rate. However, carcinoma in situ was followed after well differentiated and moderately differentiated and lastly, poorly differentiated.

In our study, the tumour was most commonly seen in the tongue (19 cases) and 18 in buccal mucosa. Based on gender, females showed more tumour in buccal mucosa and whereas the tongue was the most common site in male.

In the study presented by Almangush A, et al., the most common oral squamous cell carcinoma site was tongue and it was related with higher rate of death than oral squamous cell carcinoma in other sub-sites according to a recent analysis of Surveillance, Epidemiology, and End Results (SEER) database.[15] However, in the study done by Lin NC, et al., the most common oral squamous cell carcinoma site was buccal mucosa (34.9%) out of 3010 cases of oral squamous cell carcinoma, followed by the tongue as 29.4%.[16]

In the present study, the ratio of oral squamous cell carcinoma in male: female was 3.6:1. The incidence rate of oral squamous cell carcinoma was higher in male than females. Moreover, in the study by Sharma RG et al., the ratio of Male: Female of head and neck cancer was 2.22:1,

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thus evidently depicting that the incidence of oral squamous cell carcinoma in male is twice higher than the incidence in females.[6] The reason could be the increased consumption of tobacco & alcohol in males as compared to females.

Conclusion

In the present study, high incidence of oral squamous cell carcinoma was seen in the 31-40 years age group. The incidence was high in male compared to females (M: F = 3.6:1). The 4 cellular differentiation was distinctly different from each other (coefficient of correlation = 0.01). The well differentiated type 43.2% followed by moderately differentiated 38.2%, then poorly differentiated 31.5% and least was carcinoma in situ 10.5%. The incidence of oral squamous cell carcinoma in the tongue is higher than incidence in the buccal mucosa as 18 cases out of 37 cases.

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Conflict of Interest: None

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