

Histopathological Spectrum of Oral Cavity Lesions at a Tertiary Care Center in Western Rajasthan

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Abstract:

Background: Oral cavity lesions, encompassing benign, premalignant, and malignant conditions. Global oral cancer prevalence is a significant health concern, especially in developing regions, ranking as the 13th most common cancer worldwide. India faces a high incidence of oral cancers due to socioeconomic challenges and limited healthcare access. Tobacco use, a major risk factor, contributes to substantial morbidity and mortality. Smokeless tobacco alone causes around 200,000 deaths annually in India. The study emphasizes the importance of histopathological evaluation for early identification and treatment, considering it the gold standard in diagnosing oral cavity lesions.

Methods: This is a retrospective descriptive study conducted for two years from January 2021 to January 2023. All oral cavity lesions received by the department during the study period were included in the study. The tissues received were fixed in buffered formalin and grossed as per the department protocols. The blocks were made by wax block method and 5-micron sections were taken and slides prepared and stained with hematoxylin and eosin stain and observed under light microscope. Relevant special stains were used as and when required.

Results: We received a total of 259 biopsies and specimens of lesions of oral cavity during the study period. The male to female ratio of 2.12: 1. The male gender dominated in all the three types of lesions, benign, premalignant, and malignant lesions, however the difference was not statistically significant (p-value = 0.06). The age of patients ranged from 13 years to 80 years with the median age of 41 years. Maximum number of patients was in the 6th decade of life with 78 (30.12%) cases followed by 5th decade with 57 (22%) cases. Our study shows that the frequency of malignant lesions increases with the increase in age and in younger patients, benign lesions outnumber the other type of lesions, and the variation is statistically significant (p-value = 0.0001). Smoking was the most common risk factor identified. The most common presenting complaint of the patients was growth in the mouth (167; 64.47%), followed by ulcer (129; 49.80%), pain in the mouth was present in (87; 33.59%) and difficulty in opening of mouth was present only in (34; 13.12%) patients in the present study. The most common site of the lesion was buccal mucosa (42: 16.22% cases) followed by base of tongue (35: 13.51%). In subcategory of inflammatory lesions, there were 2 (0.77%) cases of lichen planus. Out of 43 benign lesions, pyogenic granuloma (12: 27.91% cases) was the most common diagnosis followed by hemangioma (7; 16.28% cases) and lipoma (6; 13.95% cases). In premalignant lesions hyperkeratotic leucoplakia was diagnosed in 12 (57.14%) cases and dysplastic leucoplakia with 9 (42.86%) cases. In malignant lesions the major bulk of diagnosis was squamous cell carcinoma taking the total number to 179 (69.11%) cases.

Conclusions: The present study shows that most of the lesions of oral cavity are malignant and squamous in origin. Histopathological examination provides crucial information regarding the nature of lesion and early treatment can be initiated if a malignant lesion is suspected.

Keywords: Oral Cavity, SCC, Lichen Planus, Buccal Mucosa.

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Introduction

Oral cavity lesions are among the most common cases seen in ENT, Surgery and Skin OPD. The oral cavity can host various kinds of lesions,

benign, premalignant, and malignant. The benign tumors stay in one place and do not affect other tissues or organs, while the malignant tumors

invade and spread to other parts of the body. Oral cancer presents a significant global health concern, particularly prevalent in developing regions. It is the 13th most common cancer worldwide. It registers over 3,000,000 new cases worldwide and 177757 deaths in 2020.[1] Developing countries like India record even higher prevalence of oral cancers owing to poor socio-economic status and difficulty in access to healthcare early in the disease process. In India oral cavity cancers stood as the second most common cancer with 135929 new cases of oral cavity cancers recorded in 2020. [2]

Oral lesions are frequently observed due to mucosal exposure to various agents such as tobacco, recurrent trauma, infections particularly viral infections and genetic predisposition.[3] The use of tobacco, found in multiple forms like pan, khaini, and smoking, is common and is known to be carcinogenic, leading to the painful demise of young adults during their productive years.

This not only results in a loss of workforce for the nation and society but also poses a severe health risk. In India, the prevalence of tobacco use among adults aged 15 years or above was reported to be 28.6% in 2017, according to the Global Adult Tobacco Survey in 2016-2017 (GATS 2) [4]. The use of smokeless tobacco alone accounts for approximately 200,000 deaths annually in India, contributing to 74% of the global burden of smokeless tobacco-related fatalities [5].

Tobacco smoke contains thousands of chemicals, and at least 70 of them can cause cancer. Some examples of these chemicals are hydrogen cyanide, formaldehyde, lead, arsenic, benzene, ammonia, and radioactive elements. Smokeless tobacco also has radioactive substances and substances that can cause cancer, such as benzopyrene and other Polycyclic Aromatic Hydrocarbons (PAHs). These carcinogens can affect the buccal mucosa and get absorbed through the oral mucosa, leading to oral cancer.[6] Histopathological evaluation of oral lesions can identify the benign or malignant nature of lesion early which helps in the early treatment of the disease. Histopathological examination is still considered as gold standard in the diagnosis of oral cavity lesions. This study is conducted to examine the spectrum of oral cavity lesions received at the histopathology lab at our center.

Materials and Methods

This is a retrospective descriptive study carried out in the Department of Pathology, Sardar Patel

Medical College, and Associated Group of Hospitals, Bikaner for two years from January 2021 to January 2023. All oral cavity lesions received by the department during the study period were included in the study. Clinical history and relevant investigations were noted from clinical records and discussed with other departments when required. The tissues received were fixed in buffered formalin and grossed as per the department protocols.

The blocks were made by wax block method and 5-micron sections were taken and slides prepared and stained with hematoxylin and eosin stain and observed under light microscope. Relevant special stains were used as and when required.

Inclusion criteria

- All tissue specimens of oral cavity received at the department of Pathology.

Exclusion criteria

- Patients without complete clinical records.
- Samples received without fixative.
- Degenerated samples.

Statistical analysis

Qualitative variables were summarized using percentages and proportions. Quantitative variables were summarized using mean with standard deviation. Data was entered in MS Excel and statistical analysis was done using SPSS version 27.

Results

We received a total of 259 biopsies and specimens of lesions of oral cavity during the study period. There were 176 (67.95%) male patients and 83 (32.05%) females with male to female ratio of 2.12:1. [Image 1]

The male gender dominated in all the three types of lesions, benign, premalignant, and malignant lesions, however the difference was not statistically significant (p -value = 0.06) The age of patients ranged from 13 years to 80 years with the median age of 41 years.

Maximum number of patients was in the 6th decade of life with 78 (30.12%) cases followed by 5th decade with 57 (22%) cases. Our study shows that the frequency of malignant lesions increases with the increase in age and in younger patients, benign lesions outnumber the other type of lesions, and the variation is statistically significant (p -value = 0.0001) (Table 1).

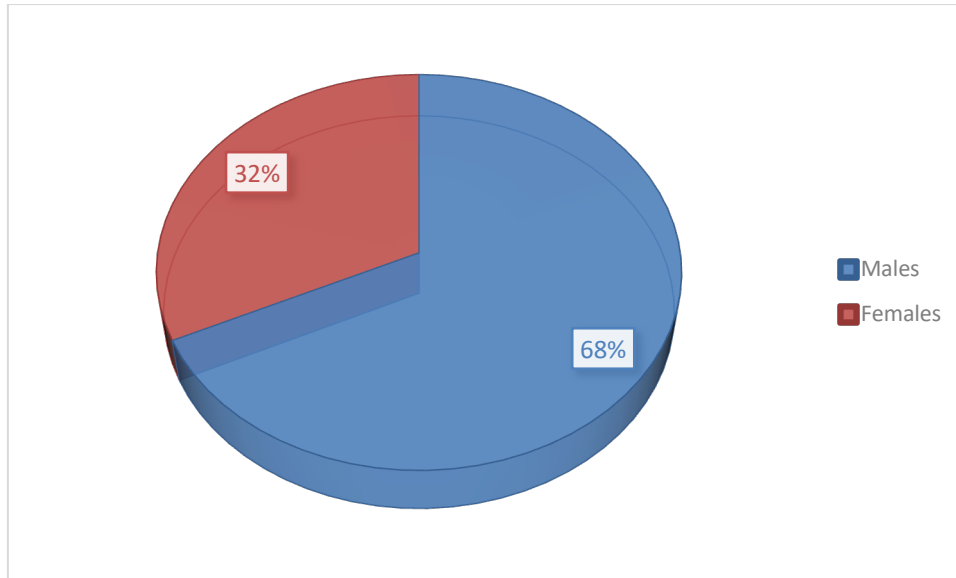


Image 1: Gender wise distribution of cases in present study.

Table 1: Nature of oral lesions in different age groups

Age group (in years)	Nature of lesion						Total	
	Malignant		Premalignant		Benign		No	%
	No	%	No	%	No	%		
11-20	3	25.00%	1	8.33%	8	66.67%	12	4.63%
21-30	9	52.94%	1	5.88%	7	41.18%	17	6.56%
31-40	22	68.75%	3	9.38%	7	21.88%	32	12.36%
41-50	44	77.19%	5	8.77%	8	14.04%	57	22.01%
51-60	65	84.42%	4	5.19%	8	10.39%	77	29.73%
61-70	35	81.40%	3	6.98%	5	11.63%	43	16.60%
71-80	15	71.43%	4	19.05%	2	9.52%	21	8.11%
Total	193	74.52%	21	8.11%	45	17.37%	259	100.00%

Chi-squared = 38.993, DF = 12, p-value = 0.0001

Table 2: Risk factors in patients included in study

Habits	Nature of lesion						Total	
	Malignant		Premalignant		Benign		No	%
	No	%	No	%	No	%		
Smoking	61	23.55%	8	3.09%	9	3.47%	78	30.12%
Tobacco/Pan Chewing	56	21.62%	4	1.54%	5	1.93%	65	25.10%
Alcohol	4	1.54%	0	0.00%	1	0.39%	5	1.93%
Smoking+Tobacco	9	3.47%	2	0.77%	0	0.00%	11	4.25%
Smoking+Alcohol	15	5.79%	1	0.39%	1	0.39%	17	6.56%
Tobacco+Alcohol	8	3.09%	1	0.39%	0	0.00%	9	3.47%
Tobacco+Smoking+Alcohol	5	1.93%	2	0.77%	0	0.00%	7	2.70%
None	35	13.51%	3	1.16%	29	11.20%	67	25.87%
Total	193	74.52%	21	8.11%	45	17.37%	259	100

In the present study, smoking was the most common risk factor associated with oral cavity and oropharyngeal neoplastic lesions (total 78; 30.12% cases). The percentage of cases with history of smoking was comparatively more with malignant lesions as compared to benign lesions. In malignant lesions 61 (23.55%) cases were associated with smoking and 56 (21.62%) cases were associated

with tobacco/pan chewing out of 259 cases (Table 2).

The most common presenting complaint of the patients was growth in the mouth (167; 64.47%), followed by ulcer (129; 49.80%), pain in the mouth was present in (87; 33.59%) and difficulty in opening of mouth was present only in (34; 13.12%) patients in the present study.

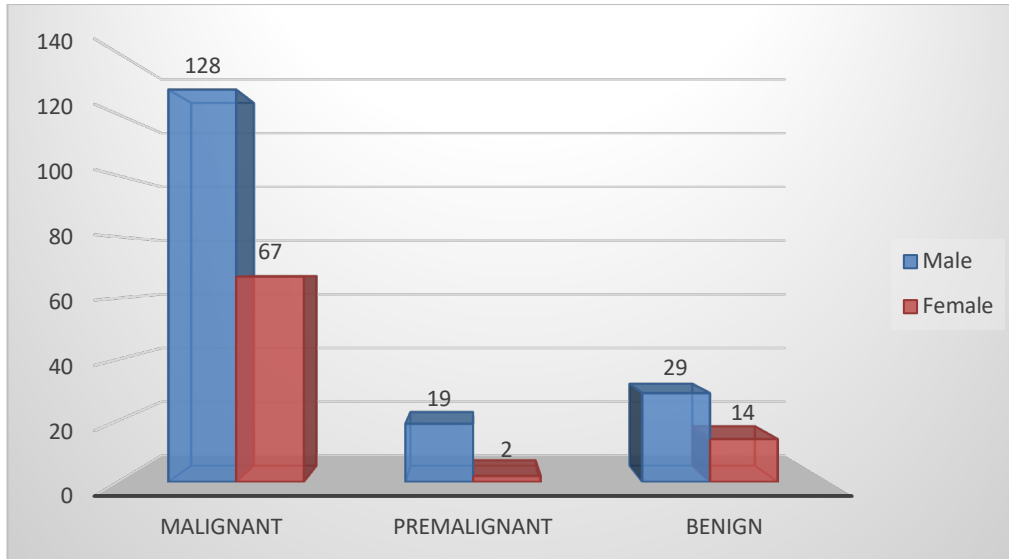


Image 2: No. of cases in different categories

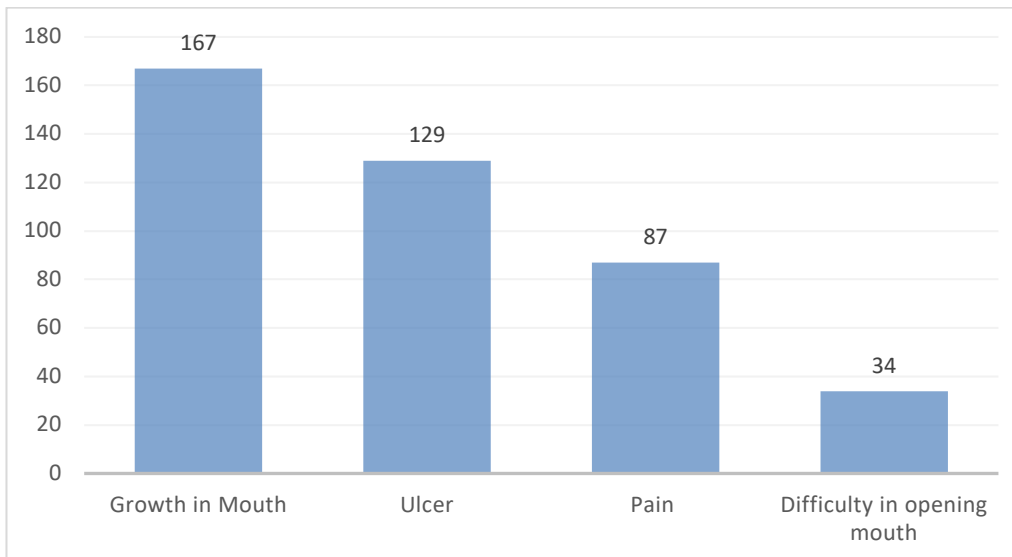


Image 3: Clinical presentation of different cases

Table 3: Site of involvement by lesions in the present study

Site of lesion	Nature of lesion							
	Malignant		Premalignant		Benign		Total	
	No	%	No	%	No	%	No	%
Alveolus	17	6.56%	1	0.39%	6	2.32%	24	9.27%
Buccal mucosa	31	11.97%	6	2.32%	7	2.70%	44	16.99%
Floor of mouth	12	4.63%	2	0.77%	5	1.93%	19	7.34%
Hard palate	6	2.32%	0	0.00%	5	1.93%	11	4.25%
Lip	12	4.63%	1	0.39%	10	3.86%	23	8.88%
Retromolar triangle	3	1.16%	0	0.00%	2	0.77%	5	1.93%
Tongue	25	9.65%	2	0.77%	5	1.93%	32	12.36%
Base of tongue	32	12.36%	2	0.77%	1	0.39%	35	13.51%
Pharyngeal wall	8	3.09%	2	0.77%	0	0.00%	10	3.86%
Soft palate	11	4.25%	3	1.16%	0	0.00%	14	5.41%
Tonsil	17	6.56%	0	0.00%	4	1.54%	21	8.11%
Vallecula	19	7.34%	2	0.77%	0	0.00%	21	8.11%
Total	193	74.52%	21	8.11%	45	17.37%	259	100.00%

In the present study the most common site of the lesion was buccal mucosa (42: 16.22% cases) followed by base of tongue (35: 13.51%). However, malignant lesions were seen most commonly in base of tongue (12.36%) followed by buccal mucosa (11.97%). On the other hand, benign lesions were most commonly occurred in lips (10: 3.86%) followed by alveolus (6; 2.32%). Other sites of lesions in our study were floor of mouth, hard palate, retromolar triangle, pharyngeal wall, soft palate, tonsils and vallecula.

Table 4: Histopathological diagnosis of various lesions

	Histopathological Diagnosis	No. of Cases	Percentage (%)
Inflammatory	Lichen Planus	2	0.77%
Benign	Basal cell adenoma	3	1.16%
	Fibroma	3	1.16%
	Haemangioma	7	2.70%
	Lipoma	6	2.32%
	Neurofibroma	4	1.54%
	Pleomorphic Salivary Adenoma	2	0.77%
	Pyogenic granuloma	12	4.63%
	Schwannoma	1	0.39%
	Squamous Papilloma	5	1.93%
Premalignant	Hyperkeratotic leucoplakia	12	4.63%
	Dysplastic leucoplakia	9	3.47%
Malignant	Carcinoma in Situ	2	0.77%
	Adenoid cystic carcinoma	3	1.16%
	Mucoepidermoid carcinoma	9	3.47%
	SCC	179	69.11%
	Total	259	

In the present study, in subcategory of inflammatory lesions, there were 2 (0.77%) cases of lichen planus. Out of 43 benign lesions, pyogenic granuloma (12: 27.91% cases) was the most common diagnosis followed by hemangioma (7; 16.28% cases) and lipoma (6; 13.95% cases). In premalignant lesions hyperkeratotic leucoplakia was diagnosed in 12 (57.14%) cases and dysplastic leucoplakia with 9 (42.86%) cases. In malignant lesions the major bulk of diagnosis was squamous cell carcinoma taking the total number to 179 (69.11%) cases.

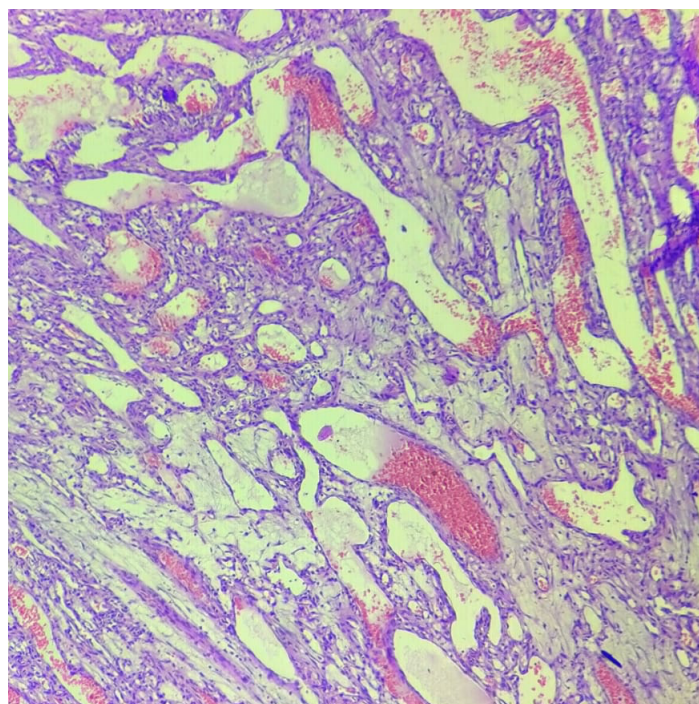


Image 4: A section of buccal mucosa biopsy showing pyogenic granuloma (H&E, 4X)

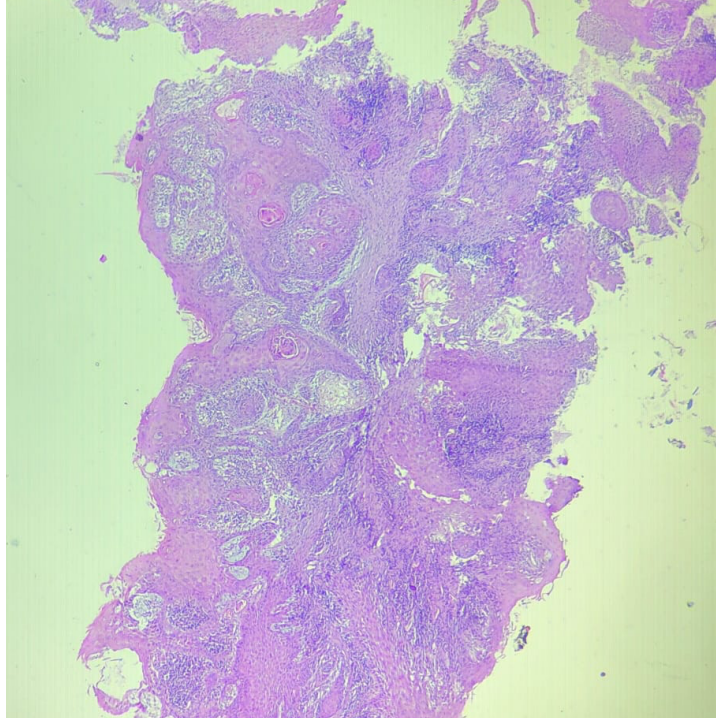


Image 5: Section showing well differentiated SCC showing keratin pearls (H&E, 4X)

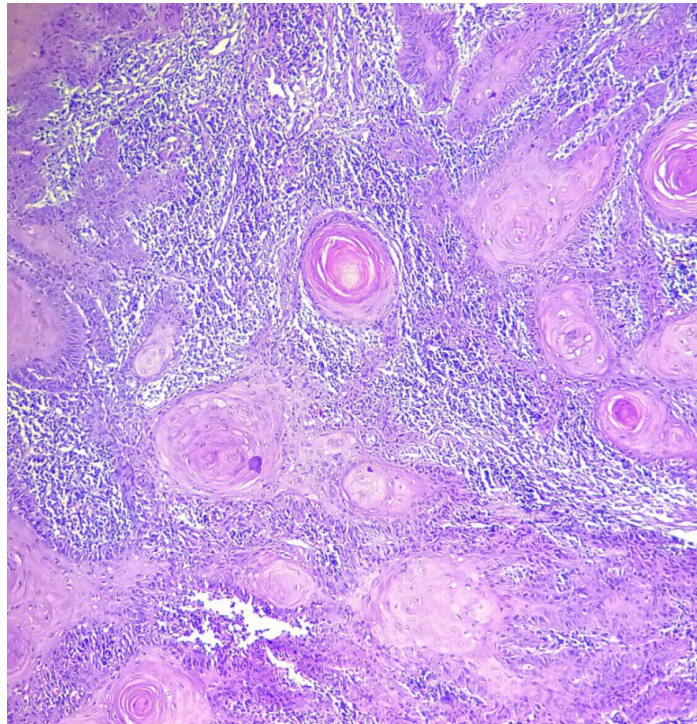


Image 6: Section of excision biopsy of oral cavity lesion showing well differentiated SCC with keratin pearls formation (H&E, 10X)

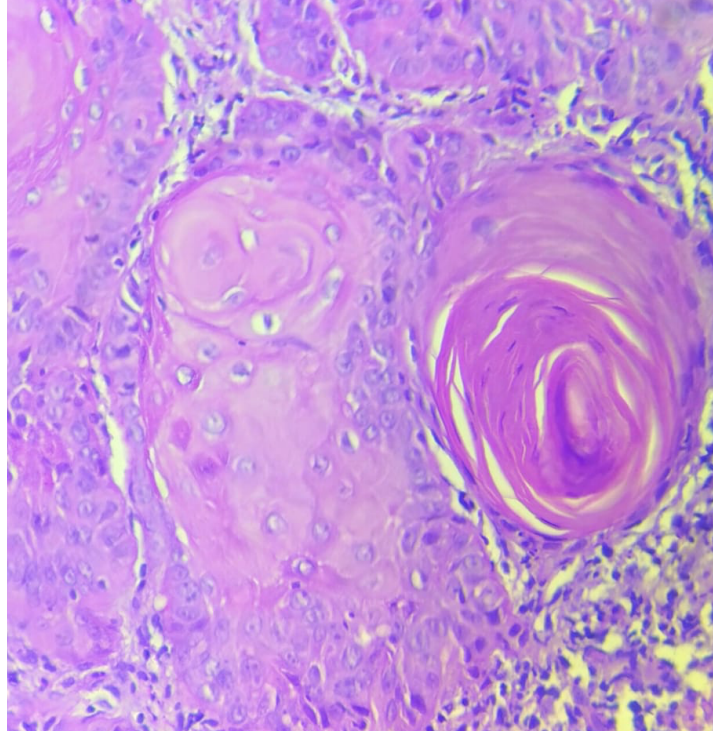


Image 7: High power view of well differentiated SCC with keratin pearls formation (H&E, 40X)

Discussion

The present study conducted from January 2021 to January 2023 included a total of 295 oral cavity and oropharyngeal lesions, including benign, premalignant and malignant which were then analyzed for the purpose of studying the clinical aspects as well as histopathological patterns of all neoplastic lesions.

In the present study, we observed the male to female ratio of 2.12: 1. The results are almost similar to the studies done by Gupta I et al.[7] who reported male to female ratio of 2.21: 1 and Nikunj, et al [8] who observed a ratio of 2.44:1 while Swati Parikh, et al., Kosam S, et al. and Agrawal R, et al. observed a ratio of 2.74:1, 3:1, and 3.3:1 respectively [9,10,11]. Most of the studies shows male predominance in development of oral cavity lesions. This shows that male gender is more prone for oral lesions. One of the main reasons for this in India seems to be more consumption of alcohol and tobacco products by males as compared to females.

In the present study maximum number of patients was observed in 6th decade of life with 30.12% cases followed by 22% cases in 5th decade. Gupta I et al. [7] also reported maximum number of cases in 5th and 6th decade of life. Thakur B. S. et al. [12] reported 60% cases in the age group of 40-60 years which is concordant with our study. In the present study it was observed that the incidence of oral cancer increases with age which was similar to the observation of Modi et al. [13] and Malaovalla et al. [14] It is further noted that there was a lower incidence of oral cancers at extreme of ages, and it

is also in accordance with all the noted studies. In the present study we observed that tobacco use has significant association with oral cavity lesions and especially neoplastic lesions.

Both smoked and non-smoked tobacco has shown high incidence of oral lesions. Smoking was the most common risk factor in our study; with 30.12% cases were smoker whereas 25.10% cases had habit of tobacco chewing. Thakur B.S. 1997 [12] noted 42.7% were smoker and 89.3% had habit of tobacco chewing. Nevertheless, earlier research indicated a significantly greater prevalence of tobacco chewing among individuals diagnosed with oral cavity tumors.

The diminished correlation with tobacco chewing could be attributed to regional disparities in tobacco usage and the predominant use of tobacco in the form of smoking. As per the current study, in majority of cases the lesions were seen in buccal mucosa (16.22%) followed by Base of Tongue (13.51%), which is in accordance with the results of the study conducted by Thakur B.S. (Buccal mucosa- 42.5% and tongue-30.3%) [12]. Agrawal R [11] observed, the common sites of occurrence of various lesions included- tongue 39 (29.32%), tonsils 30 (22.56%), buccal mucosa 27 (20.32%) which is partially in concordance with our study.

In our study squamous cell carcinoma was overall the commonest lesion with 181 (69.88%) cases. A single case of basaloid squamous cell carcinoma variant was also noted. The adenoid cystic carcinoma was reported in 3 (1.15%) and mucoepidermoid carcinoma in 9 (3.47%) cases. In

the study done by Mridu Manjari et al. [15] it was found that the dominant group was squamous cell carcinoma (93.3%), Adenoid cystic carcinoma (1.71%) and mucoepidermoid carcinoma (0.19%). Our study findings led us to the conclusion that the majority of lesions in the oral cavity and oropharynx were malignant.

Among neoplastic lesions, the buccal mucosa emerged as the most frequently affected site. Carcinoma, particularly Squamous Cell Carcinoma, stood out as the predominant histological variety.

Notably, Squamous Cell Carcinoma cases were predominantly observed in the buccal mucosa. Additionally, our study revealed the presence of both benign and malignant salivary gland tumors. Benign tumors encompassed squamous papilloma, lobular capillary hemangioma, lipoma, fibroma, neurofibroma, and schwannoma.

Emphasizing a high degree of suspicion, rooted in clinical findings and associated risk factors, alongside precise histopathological typing of lesions, is crucial for confirming or excluding malignancy in the management of oral lesions.

Conclusion

The present study shows that most of the lesions of oral cavity are malignant and squamous in origin. Histopathological examination provides crucial information regarding the nature of lesion and early treatment can be initiated if a malignant lesion is suspected.

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