Cytopathological Study of Oral Lesions in Tertiary Care Hospital in Western Part of India

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Abstract:

Introduction: Oral cancer is a heterogeneous group of cancers arising from different parts of the oral cavity, with different predisposing factors, prevalence, and treatment outcomes. It is the sixth most common cancer reported globally with an annual incidence of over 300,000 cases, of which 62% arise in developing countries. Oral cancer is a major problem in the Indian subcontinent, where it ranks among the top three types of cancer in the country. It accounts for over 30 % of all cancers in India, posing a significant challenge to health services by both preventive and diagnostic means.

Objectives: The objectives of this study are 1) To study role of FNAC and Brush cytology in diagnosis of various oral lesion 2) To study lesions of oral cavity in relation to age, sex & site 3) To compare observed findings with those of similar studies done by other authors 4) To compare it with final histological diagnosis.

Methods: A hospital based retrospective study was conducted in a tertiary care hospital at western part of India from December 2014 to November 2016. Those study participants who fulfilled the inclusion criteria were enrolled in the study. A detailed history of the oral lesion in terms of duration, progress, associated symptoms and any treatment received for the lesion was obtained. Depending on the presenting complain brush cytology and FNAC were done in our department.

Results: In this study, 110 patients presented with different lesions of the oral cavity were subjected to fine needle aspiration and brush cytology. Out of total 110 cases, 44 (40%) cases were Benign, 10 (9.1 %) cases were Premalignant lesions & 56 (50.9%) were Malignant lesions. In the present study Malignant lesions (50.9%) were more common. In the present study most common benign lesion were inflammatory lesion & squamous cell carcinoma is most common malignant lesion.

Conclusion: Among the Neoplastic lesions (56 cases), 42(75%) were male & 14(25%) were females showing Male: Female ratio of 3:1. Most common age group affected was 41-50 years (50%). The present study shows majority of cases of lesions of oral cavity involved Cheek or Buccal Mucosa (41.30%). Most common malignant lesion of oral cavity is Squamous Cell Carcinoma with buccal mucosa most common site & common in 41-50 years age group with Male: Female ratio of 3:1. Most common premalignant lesion of oral cavity is Leukoplakia with gingival mucosa most common site & common in 41-50 years age group with Male: Female ratio of 4:1. Most common Benign lesion of oral cavity is inflammation with floor of mouth followed by tongue most common site & common in 21-30 years age group with Male: Female ratio of 1.2:1.

Keywords: Cytopathology, oral lesions, neoplastic, pre-malignant and non-neoplastic lesions.

Introduction

Oral cancer is a heterogeneous group of cancers arising from different parts of the oral cavity, with different predisposing factors, prevalence, and treatment outcomes. It is the sixth most common cancer reported globally with an annual incidence of over 300,000 cases, of which 62% arise in developing countries. There is a significant difference in the incidence of oral cancer in different regions of the world, with the age-adjusted rates varying from over 20 per 100,000 populations in India, to 10 per 100,000 in the U.S.A, and less than 2 per 100,000 in the Middle East. [1] In comparison with the U.S. population, where oral cavity cancer represents only about 3% of malignancies, it accounts for over 30% of all cancers in India [2], posing a significant challenge to health services by both preventive and diagnostic means. The variation in incidence and pattern of oral cancer is due to

regional differences in the prevalence of risk factors [3]. Oral cancer is a major problem in the Indian subcontinent where it ranks among the top three types of cancer in the country. [4] The crude incidence projections by Globocan demonstrate that oral cancer crude incidence will increase in India by 2020 to 2030 in both sexes. [5] Many epidemiological studies conducted over the last three decades in America, Europe and Asia have provided strong evidence of an association between alcohol and tobacco, resulting in an increased risk of oral and pharyngeal tumors. [6] In addition to the above factors, India has a high prevalence of chewing tobacco mixtures. [7] Apart from habitual factors, other factors relating to oral cancer include syphilis, oral sepsis, iron deficiency, oral candidiasis & Fanconi's anaemia. [8,9,10,11,12,13] Early detection of common oral premalignant lesions such as Leukoplakia, Oral Submucous Fibrosis and early neoplastic changes may be the best and most cost-effective means to improve survival and quality of life for Oral Cancer patients from all socioeconomic communities. [14] Although FNAC has been used extensively in the diagnosis of head and neck masses [15] its use is underutilized as far as intraoral lesions are concerned. As FNAC is a minimally invasive procedure, it does offer an advantage over incisional biopsy in sensitive areas and it has a high diagnostic value. Cytological study of oral cells is a non-invasive technique that is well accepted by the patient, and is therefore an attractive option for the early diagnosis of benign, premalignant disorders and malignant lesions of oral mucosa. Oral cells can be obtained by different techniques of scraping the surface of the mucosa, by rinsing the oral cavity or even by taking a sample of saliva from the patients or by FNAC. In this study, FNAC and brush cytology of benign, premalignant disorders and malignant lesions of oral mucosa was performed, cytopathological examination and histological correlation done.

Objectives:

The objectives of this study are 1) To study role of FNAC and Brush cytology in diagnosis of various oral lesion, 2) To study lesions of oral cavity in relation to age, sex & site, 3) To compare observed findings with those of similar studies done by other authors, 4) To compare it with final histological diagnosis.

Material and Methods:

This study was carried out in Department of Pathology, at a tertiary care hospital in Ahmedabad from December 2014 to November 2016.

Inclusion Criteria: All clinically suspected oral lesion including benign, suspected oral precancerous lesion having nonhealing ulcers and hyperplastic growth.

Exclusion Criteria: Neoplasms arising from Nasopharynx and oropharynx.

A total of 110 patients presenting with complains related to the oral cavity were included in this study. A detailed history of the lesion in terms of duration, progress, associated symptoms and any treatment received for the lesion was obtained. An emphasis was given on the history of any adverse habit, if present, like tobacco or quid or gutkha chewing (gutkha is made up of betel nut, catechu, tobacco, lime, saffron and flavoring agents held in the mouth or chewed), smoking and alcohol consumption. Depending on the presenting complain brush cytology and FNAC were done in our department.

The smears were fixed immediately with 95% isopropyl alcohol for staining with hematoxylin and eosin (H and E) and the modified Papanicolaou method. The slides with at least 30 well-preserved cells (i.e., not obscured by blood or exudate or necrosis) from deep epithelial layers (intermediate or parabasal-basal) were considered adequate.

Results and Observations:

In this study, 110 patients presented with different lesions of the oral cavity were subjected to fine needle aspiration and brush cytology.

Table 1: Incidence of lesions of oral cavity in present study

Sr. No.	Lesions	Total no. of cases	Percentage (%)
1	Benign	44	40
2	Premalignant	10	9.1
3	Malignant	56	50.9
	Total	110	100

Out of total 110 cases 44 (40%) cases were Benign, 10(9.1%) cases were Premalignant lesions, 56(50.9%) were Malignant lesions.

Table 2: Comparison of incidence of all oral lesions observed in present study with other studies.

Sr. No.	Lesions	Khan et al. (%) (16)	M.Babshet et al. (%) [17]	Present study (%)
1	Benign	42.4	-	40
2	Premalignant	12.2	47.7	9.1
3	Malignant	45.4	52.3	50.9
4	Total	100	100	100

In the present study Malignant lesions (50.9%) were more common which is comparable with the study done by Khan et al [16] and M. Babset et al [17] 45.4 % & 52.3% respectively. Pre malignant lesions consisted 9.1 % in the present study which were 47.7% in the study done by M. Babshet et al [17] and 12.2 in the Khan et al study [16] and Benign lesions consist of 40% in the present study which is comparable with khan et al 42.4 %.

Table 3: Distribution of Oral Cavity Lesions

Oral Lesions	No	Percentage
1.Benign	44	40
a. Inflammatory	27	24.54
Acute	15	13.63
Chronic	12	10.90
b. Cystic lesion	10	9.09
Retention cyst	8	7.27
Mucocele	2	1.81
c. Tumor and tumor like condition	7	6.36
Pleomorphic Adenoma	6	5.45
Hemangioma	1	0.90
2.Premalignant	10	9.09
Leukoplakia	10	9.09
3.Malignant	56	50.90
Squamous cell carcinoma	46	41.81
Mucoepidermoid Carcinoma	5	4.54
Adenocystic Carcinoma	3	2.72
Lymphoma	1	0.90
Multiple Myeloma / Plasmacytoma	1	0.90
Total	110	100

In the present study most common benign lesion were inflammatory lesion which constitute 24.54% followed by cystic lesions 9.09% and most common premalignant condition is leukoplakia 9.09% (10/10 cases) which comparable to khan et al study in which most common benign lesion is inflammatory 34.06%, most common premalignant lesion is leukoplakia-11.35%.

In the present study squamous cell carcinoma is most common malignant lesion 41.81% followed by mucoepidermoid carcinoma 4.54% which is comparable to khan [16] et al study in which most common malignant lesion was squamous cell carcinoma,39.73% followed by mucoepidermoid carcinoma 1.74%.

Table 4: Comparison of Commonest benign, premalignant and malignant lesion of oral lesion with other study

Oral lesion	Khan et al.[16]	Sakarwal N et al.[18]	Present study
Benign	Inflammatory (34.06%)	Inflammatory (13.41%)	Inflammatory(24.54%)
Premalignant	Leukoplakia (11.3%)	-	Leukoplakia (9.09%)
Malignant	Squamous cell carcinoma (39.73%)	Squamous cell carcinoma (28.04%)	Squamous cell carcinoma (41.81%)

Table 5: Age & Sex wise distribution of oral lesions

Age	Male	Female	Ratio (M:F)	Total	Percentage(%)
1-10	3	1	3:1	4	3.63
11-20	4	3	1.33:1	7	6.36
21-30	13	7	1.85:1	20	18.2
31-40	16	9	1.77:1	25	22.7
41-50	28	13	2.15:1	41	37.3
51-60	8	3	2.66:1	11	10
>60	2	-	-	2	1.8
Total	74	36	2.05:1	110	100

In the present study among the Oral lesions(110 cases)-74 (67.27%) were male & 36(32.72%) were females showing Male : Female ratio 2.05:1 in comparison to Khan et al [16] study in which male to female ratio was 1.79.

Table 6: A comparison showing the most common malignant lesion in various studies with present study

Studies	Most common malignant lesion (Squamous cell carcinoma)
Khan et al [16]	39.73%
Sakarwal et al [18]	28.04 %
Saleh et al [19]	22.2%
Singh et al [20]	28.0%
Gillani et al [21]	60%
Present study	**41.81%**

Discussion

Benign Lesion: Study shows the distribution and cyto-histo correlation of various lesions of the oral cavity. The total 44 cases of benign lesions were further subdivided into inflammatory lesions (27 cases), cystic lesions (10 cases) and tumor and tumor like conditions (7 cases). Inflammatory lesions included acute inflammatory lesions (15 cases), chronic inflammatory lesions (12 cases) while cystic lesion included 8 cases of retention cysts and 2 cases of mucocele, 7 cases of tumor and tumor like conditions comprised of pleomorphic adenoma(6 cases),hemangioma(1 case).Three of 15 cases of acute inflammatory lesions were not followed for histological diagnosis, whereas rest 12 cases showed concordance with histological findings . One case of chronic inflammatory lesions was not followed for histological diagnosis, leaving 11 cases for histological correlation. Out of 11 cases, 1 cases turned out to be squamous cell carcinoma on histology (false negative) while rest 10 cases showed concordant results. All 10cases cystic lesion shows concordant result on histology. Among 7 cases of tumor and tumor like lesions, aspirates from one case of pleomorphic adenoma not followed for histological diagnosis. Rest 5 cases of pleomorphic adenoma and 1 case of hemangioma showed concordant results with final histopathological diagnosis.

Premalignant lesion: A total of 10 cases of pre-malignant lesions included in present study comprised of 10 cases of leukoplakia . Out of 10 cases of leukoplakia, smears from one cases was not followed for histological diagnosis, leaving 9 cases for cytological and histological correlation. Seven cases were correctly diagnosed by FNAC/brush cytology. Two cases turned out to be squamous cell carcinoma (false negative) and The cytological diagnosis was correct in 7 of 9 adequate aspirate of leukoplakia.

Malignant lesions: Among 56 cases of malignant lesions, squamous cell carcinoma was the most common malignancy (46 cases),followed by mucoepidermoid carcinoma (5 cases),adenoid cystic carcinoma(3 cases). Two cases of squamous cell carcinoma were not followed for histological diagnosis , histological correlation was available in rest 44 cases. The 40 cases showed concordant result with final histological findings while 4 cases of squamous cell carcinoma turned out to be a case of severe dysplasia on histopathology (false positive).

In the present study diagnostic accuracy of FNAC and brush biopsy for benign, premalignant and malignant was 99.01%, 94.11 %,93.14 % respectively which is comparable and slightly higher for malignant and benign lesion than Khan et al study [16] and Günhan *et al.* [22]

Summary & Conclusion

Out of total 110 cases, 44 (40%) cases were Non neoplastic lesions, 10(9.1%) cases were Premalignant lesions, 56(50.9%) were Malignant lesions.

Among the Neoplastic lesions (56 cases), 42(75%) were male & 14(25%) were females showing Male: Female ratio of 3:1. Most common age group affected was 41-50 years(50%). The present study shows majority of cases of lesions of oral cavity involved Cheek or Buccal Mucosa (41.30%).

The diagnostic accuracy of FNAC and Brush cytology in diagnosis of oral in the present study for benign lesion, premalignant lesion and malignant lesion were 99.01%, 94.11 %, 93.14 % respectively.

References

1. R. Sankaranarayanan, E. Masuyer, R. Swaminathan, J. Ferlay, and S. Whelan, ―Head and neck cancer: a global perspective on epide-miology and prognosis, Anticancer Research, 1998; 18(6): 4779–4786.
2. R. Sankaranarayanan, K. Ramadas, G. Thomas et al., Effect of screening on oral cancer mortal-ity in Kerala, India: a cluster-randomised con-trolled trial, The Lancet, 2005; 365: 9475: 1927–1933.
3. Dangi J, Kinnunen TH, Zavras AI. Challenges in global improvement of oral cancer outcomes: Findings from rural Northern India. Tob Induc Dis. 2012;10:5
4. J. K. Elango, P. Gangadharan, S. Sumithra, and M. A. Kuriakose, Trends of head and neck can-cers in urban and rural India, Asian Pacific Jour-nal of Cancer Prevention, 2006; 7(1): 108–112.
5. Data extracted from Globocan, 2008 data. Pop-ulation forecasts were extracted from the United Nations, World Population prospects, the 2008 revision. Numbers are computed using age-

specific rates and corresponding populations for 10 age-groups.

6. Madani AH, Sotoodeh Jahromi A, Dikshit M, Bhaduri D. Risk Assessment of Tobacco Types and Oral Cancer. Am J Pharmacol Toxicol. 2010; 5:9–13.

7. Gupta PC, Ray CS. Smokeless tobacco and health in India and South Asia. Respirology. 2003; 8:419–431.

8. Binnie WH, Rankin KV: Epidemiological and diagnostic aspects of oral squamous cell carcinoma. J Oral Pathol 1984; 13:333-341.

9. Binnie WH, Rankin KV, Mackenzie IC: Etiology of oral squamous cell carcinoma. J Oral Pathol. 1983; 12:11-29.

10. AlAbrihemy, Z. A. A., Ali, H. H. M., & Saadi, K. A. A. The Effect of CD4+CD28 T Cells and Their Pathological Role in Pregnant Women with Diabetes with Role C. Peptide in Diabetes Diagnosis. Journal of Medical Research and Health Sciences, 2023;6(10): 2763–2770.

11. Chen J, Katz RV, Krutchkoff DJ: Intraoral squamous cell carcinoma: epidemiologic patterns in Connecticut from 1935 to 1985. Cancer. 1990; 66:1288-1296.

12. Neville BW, Day TA: Oral cancer and precancerous lesions. CA Cancer J Clin. 2002; 52:195-215.

13. Reed K, Ravikumar TS, Gifford RRM, Grage TB: The association of Fanconi's anemia and squamous cell carcinoma. Cancer. 1983; 52: 926-928.

14. Rich AM, Radden BG: Squamous cell carcinoma of the oral mucosa. A review of 244 cases in Australia. J Oral Pathol. 1984; 13:459-471.

15. Sankaranarayanan R, Swaminathan R, Black RJ. Cancer survival in developing countries. Cancer.1996;78(12):2461–4.

16. Prasad H, Ramesh V, Balamurali P. Morphologic and cytomorphometric analysis of exfoliated buccal mucosal cells in diabetes patients. J Cytol. 2010;27:113-7.

17. Khan N, Afroz N Haider A, Hassan MJ, Role of fine needle aspiration, imprint, and scrape cytology in the evaluation of intraoral lesions. J cytol. 2013; 30:263-9

18. M Babshet, K Nandimath, SK Pervatikar, and VG Naikmasur. Efficacy of oral brush cytology in the evaluation of the oral premalignant and malignant lesions J Cytol. 2011 Oct-Dec; 28(4): 165–172.

19. Sakarwal N, Awasthi S, Dutta S, Nizammudin S, Kumar A, Ahmad F, Vyas P. Fine Needle Aspiration Cytology: A Diagnostic Tool for Oral Lesions. Int J Sci Stud. 2015;3(2):90-94.

20. Saleh HA, Clayman L, Masri H. Fine needle aspiration biopsy of intraoral and oropharyngeal mass lesions. Cytojournal. 2008;5:4.

21. Gandhi S, Lata J, Gandhi N. Fine needle aspiration cytology: A diagnostic aid for oral lesions. J Oral Maxillofac Surg. 2011; 69:1668-771.

22. Gillani M, Akhtar F, Ali Z, Naz I, Atique M, Khadim MT. Diagnostic accuracy, sensitivity, specificity and positive predictive value of fine needle aspiration cytology (FNAC) in intra oral tumors. Asian Pac J Cancer Prev. 2012; 13: 3611-5.

23. Günhan O, Doğan N, Celasun B, Sengün O, Onder T, Finci R. Fine needle aspiration cytology of oral cavity and jaw bone lesions. A report of 102 cases. Acta Cytol. 1993;37:135-41.