

A PROSPECTIVE CLINICO-PATHOLOGICAL STUDY OF ORAL LESIONS AND DIAGNOSTIC CORRELATION BETWEEN BRUSH CYTOLOGY AND HISTOPATHOLOGY

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ABSTRACT

BACKGROUND

Oral carcinoma is the 6th most common malignancy in western world and accounts for more than 40% cancers in the world. Normally, the standard practice to confirm the presumed clinical diagnosis is to take punch biopsy of the lesion. But exfoliative cytology being a non-invasive procedure has a better patient compliance.

Aims and Objectives- To evaluate the clinical profile of the patients of oral mucosal lesions and to find the diagnostic correlation between brush cytology and histopathology of these oral mucosal lesions as well as to see the histopathological pattern of these lesions and to establish the factors which are usually causative to such malignant oral lesions.

MATERIALS AND METHODS

60 cases with oral mucosal lesions were included in the study. All patients underwent oral brush cytology and punch biopsy. Sensitivity, specificity, positive and negative predictive values were calculated. Cytopathology and histopathology of the lesions were compared.

RESULTS

The incidences of oral cancer were very high among the age group of 42 - 50 years. Males were more affected (M: F 3.2: 1) and the most common site involved was the tongue. The sensitivity, specificity, positive and negative predictive values for malignant lesions were 92.7%, 80%, 98% and 50%. Statistical analysis showed $p < 0.05$, suggesting that there is significant association between brush cytology and histopathology in assessing clinically premalignant and malignant lesions.

CONCLUSION

Oral brush cytology is an important screening tool for early diagnosis of oral cancer and is the key factor for its effective management. The fact that it is painless, easy to perform, has better patient compliance, has high specificity in both malignant and premalignant lesions makes it an ideal screening test.

KEYWORDS

Punch Biopsy, Brush Cytology, Oral Mucosal Lesions.

HOW TO CITE THIS ARTICLE: Upadhyay A, Mundra RK. A prospective clinico-pathological study of oral lesions and diagnostic correlation between brush cytology and histopathology. J. Evolution Med. Dent. Sci. 2018;7(14):1699-1702, DOI: 10.14260/jemds/2018/384

BACKGROUND

Oral cancer is a global health issue with increasing incidence and mortality rates. It is the 6th most common malignancy representing 2% to 4% of the malignancies in the West and accounts for almost 40% of all cancers in the Indian subcontinent.^[1] Oral cancers are the most common cancers among Indian population, and it accounts for 50% - 70% of all cancers diagnosed in India.^[2]

The risk of developing cancer increases with age. In UK, majority of cases (86%) were found to be in the people aged 50 years or above. In India the presentation of oral cancer has been observed at a relatively earlier age, which may be due to frequent use of paan and areca nut in younger population.^[3]

'Financial or Other Competing Interest': None.
Submission 07-02-2018, Peer Review 15-03-2018,
Acceptance 21-03-2018, Published 14-04-2018.

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DOI: 10.14260/jemds/2018/384



The following entities have been suggested as possible predisposing factors in the formation of head and neck cancer: Exposure to tobacco, radiation, malnutrition, alcohol consumption, genetic susceptibility, viruses, syphilis and traumatic irritation. The high incidence of oral cancer in India has emphasised the relationship between tobacco chewing, smoking habits and oral cancer.^[4] Oral cancers develop by transformation through precancerous lesion, subsequently developing into cancerous lesion. Precancerous lesions of oral mucosa known as potentially malignant disorders in recent years consists of a group of diseases which should be diagnosed in the early stage. Oral leukoplakia, oral submucous fibrosis and oral erythroplakia are the most common oral mucosal diseases that have a very high malignant transformation rate.^[5]

Exfoliative cytology is commonly used in oral smears collected by cytobrush to show a significant improvement in smear thickness and cellular distribution, which leads to easier identification of abnormal cells.^[6] Punch biopsy is the gold standard method for diagnosing oral carcinoma, but exfoliative cytology being a non-invasive procedure has a better patient compliance. The present study has been done to find out the efficacy of oral scrap smear as a screening tool for detecting oral carcinoma and to find its utility in detecting

pre-malignant and malignant lesions in comparison to oral punch biopsy.

MATERIALS AND METHODS

60 patients with oral lesions reporting to the ENT OPD were selected for the prospective observational study design. A detailed history regarding presenting complaints, history of presenting illness, past history regarding tobacco chewing, smoking and any similar lesions or swelling and any chronic systemic illness like tuberculosis, hypertension, cardiac disease, asthma, diabetes etc. Patients were thoroughly investigated for complete haemogram, blood sugar, blood urea, serum creatinine, coagulation profile and chest x-ray for any secondary focus. Oral brush cytology was performed in all the 60 cases. Oral scraping was done with the help of brush. It is important to brush the edges of the ulcer as well as the floor in order to obtain diagnostic material and smeared onto the glass slide and it is immediately fixed with isopropyl alcohol (95% absolute alcohol) and was sent for cytological examination.

The Slides were reported under the following Category-

1. **Unsatisfactory:** (a) Acellular or hypocellular; (b) Cellularity adequate, but poor air drying or fixation; (c) Too thick.
2. **Positive for Malignant Cells:**^[7,8] The smears are highly cellular with the following characteristics: (a) Ill-defined cell border; (b) High cellular atypia; (c) High nuclear atypia; (d) Enlarged nuclei with high N: C ratio; (e) Condensation of nuclear chromatin forming strands, coarse clumps and dense peripheral nuclear outlines; (f) Densely packed hyperchromatic nuclei in compact groups with no visible cell outline; (g) Multiple and enlarged nucleoli; (h) Multinucleated giant cells; (i) Tendency towards spherical shape; (j) Keratinized pearls of malignant cells are frequently seen; (k) Background is necrotic with blood and numerous leukocytes.
3. **Suspicious for Malignant Cells (Dysplastic Cells):**^[9,10] With following characteristics: (a) Hyperchromasia of nuclei; (b) Increased N: C ratio; (c) Anisonucleosis and Nuclear pleomorphism; (d) Irregularities of nuclear membrane; (e) Nuclear crowding; (f) Nuclear moulding, clumping and irregular distribution of chromatin.
4. **Negative for Malignancy:** Adequate cellularity, neither suspicious nor malignant cells present. The punch biopsy was also performed in all patients and sent for histopathological correlation.

Cytopathology and histopathology of the lesions were compared thereafter.

RESULTS

Of the total 60 cases, 2 cases were found to be inadequate on cytology. Clinically pre-malignant lesions included erythroplakia, leukoplakia and non-healing ulcers, whereas any oral growth was suspected as potentially malignant lesions. Demographic distribution illustrated male predominance with most common site to be tongue and tobacco chewing was found to be most common factor responsible for addiction (Table 1).

Characteristics	Range	18-65
Age	Male	46 (76.67%)
	Female	14 (23.33%)
Lesions	Clinically pre-malignant	35 (58.33%)
	Clinically malignant	25 (41.66%)
Site	Tongue	31 (51.67%)
	Buccal mucosa	19 (31.67%)
	Palate	3 (5%)
	Floor of mouth	1 (1.67%)
	Lips	2 (3.33%)
	Retromolar trigone	2 (3.33%)
	Upper and lower alveolus	2 (3.33%)
Addiction	Tobacco chewing	52 (86.67%)
	Smoking	40 (66.66%)
	Alcohol	36 (60%)
	Supari	36 (60%)
	Betel nut	32 (53.33%)
	Gutka	28 (46.67%)

Table 1. Shows the Age, Gender, Clinically Pre-malignant and Malignant Lesions affected Site and Addiction

Report of Brush Cytology	No. of Cases	Percentages
Negative for malignant cells	6	10.0%
Positive for malignant cells	42	70.0%
Suspicious for malignant cells	10	16.7%
Unsatisfactory for malignant cells	2	3.3%
Total	60	100.0%

Table 2. Distribution of Cases as reported by Brush Cytology

Report of Brush Cytology	No. of Cases	Percentages
Negative for malignant cells (Negative + Unsatisfactory)	8	13.3%
Positive for malignant cells (Positive + Suspicious)	52	86.7%
Total	60	100.0%

Table 3

Report of Biopsy	No. of Cases	Percentages
Non-malignant	5	8.3%
Malignant	55	91.7%
Total	60	100.0%

Table 4. Distribution of Cases as reported by Biopsy

Brush Cytology Report	Biopsy Report		Total
	Non-Malignant	Malignant	
Negative for malignant cells	3 50.0%	3 50.0%	6 100.0%
Positive for malignant cells	0 0.0%	42 100.0%	42 100.0%
Suspicious of malignant cells	1 10.0%	9 90.0%	10 100.0%
Unsatisfactory for malignant cells	1 50.0%	1 50.0%	2 100.0%
Total	5 8.3%	55 91.7%	60 100.0%

Table 5. Distribution of Cases according to Brush Cytology in Relation to Biopsy Report

Brush Cytology Report	Biopsy Report		Total
	Non-Malignant	Malignant	
Negative for malignant cells	4 50.0%	4 50.0%	8 100.0%
Positive for malignant cells	1 1.9%	51 98.1%	52 100.0%
Total	5 8.3%	55 91.7%	60 100.0%

Table 6. Association of Brush Cytology Findings and Biopsy Findings

(P value= 0.000, Significant).

There is a statistically significant association seen between the findings of brush cytology and biopsy report (P<0.05), showing that brush cytology findings are associated with biopsy findings.

For malignant lesions, following findings hold true:*

True positive	51
False positive	1
True negative	4
False negative	4
Sensitivity	92.73%
Specificity	80.00%
Positive predictive value	98.08%
Negative predictive value	50.00%
Diagnostic accuracy	91.67%

*(Sensitivity and specificity for premalignant lesions could not be calculated separately due to very less sample size of only premalignant lesions).

DISCUSSION

Oral cancer is the commonest cancer in India accounting for 50% - 70% of total cancer mortality. The incidence of oral carcinoma is increasing with the increasing use of tobacco and smoking. Biopsy is considered as the gold standard for diagnosing oral lesions, but it has its own drawbacks including poor patient compliance and the diagnosis being done in late cases when the lesions looks clinically malignant.

The patients in this series were of the age between 18 and 65 years. Most of the patients were elderly and the maximum number of patients were of age group 42 - 50 years (25%). Bharti et al^[11] states that sex ratio was 7: 1 with male predominance. In our study also males (76.67%) were affected more than females (23.33%) and the male: female ratio was 3.2: 1. Probably as tobacco chewing, smoking and alcohol was more common in males. In our study, 71.66% of the patients presented with oral ulcerations followed by burning sensation in the oral cavity as the second most common symptom seen in about 51.66% of the patients, difficulty in swallowing in 40% of the patients, difficulty in mouth opening in 10%, swelling in neck in about 8.33% and change in voice in 1.66%. Other studies show that ulceration is the most common presentation in malignant lesions.^[12]

In our study of 60 cases, non-healing ulcer (pre-malignant lesions) in 48.33% of cases followed by clinically malignant lesions was seen in 41.66% cases, erythroplakia in 5% of cases, 3.33% cases of leukoplakia and lichen planus in 1.66% of cases.^[13] Swelling was the most common clinical type in their present study for malignant lesions and white lesions is the most common for pre-malignant lesions.

Tobacco chewing was the most important risk factor, which was more common among male population (86.67%) followed by smoking (66.66%) and alcohol consumption (60%) and dual addiction of tobacco chewing and smoking with or without alcohol consumption caused more of incidence of malignant lesions individually.^[14] Many studies reported high incidence of tobacco chewing in 58 patients (58.57%) in the form of bidi, cigarette or both in their study.

In our study the most common site involved was tongue in approximately 51.67% cases, buccal mucosa was the second most common site to be involved in 31.67% cases. Bharti Jha et al similarly found tongue (38%) as the common site for pre-malignant lesion followed by floor of mouth (28%).

The sensitivity, specificity, positive and negative predictive values for malignant lesions were 92.7%, 80%, 98% and 50%. Sensitivity and specificity with regards to pre-malignant lesions could not be calculated due to very less sample size (n= 5).

In the comparison of histology and brush cytology, null hypothesis was considered. Analysis of this showed there is a statistically significant association seen between the findings of brush cytology and biopsy report (p < 0.05), showing that brush cytology findings are associated with biopsy findings.

CONCLUSION

Oral brush cytology is an important screening tool for early diagnosis of oral cancer and is the key factor for its effective management. The fact that it is painless, easy to perform, has better patient compliance, high specificity in both malignant and pre-malignant lesions makes it an ideal screening test. The patients with pre-malignant conditions should be paid special attention for easy diagnosis, because their effective management can stop further malignant transformation and morbidity. All the cases were found to be associated with tobacco chewing, smoking and alcohol. Early diagnosis of precancerous and cancerous lesions with awareness regarding hazards of tobacco is strongly recommended.

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