Role of Oral Exfoliative Cytology in Oral Leukoplakia and Squamous Cell Carcinoma

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Abstract

Squamous cell carcinoma is the most common cancer of the oral cavity. Unlike other cancer, due to its accessibility the oral cancer can detected at the early stage. Oral exfoliative cytology is the simple, sensitive and valuable adjuvant for gold standard Biopsy. In our study we have included 17 cases of oral leukoplakia, and 20 cases of oral squamous cell carcinoma to analze the sensitivity and specificity of oral exfoliative cytology. We have also included the cytological features noticed in leukoplakia and squamous cell carcinoma. Result was suggestive of 69% of sensitivity in leukoplakia and 75% of sensitivity in squamous cell carcinoma and both has 100% specificity in oral exfoliative cytology.

KEYWORDS: **Oral exfoliative cytology, Squamous cell carcinoma, Oral cytology.**

Introduction

Squamous cell carcinoma is the most common malignant tumor of the oral cavity, 90% of the head and neck cancers are squamous cell carcinomas, originating from the mucosal lining epithelium of these regions. Head and neck cancers often spread to the lymph nodes of the neck, and this is usually the first manifestation of the disease at the time of diagnosis. Unlike other cancers due to its accessible location oral cancer can be detected at an early stage.

Oral exfoliative cytology is the microscopic examination of shed cells from an epithelial surface. It is a non invasive, simple sensitive staining technique which can be used as an adjuvant for biopsy or where the gold standard biopsy is not feasible or in mass screening .

Aim

- To study the exfoliated cells from oral leukoplakia and squamous cell carcinoma.
- To compare the cytological finding with histopathological finding.
- To analyze the sensitivity and specificity of oral exfoliative cytology.

Hypothesis

In oral leukoplakia, the exfoliative cytology would differ markedly from normal cytology in the following aspects:

- Alteration in proportion of the different types of epithelial cell.
- Presence of atypical epithelial cell.
- Presence of malignant cell.

Materials and methods

The study group consisted of 17 patients with clinically suspicious oral leukoplakia and 20 patients with clinically suspicious squamous cell carcinoma. With the consent of the patients, scrapings were made with wooden spatula moistened with normal saline. The scrapings were smeared on plain glass slides, slide fixed immediately in 95% ethanol, followed by staining with PAP stain. The biopsies were also taken for all these cases for histopathological confirmation and comparison of results.

Results

Age and sex distribution:

The 17 oral leukoplakia cases comprised of 15 males and 2 females.2 cases were in 20 to 30 years age group, 5 cases were in 31 to 40 years age group, 4 cases were in the 41 to 50 years age group, 6 cases were above 50 years age group. The 20 squamous cell carcinoma cases comprised of 12 males and 8 females cases.5 were in the 51 to 60 age group, 6 cases were in the 41 to 50 year age group, 5 cases were in the 61 and above age group and one case was in the 31 to 40 year age group.

Site distribution:

Among Oral leukoplakia, 8 cases involved the commissure of the mouth, 4 cases involved the buccal mucosa, and 2 cases involved the labial mucosa and one case each in floor of the mouth, palate and tongue. Out of 17 cases, 8 cases had homogenous surface, 8 cases had red and white color and one case had nodular surface.

Out of 20 squamous cell carcinoma 11 cases had the lesion in the buccal mucosa, 3 cases in the tongue, 3 cases in the alveolar mucosa , 2 patients in the palate and one patient had it in the floor of the mouth.

Cytological finding:

Out of 17 oral leukoplakia, 8 cases would be classified as class I, 7 cases as class II, one case as class III and one case as classIV. Out 20 squamous cell carcinoma cases, 6 cases was classified as class V cells, 2 cases as classIV cells,7 cases as class III cells, 5 cases as class II cells. (**Table 1**) (**Fig 1-4**)

Histopathological findings:

Out of 17 oral leukoplakia, 4 cases showed mild dysplasia, 3 cases showed moderate dysplasia, 3 cases showed severe dysplasia, 4 cases showed hyperkeratosis & epithelial atypia, 2 cases showed only hyperkeratosis and one case showed malignant changes. Out of 20 patients of squamous cell carcinoma, 18 were diagnosed as well differentiated and 2 were diagnosed as moderately differentiated carcinoma.(**Table 2**)

Table1 : Leukoplakia : Comparison of cytological finding and Histopathological finding

Histopathological diagnosis	Cytological diagnosis					
	Class I	Class II	Class III	Class IV	Class V	Total number of patients
Hyperkeratosis	2					
Hyperkeratosis & epithelial atypia	4					
Mild dysplasia	2	2				
Moderate dysplasia		2	1			
Severe dysplasia		3				
Malignant change				1		
Total	8	7	1	1		17

Table 2 : Squamous cell carcinoma : Correlation of Cytological and Histopathological findings

Histopathological Diagnosis	Cytological Diagnosis					
	Class I	Class II	Class III	Class IV	Class V	Total number of patients
Well differentiated	0	5	7	2	4	18
Moderatetly differentiated	0	0	0	0	2	2

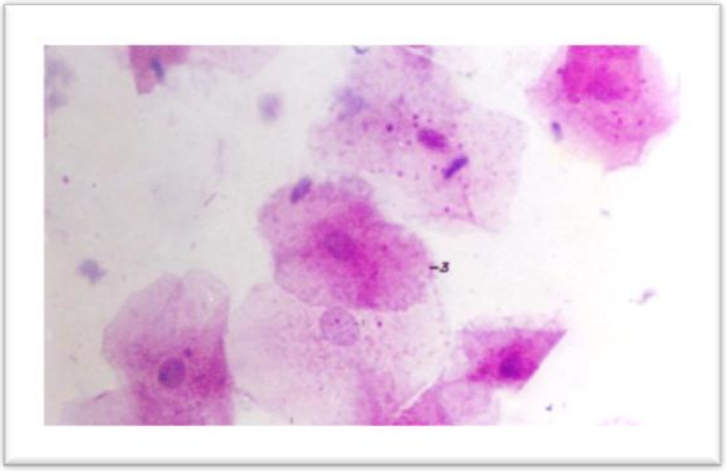


Fig 1: ClassII-cornified cells showing pleomorphic nucleus and eosinophilc cytoplasm and numerous keratohyaline granules.

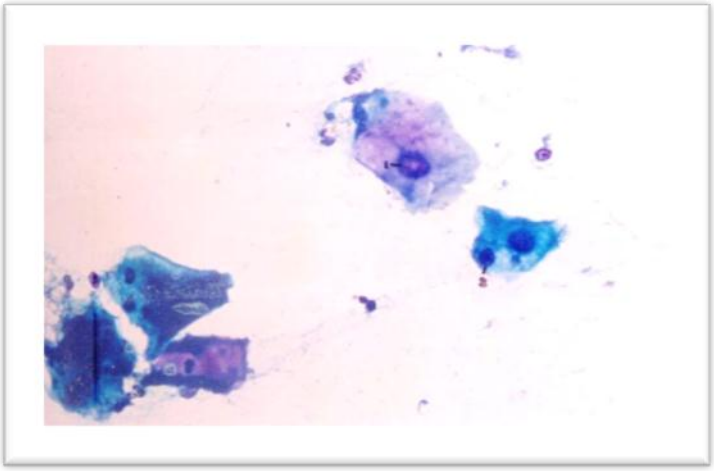


Fig 2. ClassIII- cornified cells showing perinuclear condensation and abnormal mitosis.

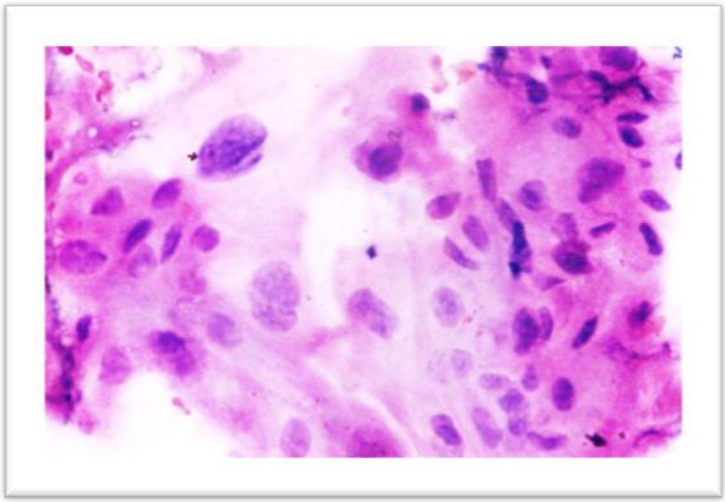


Fig 3: Class IV- pleomorphic cells with ill defined cellular border.

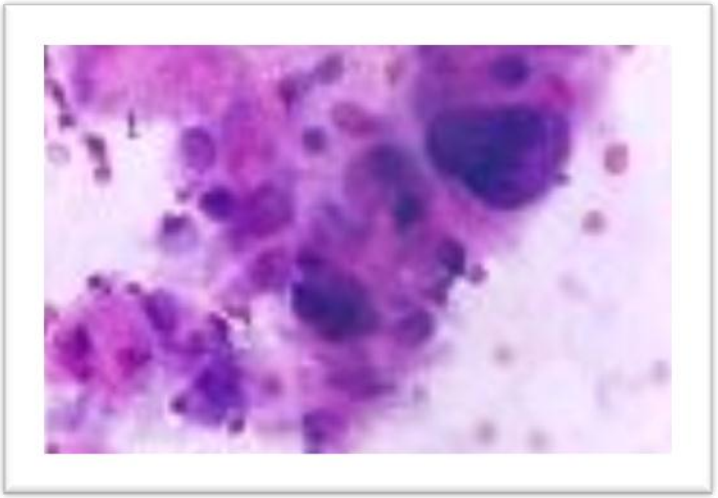
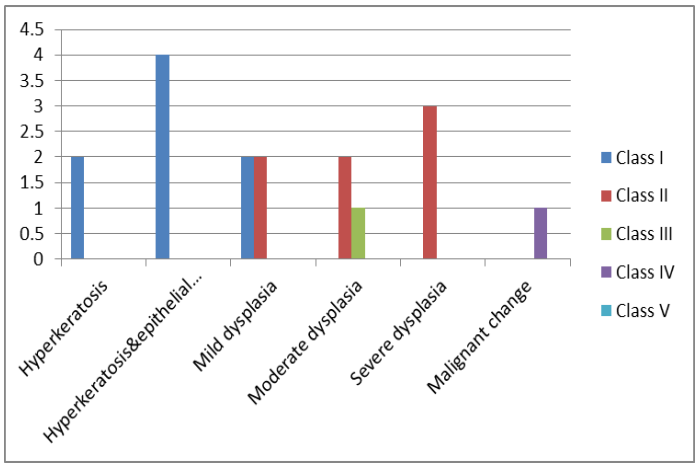
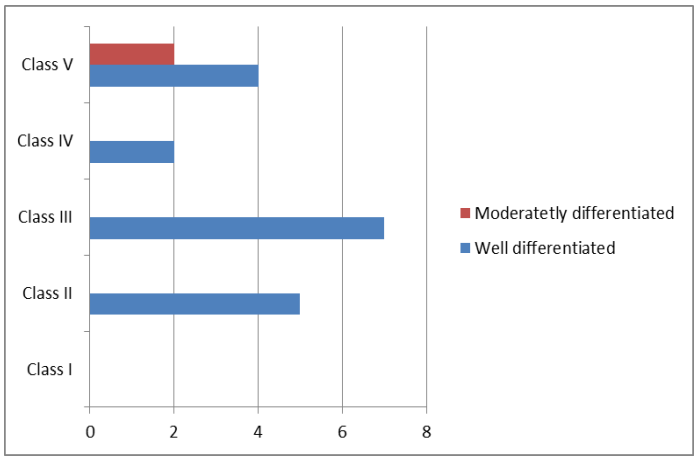


Fig 4: Class V- vacuolization of cytoplasm in dysplastic cells.



Graph 1: : Leukoplakia: Comparison of cytological finding and Histopathological finding



Graph 2: Squamous cell carcinoma : Correlation of Cytological and Histopathological finding

CLASSIFICATION OF PAPANICOLAOU[1]:

CLASS I : (Normal) indicate that only normal cells were observed.

CLASS II : (Atypical) indicate minor atypia but no evidence of malignant changes.

CLASS III : (Intermediate) the cells display wider atypia that may be suggestive of cancer, but they are not clear cut.

CLASS IV : (Suggestive of cancer) few epithelial cell with malignant character or many cells with border line characteristic.

CLASS V : (Positive cancer) cells that are obviously malignant.

Sensitivity and specificity:

In 17 cases of leukoplakia 9 patients were cytologically positive and histopathologically also positive, 4 patients were cytologically negative and histopathologically positive, 4 patients were cytologically negative and histopathologically also negative and no patients were cytologically and histopathologically negative. The sensitivity is 69% and the specificity is 100%.(**Table 3**)

In 20 cases of squamous cell carcinoma 15 patients were cytologically positive and Histopathologically also positive and 5 patients were cytologically negative and Histopathologically positive with the sensitivity of 75% and specificity of 100%.(**Table 4**)

Table 3: Leukoplakia: Sensitivity and specificity

	Histopathologically Positive	Histopathologically negative	Total
Cytological positive	9	0	9
Cytological negative	4	4	8
Total	13	4	17

Table 4: Squamous cell carcinoma: Sensitivity and specificity

	Histopathologically positive	Histopathologically negative	Total
Cytologically positive	15	0	15
Cytologically negative	5	0	4
Total	20	0	20

Discussion

Oral exfoliative cytology is the microscopic examination of shed cells from an epithelial surface[2,3,4].Papanicolaou and Traut's staining technique[1] for cytology smears were first used in oral leukoplakia by Montgomery and von Hamm.[2] Jolar Bancozy studied 201 oral leukoplakia[5] and found 76.6% of cases correlated with histological findings. In our study, out of 17 suspected leukoplakia patients we found that cytology of class I type in 8 patients, class II in 7 patients, class III type in one patient and class IV type in one patient. We observed atypical cells characterized by nuclear enlargement with variation in the size and shape of the cells and eosinophilic cytoplasm. A few cells characterized by perinuclear condensation of chromatin and abnormal mitosis were also seen. Histopathologically all these cases showed dysplastic changes. One case clinically diagnosed as leukoplakia, showed malignant changes[6].

In our study, 4 cases of leukoplakia did not show any cytological features, suggesting of dysplasia. On histopathological examination there were dysplastic changes. One of the features in all these 4 cases was hyperorthokeratosis. The presence of hyperkeratosis could have been the reason for not obtaining cells with dysplastic features on cytology. This was also the experience of Jolan Bancozy in his study of 201 cases of oral leukoplakia. It's stated that prior removal of the superficial layer scraping may aid in diagnosis of this

type of leukoplakia. In our study of exfoliative cytology in leukoplakia 69% was sensitive and 100% were specific.

Several authors have listed the criteria for malignancy in the interpretation of oral smears[1,7,8].In our study of 20 suspected squamous cell carcinoma we found cytology was of class II type in 5 patients, class III type in 7 patients, class IV type in 2 patients, class V in 6 patients. Malignant cells are characterized by large nucleus with an increased Nuclear/Cytoplasmic ratio, hyper chromatic nuclei, irregular size and shape of the nuclei, mutinucleation, abnormal shape of the epithelial cells, bizarre shape, tadpole cell, naked nucleus, abnormal mitosis and excessive cornification, all this finding where consistent with other authors. Our study revealed 75% sensitivity and 100% specificity[6,9,10].

Conclusion

Out of 37 patients of oral leukoplakia and squamous cell carcinoma, we found that in oral leukoplakia and squamous cell carcinoma there was an alteration in the proportion of different types of cells, more cornified cells in leukoplakia and large number of basal cells in the squamous cell carcinoma. Atypical cells noticed in 9 out of 17 patients of oral leukoplakia and 12 out of 20 cases of squamous cell carcinoma. In hyperkeratosis the cytology does not show any characteristic atypical features. Oral exfoliative cytology is a reliable adjuvant to biopsy with the 69% sensitivity and 100% specificity in oral leukoplakia and 75 % sensitivity and 100% specificity in squamous cell carcinoma.

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