Case Reports in Odontology
ISSN:2410-0412
Journal homepage:
www.casereportsinodontology.org

Cytopathology Importance in Early Detection of Oral Lesions- A Clinical Observation and Review

[PP: **09-14]**

Dr. Sandeep Singh Sihmar
Darshan Dental & Oral Cancer Diagnostic & Treatment Center, Bhiwani, Haryana, I**ndia**

Dr. Preeti
Department of Oro-Maxillofacial Surgery, P.D.M Dental College and Research institute, Haryana, India, I**ndia**

Dr. Shashi Singh
Department of Orthodontics & Dentofacial Orthopedics, Geetanjali Dental College and Research Institute, Udaipur, Rajasthan, I**ndia**

Dr. Poonam Devi
CHC Nohar, Hanumangarh, I**ndia**

Abstract:

Oral cancer is the most common cancer and constitutes a major health problem in India. Most cases of Oral squamous cell carcinoma (OSCC) are not diagnosed until they reach an advanced stage, so prognosis is poor. Early detection of potentially malignant or cancerous oral lesions can improve the survival and the morbidity of patients. Cytology is used for assessment of detectable superficial oral and oropharyngeal lesions may arise from surface mucosa, minor salivary glands, mesenchymal tissue, and lymphoid structures. Cytological study of oral cells is a non-aggressive technique that is well accepted by the patient, and is therefore an attractive option for the early diagnosis, including epithelial atypia and squamous cell carcinoma.

In this report, we discuss two cases that were identified by abnormal cytological features in exfoliative cytology samples stained with PAP stain, which turned out to be early invasive squamous cell carcinoma and epithelial dysplasia respectively in biopsy.

Keywords:	*Exfoliative Cytology, PAP Stain, Potentially Malignant Disorders, Malignancy*
ARTICLE INFO	The paper received on: 07/**01/2021** Accepted after review on: **13/02/2021** Published on: **26/05/2021**

Cite this article as:
Sihmar, S., Preeti., Singh, S. & Devi, P. (2021). Cytopathology Importance in Early Detection of Oral Lesions- A Clinical Observation and Review. *Case Reports in Odontology. 8(1), 09-14.*

1. Introduction

The high mortality rate from oral cancer is due to several factors, but undoubtedly, the most significant is delayed diagnosis. Survival and cure rate dramatically increase when oral cancer is detected as an early stage disease. Approximately two thirds of patients at time of diagnosis are symptomatic and over 50% display evidence of spread to regional lymph nodes and metastases [1].

Exfoliative cytology not only aids in the differential diagnosis of an unidentified oral lesion or a probable benign lesion when the physician or dentist is reluctant to perform a biopsy, but also helps to detect carcinoma in situ and other premalignant lesions in suspicious red, velvety and granular-appearing areas. Oral exfoliative cytology is not a substitute for biopsy.

Rather, it is a useful adjunct in the diagnosis of oral surface lesions due to cancer, viral disease, vesiculobullous dermatoses or fungal infection.

Cytologic examination may be required when the clinician is averse to biopsy for a seemingly innocuous lesion, such as a large oral ulcer or a small, mild enythematous area without induration, especially if the lesion is located in a region known to give rise to rapidly proliferating carcinomas with early metastases such as the tongue, floor of the mouth and faucial regions. If, on the other hand, the physician feels biopsy is in order, cytology may provide useful additional information. Occasionally, carcinoma or carcinoma in situ can be detected in its early stages [2].

Oral cytology is also of value in monitoring patients following treatment for oral cancer. Periodic cytologic examinations of the treated and adjacent areas may detect suspicious or positive malignant change before the reappearance of clinical signs, since these patients may develop a new cancer at other sites more frequently than patients without a history of cancer. Cytology may also be helpful monitoring patients following radiation therapy. An experienced oral or general pathologist or cytologist can usually differentiate between malignant cells and those showing radiation change. If cytology is positive in areas of previous irradiation, biopsy may be indicated.[1]

In this clinical observation, we discuss two special cases in which we found clues of diseases by cytology, confirmed it with biopsy. Histopathology diagnosed early invasive squamous cell carcinoma and epithelial dysplasia. Conservative surgery was performed to excise the lesions with limited morbidity.

2. Case Reports

2.1 1st Case

A 52 year old male patient reported to Darshan Dental & Oral cancer center with burning sensation in his mouth on right side. He was having habit of smoking since 25 years.

Clinical examination revealed whitish red lesion extending from right second premolar to retromolar area. (Figure 1)

Radiographs revealed a diffuse radiolucency involving the posterior mandible. (Figure 2). He was provisionally diagnosed with leukoplakia.

Cytopathology showed numerous epithelial cells with micronuclei (Figure 4). It was reported as epithelial dysplasia and biopsy was advised for confirmation.

Incisional biopsy was performed. Histopathology shows parakeratinized stratified squamous epithelium with features of epithelial dysplasia. One area showed break in basement membrane and invasion of malignant epithelial cells into the underlying stroma. There was evidence of sub epithelial inflammation. It was diagnosed as early invasive squamous cell carcinoma (Figure 5) and advised immediate treatment.

The oral lesion was treated with excisional biopsy in our clinic. The patient was referred for hemi-mandibulectomy with radical neck dissection.

2.2 2nd Case

A 72 year old male patient reported to Darshan Dental & Oral cancer center with complaints of sensitivity in his all teeth. He was got knee replacement 2yr back, and taking medication for prostatic enlargement. He was having habit of smoking bidis for several years. During the examination, reddish-white lesions were noticed on the labial mucosa, buccal mucosa and palate. He was advised cytopathology as a screening test.

Exfoliative cytology showed numerous microbial colonies and few fungal hyphae (Figure 8) and keratinized and non-keratinized epithelial cells along with inflammatory cells. Few cells were enlarged with hyperchromatic nuclei. Few cells showed abnormal nuclear cytoplasmic ratio. It was diagnosed with epithelial dysplasia and biopsy was advised.

Incisional biopsy was performed. Histopathology showed parakeratinized stratified squamous epithelium with hyperkeratosis in few areas and evidence of epithelial dysplasia in few areas. Hyperchromatic epithelial cells (Figure 9) were seen extending beyond the middle third of the epithelium. The underlying fibrous connective tissue showed foci of inflammatory cells, minor salivary glands and muscle tissue. Histopathological features were suggestive of hyperkeratosis with moderate epithelial dysplasia.

On the basis of histopathology we did complete excision of lesion and the patient is under the regular follow up.

3. Discussion

Early detection of potentially malignant or cancerous oral lesions promises to improve the survival and the morbidity of patients suffering from these conditions. Cytological study of oral cells is a non-invasive method to identify oral lesions with minimal discomfort to the patient. A significant proportion of oral squamous cell carcinomas (OSCC) develop from potentially malignant disorders like leukoplakia and oral submucous fibrosis. Adjuncts for detection of lesions and selection of biopsy sites include vital tissue staining like Toluidine blue and exfoliative cytology. Unfortunately, sensitivity of cytological diagnosis in a meta-analysis of 1306 cases from 14 studies showed an average of 87.4% (ranging from 73.8 to 100%). Histological examination of tissue remains the gold standard for diagnosis and identification of malignant oral lesions. Biopsy is an invasive technique with surgical implications, technique limitations for professionals and psychological implications for most patients. It also presents limitations when the lesions are large and in these cases it is important to select the most appropriate site of biopsy.[3]

Babshet M, Nandimath K et al studied total of 67 patients, 32 premalignant lesions and other 35 frank oral carcinomas. All patients underwent oral brush cytology using a toothbrush followed by punch biopsy. 18% of cases were false negatives. The sensitivity, specificity, positive predictive value and negative predictive value were 77%, 100%, 100% and 38%, respectively. Statistical analysis showed $P>0.05$, suggesting that there is no significant difference between histopathology and brush cytology in assessing both premalignant and malignant lesions. Inter- and intra-examiner reliability was 99.22% and 99.77%, respectively. They concluded that Brush cytology using a tooth brush is reliable and can be easily performed with less cost and discomfort to the patient. It is useful in those situations when a patient refuses to have a biopsy performed or when medically compromised patients would be exposed to unnecessary surgical risks. It can be used for screening for suspicious oral lesions, and may have applications in resource-challenged areas.[4]

We have seen a dramatic switch from histopathological to molecular methods of disease diagnosis and exfoliative cytology has gained importance as a rapid and simple method for obtaining DNA samples. Changes occur at the molecular level before they are seen under the microscope and before clinical changes occur. Identification

of high-risk oral premalignant lesions and intervention at premalignant stages could constitute one of the keys to reducing the mortality, morbidity and cost of treatment associated with OSCC [3].

Shaila M, Shetty P et al studied 55 clinically diagnosed cases of leukoplakia and 55 age and sex matched normal controls. Smears were prepared using oral rinse technique followed by the conventional exfoliative cytology. Papanicoloau stained smears were evaluated for atypia and subjected to image analysis. Based on the presence of atypia they were further divided into three groups. They found Smears prepared with both methods demonstrated atypia in 18 cases. The cellular diameter and cellular area (CA) were progressively increased from Group 1 through Groups 2 and 3 in both the smears. Nuclear diameter and nuclear area and nuclear cytoplasmic ratio progressively decreased from Group 1 through Groups 2 and 3. They conclude that Cytomorphometric analysis of keratinocytes obtained with oral rinse method and wooden spatula can serve as a useful screening aid to detect oral leukoplakia. Oral rinse method being more convenient results in smears of better quality.[5]

Verma R, Singh A et al conducted a study over 90 subjects including 30 cases each of oral leukoplakia, OSCC and clinically normal oral mucosa. The smears obtained were stained with Papanicolaou (PAP) stain and cytomorphological assessment of the keratinocytes was carried out. They conclude that evaluation of nuclear and CA of keratinocytes by cytomorphometry can serve as a useful adjunct in the diagnosis and prognosis of a dysplastic lesion which may lead to OSCC.[6]

Kabiraj A, Khaitan T et al also conducted a study on 160 subjects with 25–50 years of age. Among 40 control subjects showed Class I features. 40 were clinically diagnosed with oral leukoplakia, 40 were diagnosed with oral lichen planus, 40 were diagnosed with oral submucous fibrosis, and 40 were in the control group. The prepared smears were subjected to Papanicolaou stain and analyzed microscopically for the evaluation of the cytomorphological features. Results showed that when analyzed microscopically, 36 (90%) out of the 40 oral leukoplakic lesions showed Class II cytological features whereas 4 (10%) revealed Class I features. Among 40 patients with oral lichen planus, 26 (65%) showed Class II features while the remaining 14 (35%) revealed Class I features. In 40 subjects with oral submucous fibrosis, 32 (80%) showed Class II features while the other 8 (20%) showed Class I features.[7]

Mulki S, Sheety P et al conducted a comparative study on 105 normal cases Two smears were prepared from clinically normal mucosa using an oral rinse and further two smears were scraped from clinically normal buccal mucosa using a wooden spatula. They found that Oral rinse was found to be significantly more efficient than the wooden spatula, in terms of cell yield .[8]

Olms C, Hix N et al conducted a Study for comparison of liquid- based conventional cytology of oral brush biopsies and concluded that both techniques are diagnostically reliable. The liquid-based method showed an overall improvement on sample preservation, specimen adequacy, visualization of cell morphology and reproducibility. Liquid-based cytology simplifies cell collection due to easier handling and less transfer errors by dentists.[9]

Based on our clinical observation, we recommend exfoliative cytology to

performed by every dentist for investigation of doubtful oral lesions. PAP stain is a simple procedure and could be performed chairside without much hassle. We are proud to identify these cytological changes and treat the patient promptly without post-operative morbidity.

References

1. Rickles.N :Oral Exfoliative Cytology an Adjunct to Biopsy. U.S. GovernmentPrinting Office,Washington, D.C. 20402as PublicHealth Service PublicationNo. 1949.
2. Detail brush cytology; Cytology in diagnosis oral lesions from PubMed NIH.Gov 2006.
3. Mahrotra R et al .Applocation of cytology and molecular biology in diagnosis premalignant or malignant oral lesions. Molecular Cancer 2006.
4. Babshet M, Nandimath K et al:Efficacy of oral brush cytology in the evaluation of the oral premalignant and malignant lesions. J Cytol 2011 ,Oct-Dec;28(4):165-172.
5. A new approach to exfoliative cytology: A comparative cytomorphometric study, Indian Journal of Cancer,Vol 53,2016.
6. Verma R, Singh A et. al: Evaluation of exfoliative cytology in the diagnosis of oral premalignant and malignant lesions: A cytomorphometric analysis, Dental Research Journal, Jan-Feb 2015.
7. Kabiraj A, Khaitan T et al: Screening of Oral Potentially Malignant Disorders Using Exfoliative Cytology : A diagnostic Modality. Journal of Cancer Epidemiology. Article ID 8134832,Vol 2016.
8. Mulki S, Shetty P: Oral Rinse as a Simpler Approach to Exfoliative Cytology: A Comparative Study.,Journal of Clinical and Diagnostic Research. Vol:7, 2013.
9. Olms. C, Hix. N et al:Clinical comparison of liquid-based and conventional cytology of brush: a randomized controlled trial. Head & face Medicine, Article no.9,2018

Figures with Legends:

Figure 1 is the clinical picture showing the red-white lesion on the right buccal mucosa.

Figure 2 is the orthopantomogram showing a diffuse radiolucency in the third molar region.

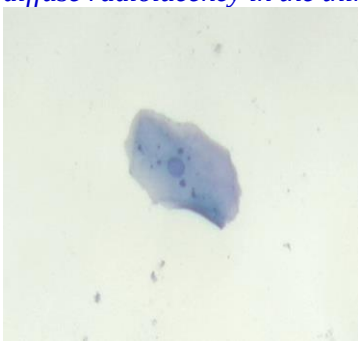

Figure 3 is the cytology sample showing multiple micronuclei within the epithelial cell. PAP stain, 40x

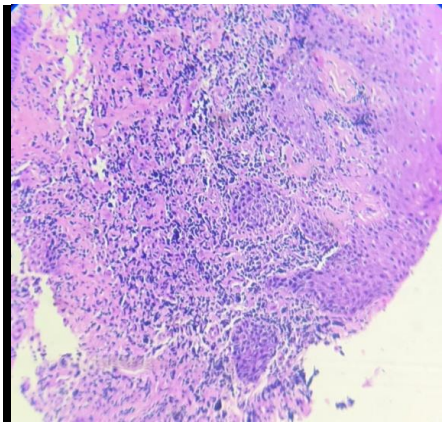

Figure 4 is the photomicrograph showing epithelial dysplasia and malignant epithelial cells in the superficial connective tissue stroma. H & E, 10x

Figure 5 shows pale, whitish lesions on the upper and lower lips

Figure 6 shows reddish-white lesion on the palate.

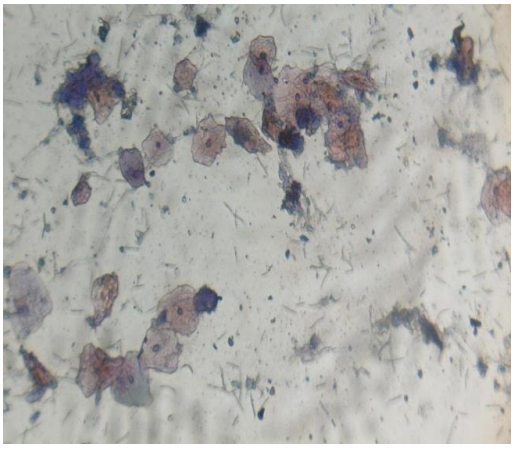

Figure 7 shows numerous epithelial cells, microbial colonies and few fungal hyphae. PAP stain, 10x

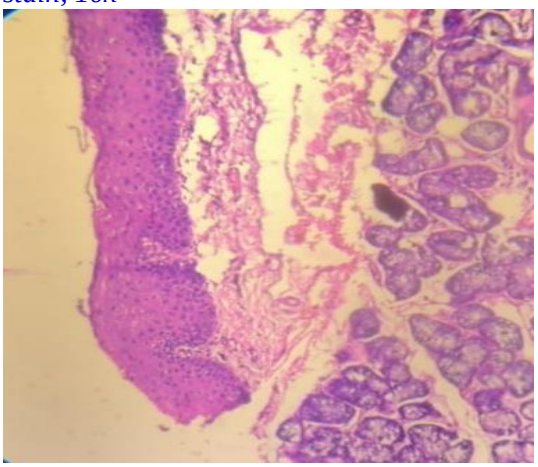

Figure 8 is the photomicrograph showing epithelial dysplasia and minor salivary glands in the connective tissue.

Cite this article as: Sihmar, S., Preeti, Singh, S. & Devi, P. (2021). Cytopathology Importance in Early Detection of Oral Lesions- A Clinical Observation and Review. *Case Reports in Odontology. 8(1), 09-14.*