International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2020): 7.803

Detection of Cytological Alterations in Oral Mucosa among Female Cigarette Smokers

Faris Merghani Eltom[1], Saad Ali S. Aljohani[2], Asma Abdulrahim Alharbi[2], Eman Ahmad M. Eisawi[3], Ghaidaa Yasir M. Bedair[3], Lama Sulaiman Alahmadi[3]

[1]Department of Histology, College of Medicine, Alrayan Colleges, Madinah, Kingdom of Saudi Arabia
Corresponding Author Email: *alfaris-sust[at]hotmail.com*

[2]Department of Genetic, College of Medicine, Alrayan Colleges, Madinah, Kingdom of Saudi Arabia

[3]College of Medicine, Alrayan Colleges, Madinah, Kingdom of Saudi Arabia

Abstract: ***Background: Smoking is a major cause of cytological changes in the oral mucosa. We evaluated the cytoloaical chanaes in the oral mucosa of female cigarette smokers, using Papanicolaou staining. Materials and methods: Oral smears were collected from 100female volunteers: 50 were cigarette smokers, and another 50 were treated as a control group. The smokers included in this study had been continuously exposed for more than 2 years. Smears were stained using the Papanicolaou technique. Results: Some cytological changes were detected among both cases and controls: atypia (1.0%, 0%, respectively), keratinization (0.2%, 0%, respectively), inflammation (20%, 9.8%, respectively), and bacterial infection (6%, 2%, respectively). Conclusion: The results showed higher percentages of cytological changes among female cigarette smokers users compared with nonusers; however, the differences were not statistically significant. The degree of change depends on the duration of alcohol consumption and cigarette smoking.***

Keywords: cytological Alterations, Oral mucosa, Female, Cigarette smokers

1. Introduction

Oral cancer is one of the most widespread cancers in developing countries [(1)]. In the United States, smoking accounts for 30% of all cancer-related deaths [(2)]. The risk increases with the frequency of exposure. Although easy to access Oral cancer requires self-examination, it is usually diagnosed at advanced stages, resulting in poor prognosis, and survival rate among patients. The morbidity and mortality rates of oral cancer have not decreased despite advances in therapeutic techniques, leading to increased treatment costs, and complications. Hence, the early diagnosis of oral cancers is critical for successful treatment [(3)]. Exfoliative cytology is a non-invasive technique that has been accepted by patients and is a good diagnostic method for the early diagnosis of oral mucosal lesions [(4)]. Oral exfoliative cytology is particularly valuable for mass screening purposes; with a sensitivity of 94%, and specificity of 100% [(5)]. Recent advances in technology facilitates the use of reliable quantitative techniques such as cytomorphometry, histometric, and computer-assisted image analyzer. The evaluation of parameters such as nuclear area (NA), cytoplasmic area (CA), and ratio of NA/CA (N/C), may increase the sensitivity of exfoliative cytology for early diagnosis since these are precise, objective, and reproducible [(6)].

2. Materials and Methods

Oral smears were collected from 100 female volunteers; 50 were cigarette smokers, and another 50 were treated as a control group. Each participant was well informed about the study and signed a written ethical consent form before participating in the study. The study was approved by Ethical Committee, Al Rayyan medical college. cytological smears were taken using a sterile wooden tongue depressor. In each case, the surface epithelium of the buccal mucosa was scraped and applied to a clean frosted glass slide. The smear was immediately fixed in 95% ethanol for 15 minutes, and finally stained using the Papanicolaou procedure. Quality control measures were taken during sample collection and processing.

Questionnaire information
Information obtained in questionnaires from female cigarette smokers was as follows: age, occupation, frequency of daily smoking. In addition, other parameters, including presence of chronic diseases. For nonsmokers, only age and occupation were obtained for the questionnaires.

Cytological assessment: We checked for the presence of inflammation, infection, atypia, and keratinization. Features such as irregular nuclear borders, bi- or multinucleation, and differences in size and/or shape of cells and nuclei, abnormal nuclear line, hyperchoromatosis and cytoplasmic vacuolations.

Statistical analysis: Statistical analysis was carried out on all samples using the Frequencies, cross tabulation and chi-square were calculated, to determine statistical significance ($P<0.05$) with 95% confidence level.

3. Results

There are 100 samples in total, of which 50 are from cases and 50 are from controls. All smokers were female, the case and control groups had average ages ranged from 20-60 years (no significant difference ($P> 0.05$) (Table1). Cytological changes such as inflammation were identified in both cases and controls, while atypia, infection, and keratinization were only identified in cases (Table 2).No significant difference ($P>0.01$) was observed between the diagnosed cytological changes of cases and controls.

Cytological changes such as inflammation and infection identified in both short and long duration of cigarette smoking, while atypia, fungal infection and keratinization were only identified in long duration (Table 3)

Table 1: Distribution of the study population by age

Age (year)	Cases (n=50)		Controls (n=50)	
	N	%	N	%
20-30	25	50	16	32
31-40	17	34	19	38
41-50	5	10	11	22
51-60	3	6	4	8

Table 2: Frequency of cytopathological changes among the study population.

Results	Cases (n=50)		Controls (n=50)	
	N	%	N	%
Atypia	1	2	0	0
Inflammation	13	26	4	0
Bacterial infection	4	8	0	0
keratinization	1	2	0	0
candida albicans	1	2	0	0
Normal	30	60	46	92

Table 3: Results of cases (cigarette smokers) and duration of usage

Results	Duration		Total
	(2-3 years)	(4-6 years)	
Atypia	0	1	1
Inflammation	11	2	13
Bacterial infection	3	1	4
keratinization	0	1	1
candida albicans	0	1	1
Normal	21	9	30

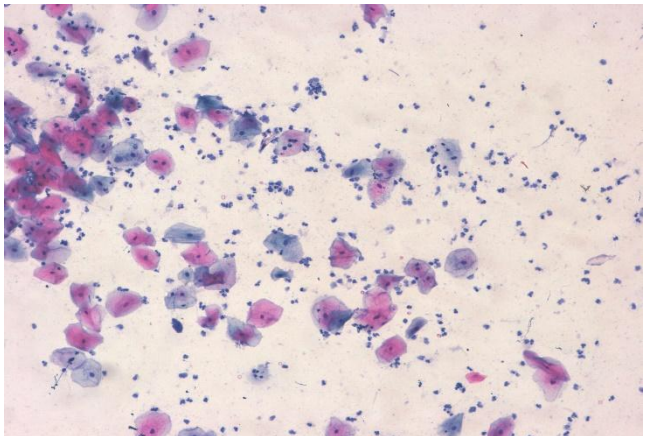

Figure 1: Cytologic sample of buccal mucosa stained by Papanicolaou method showing inflammation (×10).

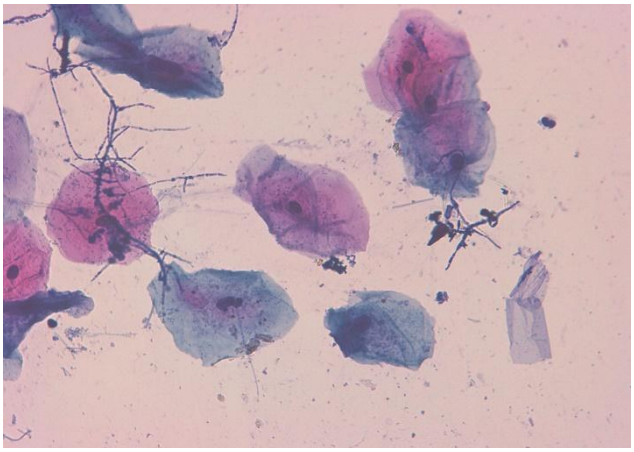

Figure 2: Cytologic sample of buccal mucosa stained by Papanicolaou method showing Candida (×40)

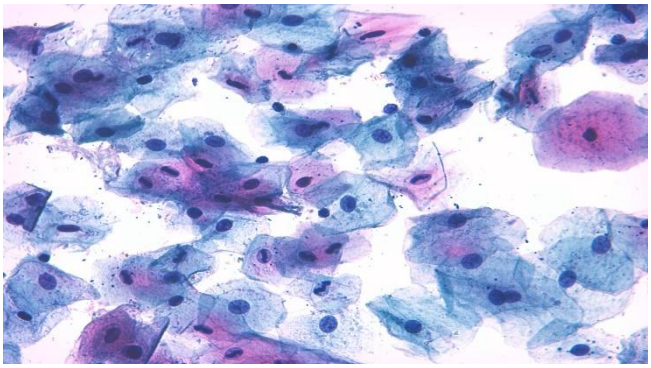

Figure 3: Cytologic sample of buccal mucosa stained by Papanicolaou method showing Atypia (×40)

4. Discussion

Oral exfoliation cytology is a simple and non-invasive method. Diagnostic techniques that can be used for early detection potentially malignant lesions [7]. Cytological assesses parameters such as, nuclear shape, nuclear-cytoplasmic ratio, color density, and vacuolated cytoplasm. These quantitative techniques may increase the sensitivity of exfoliative cytology for the early diagnosis of oral cancers [8]. All major forms of tobacco, such as cigarettes, Cigars, pipes, and smokeless tobacco can cause oral cancer. The present results report the causes of oral cell changes among cigarettes smoking, which is strongly related to cancer risks. With the extension of smoking time, this risk tends to increase. The longer a person is exposed to smoking, the higher the risk [9]. This study shows that smoking is more common among young people (50%), followed by subjects between 30 and 40 years old (34%). These people are at greater risk of oral pathological changes, which may lead to cancer; therefore, it is believed that long-term exposure will increase the risk [9]. In some smears, inflammatory bacteria and white blood cells are present, which indicates that smoking may be related to oral infections. Abdelaziz et al. examined 200 oral smears from cigarettes smoking and observed a significant increase in the number of dyskeratotic cells compared to controls [10].According to reports, prolonged smoking is the cause of pathological changes in the oral mucosa, including dysplasia, increased keratosis, and mitosis [11], and an increase in the ratio of nucleus to cytoplasm has also been observed [12],

5. Conclusion

Cigarette smoking is risk factors for oral atypical cellular changes and possibly oral infection. The degree of change depends on the duration of cigarette smoking.

References

[1] Gupta PC, Sinor PN, Bhonsle RB, Pawar VS, Mehta HC. Oral submucous fibrosis in India: a new epidemic? *Natl Med J India* 1998. May-Jun;11(3):113-116.
[2] Morse DE, Psoter WJ, De La Torre Feliciano T, Cruz G, Figueroa N Am J Public Health. 2008 Jul; 98(7):1200-2.
[3] Hashemipour MA, Aghababaie M, Mirshekari TR, Asadi-Shekaari M, Tahmasbi-Arashlow M, Tahmasbi-Arashlow F, et al. Exfoliative cytology of oral mucosa among smokers, opium addicts and nonsmokers: A cytomorphometric study. Arch Iran Med 2013;16:725-30
[4] Buch AC, Patel SS, Chandanwale SS, Kumar H, Patel KM, Sunita A. Study of oral exfoliative cytology in tobacco chewers of western India. Int J Pharma Bio Sci 2014;4:138-43.
[5] Rajesh S, Reddy SB, Shriniwas K. Cytomorphometric analysis of obtained squames obtained from normal oral mucosa and lesions of oral submucous fibrosis. J Indian Acad Oral Med Radiol 2012;24:200-5.
[6] Goregen M, Akgul HM, Gundogdu C. The cytomorphological analysis of buccal mucosa cells in smokers. Turk J Med Sci 2011; 41:205-10.
[7] Einstein TB, Sivapathasundharm B. Cytomorphometric analyses of the buccal mucosa of tobacco users. Indian J Dent Res 2005; 16: 42-46.
[8] Ogden GR, Cowpe JG, Wight AJ. Oral exfoliative cytology: Review of methods of assessment. J Oral Pathol Med 1997; 26:201-5.
[9] Winn DM. Tobacco use and oral disease. *J Dent Educ* 2001. Apr;65(4):306-312.
[10] Abdelaziz, M. S., & Osman, T. E. Detection of Cytomorphological Changes in Oral Mucosa among Alcoholics and Cigarette Smokers. Oman Med J, 2011; 26(5), 349-352. doi:10.5001/omj.2011.85
[11] Anderson DL. Intraoral site distribution of malignancies and preinvasive malignant cell transformations in dental patients and alcoholics. Acta Cytol 1972. Jul-Aug;16(4):322-326.
[12] Müller P, Hepke B, Meldau U, Raabe G. Tissue damage in the rabbit oral mucosa by acute and chronic direct toxic action of different alcohol concentrations. *Exp Pathol* 1983;24(2-3):171-181.