Tobacco Usage in Relation to the Anatomical Site of Oral Leukoplakia in Imphal, Manipur - An Observational Study

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Abstract

Objective: Tobacco usage is the most important known aetiological factor in the development of oral leukoplakia. The purpose of this study was to investigate the possible relation of tobacco usage to the anatomical site of the leukoplakia.

Subjects and Methods: Clinical data regarding tobacco usage and localisation of leukoplakia obtained from 166 patients with oral leukoplakia.

Results: Leukoplakia in the floor of mouth appeared to be statistically significantly more often present in smokers than in non-smokers, compared to all other oral sites ($P < 0.001$; OR= 8.47 and 18.13 for men and women, respectively). On the contrary, leukoplakias on the borders of the tongue were statistically significantly more common among non-smokers, than smokers, compared to all other oral sites ($P < 0.001$; OR= 0.22 and 0.12 for men and women, respectively).

Conclusion: The present study suggests that the influence of tobacco on the development of Leukoplakia varies by anatomical site.

Keywords: Oral Leukoplakia; Tobacco

INTRODUCTION

Tobacco usage is the most important known aetiological factor in the development of oral leukoplakia. Patients who smoke have a six-fold increased risk of developing leukoplakia of the oral mucosa than non-smokers.[1] Leukoplakia in non-smokers is often referred to as 'idiopathic leukoplakia'. The site of the leukoplakia depends, among other things, on the type of the smoking habit, the quality, and the quantity of the tobacco.[2] The purpose of the present study is to evaluate possible differences between smokers and non-smokers with regard to the anatomical site of their leukoplakia

PATIENTS & METHODS

Data were obtained from 166 patients with oral leukoplakia, who were referred to the Department of Oral Pathology, JNIMS Imphal. Leukoplakia has been defined as a predominantly white lesion of the oral mucosa that cannot be characterized as any other definable lesion.[3]

Since there were only five patients with leukoplakia of the lips, these patients were excluded. The remaining group of 161 patients consisted of 73 men and 88 women. The mean age was 57 years (range 23–91 years).

Data about the usage of tobacco were obtained from the patients records at the time of diagnosis of the leukoplakia. Fifteen patients were excluded from further evaluation, because of insufficient available data about their smoking habits. In the remaining group of 146 patients, a distinction was made only between smokers (almost exclusively cigarettes) and non-smokers.

The localisation of the leukoplakias was specified according to the anatomical distribution recommended by the ICD-DA (WHO, 1995).[4] For analysis of a possible relation of tobacco usage and the localisation of leukoplakia four oral subsites and a category of 'multiple sites' were studied, separately for men and women. The relation was expressed as an odds ratio (OR) with 95% confidence interval. Statistical significance was assessed using the Chi- square test, with P-values less than 0.05 considered significant.

RESULTS

Table 1 shows the distribution of smokers and non-smokers according to gender for the study population of 146 patients, together with the mean ages. Remarkable is the difference in mean age between female smokers and non- smokers.

Table 1: Mean ages (years) and number (n) of men and women with oral leukoplakia in smokers and non-smokers

	Smoker Mean age (n)	*Non-smoker Mean age (n)*	*Mean age (n)*
Men	57.4 (44)	56.6 (24)	57.1 (68)
Women	48.8 (47)	65.6 (31)	55.7 (78)
Overall	53.1 (91)	61.7 (55)	56.4 (146)

Table 2: Distribution of oral (sub)site of the leukoplakia according to smokers (S) and non-smokers (NS), subdivided according to gender

LOCALISATION	MEN		WOMEN		TOTAL
	S	NS	S	NS	
Cheekmucosa (includingCommissures)	11	1	6	5	23
Gingiva upper/lower, palate	6	6	4	3	19
Borderstongue	10	14	7	19	50
Floorofmouth	12	1	17	1	31
Multiplesites	5	12	13	3	23
TOTAL	**44**	**24**	**47**	**31**	**146**

The distribution of smokers and non-smokers according to oral (sub)site of the leukoplakia is shown in Table 2. Leukoplakias of the cheek mucosa, including the com- missures, were found more often in men who smoke, than in men who did not. Among women, this difference was not noted. Leukoplakias in the floor of the mouth appeared to be statistically significantly more often present in smok- ers than in non-smokers, compared to all other oral subsites (both men and women, $P < 0.001$). Leukoplakias on the borders of the tongue were statistically significantly more common among non-smokers than smokers, compared to all other oral subsites (both men and

women, $P < 0.001$). The odds ratios (ORs) for the oral subsites related to the use of tobacco according to gender are shown in Table 3; the total number of all other oral subsites were used as the reference group for each individual subsite.

Table 3: Odds ratios (ORs) for the use of tobacco of oral leukoplakia of the various oral subsites related to all other localisations according to gender.

ORAL SUBSITE	MEN		WOMEN	
	OR	*95%CI*	*OR*	*95%CI*
Cheekmucosa (includingCommissures)	7.54	1.41–39.93	0.82	0.25–2.67
Gingiva Upper/ Lower, Palate	0.48	0.14–1.62	0.93	0.16–5.50
Borderstongue	0.22	0.08–0.62	0.12	0.04–0.34
Floorofmouth	8.47	1.41–50.97	18.13	3.58–91.95
Multiplesites	1.40	0.28–6.99	3.82	0.23–60.25

The highest ORs for men were seen in the floor of mouth and in the cheek mucosa, being 8.47 and 7.54 respectively. The highest OR for women was seen for the floor of mouth (OR=18.13). The lowest OR for men and women was seen for leukoplakias on the borders of the tongue (0.22 and 0.12, respectively).

DISCUSSION

The results of the present study suggest that the influence of tobacco on the development of oral leukoplakia varies by anatomical subsite. This finding is in accordance with that of a study about the role of tobacco related to the anatomical subsite for the development of oral squamous cell carcinoma.[5] Our study shows that in smokers the floor of mouth is the site of predilection for oral leukoplakia, whereas the borders of the tongue are affected statistically significantly more often in non-smokers. The OR of 8.47 in men for a leukoplakia located in the floor of mouth means that leukoplakia in the floor of mouth is approximately 8.5 times more likely to occur in a smoker than in a non-smoker. The accompanying confidence interval (CI) (1.41–50.97) is with 1.41, on the mini- mum side, rather low. However, the OR of 18.13 in women for a leukoplakia located in the floor of mouth shows a rather high CI (minimum of 3.82), which means that leukoplakia in the floor of mouth in women is at least approximately four times more likely to occur in women who smoke than women who do not smoke. There is no explanation for the gender differences with respect to the differences in the site of predilection for leukoplakia in the cheek mucosa in men who smoke, and leukoplakia located in the floor of mouth in women who smoke. Highly speculative would be that men and women would exhibit a different way of placing the cigarette between their lips; men keep their cigarette perhaps more to the side of their lips, while women might keep the cigarette more centred.

The apparently strong local effect of smoking on the development of leukoplakia in the floor of mouth in smokers may be explained by the fact that saliva in this oral subsite acts as a reservoir for carcinogens in tobacco pro- ducts.[6] Furthermore, the degree of keratinisation and the permeability of the oral mucosa may play a role in the local effect of tobacco products.[7,8]Different tobacco habits may play a role in the distribution of leukoplakia in the various oral subsites as well. In The Netherlands, smoking cigarettes is the most common form of tobacco usage (NIPO, 1991). In the present study 64% of the men were smokers, and 60.3% of the women were smokers, whereas the proportion of the adult population in The Netherlands, smoking tobacco is 36.7% and 30.3% for men and women, respectively.[9]Including the proportion of ex-smokers, these percentages for the adult population for men and women would be 56.0% and 45.5%, respectively;[9] still significantly less than the patients with oral leukoplakia in this study, which

supports the causative relation between smoking and the development of oral leukoplakia.

Various reports have suggested a synergistic effect of tobacco and alcohol usage in oral carcinogenesis.[10,11] Alcohol usage alone probably does not play a major role in the aetiology of oral leucoplakia but may have a similar synergistic effect on the development of leukoplakia as has been reported in oral squamous cell carcinoma.[12] The limited information about alcohol consumption in our group of patients did not allow statistical analysis in this respect.

Various reports showed an inreased risk of malignant transformation of leukoplakia in women without smoking habits.[13] This was also the case in the present material, reported elsewhere.[14] The association of an increased risk of malignant transformation of oral leukoplakia in women who do not smoke remains unclear.

CONCLUSION

Tobacco usage in men results significantly more often in leukoplakia of the cheek mucosa, including the commissures, than in men who do not smoke. This difference is not noted among women. Furthermore, leukoplakia of the floor of mouth almost exclusively occurs in smokers, either men or women. Interestingly, leukoplakia of the borders of the tongue is relatively more common in women who do not smoke. The various limitations of the present retrospective study do not allow further speculation about the significance of the above-mentioned observations.

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