

Original Research

Assessment of levels of salivary alkaline phosphatase levels in oral leukoplakia patients

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ABSTRACT:

Background: The present study was undertaken for assessing the salivary alkaline phosphatase levels in oral leukoplakia patients. **Materials & Methods:** A total of 20 patients with presence of oral leukoplakia and 20 healthy controls were enrolled. Only those patients were included in the oral leukoplakia that depicted hyperkeratosis on histopathology with absence of any other definable lesion. Complete demographic details of all the patients were obtained. All the patients were recalled in the morning and salivary samples were obtained in micropipette. All the samples were sent to laboratory where auto-analyze was used for evaluating the salivary alkaline phosphatase levels. **Results:** Mean salivary alkaline phosphatase levels among the patients of the oral leukoplakia group 55.25 U/L and 12.11 U/L respectively. While comparing statistically, significant results were obtained. **Conclusion:** Salivary alkaline phosphatase levels were significantly altered in oral leukoplakia patients.

Key words: Oral Leukoplakia, Alkaline phosphatase

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INTRODUCTION

Oral leukoplakia, being a predominantly white change of the oral mucosa, is the most common potentially (pre)malignant lesion. It is a relatively rare disease with an estimated prevalence of less than 1%. Men and women are more or less equally affected. Oral leukoplakia rarely occurs in the first two decades of life and is much more common in tobacco users than in non-tobacco users. Leukoplakia may occur everywhere in the oral cavity and is often asymptomatic otherwise. The clinical diagnosis is primarily based on visual inspection and manual palpation. There are no other useful diagnostic aids for the clinical diagnosis.¹⁻³ Most, if not all oral squamous cell carcinomas are preceded by clinically visible changes of the oral mucosa. Such changes are often predominantly white, being designated as leukoplakias. At present, oral leukoplakia has been defined as "A predominantly

white plaque of questionable risk having excluded (other) known diseases or disorders that carry no increased risk for cancer". It has been added that leukoplakia is primarily a clinical term and has no specific histology.⁴⁻⁶

Saliva is an oral fluid that has been used as a diagnostic tool in medicine and dentistry. The source of the specimen that can be used for salivary markers are whole saliva, gingival crevicular fluid (GCF) and plaque. Among these, enzymes released from the host can be easily obtained within the oral cavity either from GCF or from the whole saliva. Several enzymes evaluated for the early diagnosis of periodontal disease are lactate dehydrogenase, alkaline phosphatase (ALP), acid phosphatase, aspartate aminotransferase and alanine aminotransferase.⁷⁻⁹ Hence; the present study

was undertaken for assessing the salivary alkaline phosphatase levels in oral leukoplakia patients.

MATERIALS & METHODS

The present study was conducted with the aim of assessing the salivary alkaline phosphatase levels in patients with oral leukoplakia. A total of 20 patients with presence of oral leukoplakia and 20 healthy controls were enrolled. Only those patients were included in the oral leukoplakia that depicted hyperkeratosis on histopathology with absence of any other definable lesion. Complete demographic details of all the patients were obtained. All the patients were recalled in the morning and salivary samples were obtained in micropipette. All the samples were sent to laboratory where auto-analyze was used for evaluating the salivary alkaline phosphatase levels. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Chi-square test and student t test was used for evaluation of level of significance.

RESULTS

Mean age of the patients of the oral leukoplakia group and the control group was 51.2 years and 55.4 years respectively. Among the oral leukoplakia group, there were 14 males and 6 females while in the control group, there were 12 males and 8 females. Mean salivary alkaline phosphatase levels among the patients of the oral leukoplakia group 55.25 U/L and 12.11 U/L respectively. While comparing statistically, significant results were obtained.

Table 1: Comparison of salivary alkaline phosphatase levels

Group	Salivary alkaline phosphate levels	p- value
Oral leukoplakia	55.25 U/L	0.00 (Significant)
Control	12.11 U/L	

DISCUSSION

OL's etiopathogenesis encompasses two broad categories, as follows: OL of unknown etiology or idiopathic and OL associated with tobacco use. OL is more often found among older and elderly men, and its prevalence increases with age advancement. It has been estimated that less than 1% of the affected men are younger than 30 years old and that the prevalence increases to 8% in male patients older than 70 years old and to 2% in female patients of 70 years or more. OL's histopathologic aspects may vary from epithelium atrophy to hyperplasia, which can be associated with varying degrees of epithelial dysplasia.⁶⁻⁸ ALP is a membrane-bound glycoprotein found on most cell membranes in the body and physiologically occurs during bone formation in developmental stages. It is

produced by many cells within the periodontal environment, the principal source being PMNs leukocytes, bacterial fibroblast and osteoblast activity which is disturbed due to diabetes, smoking, etc., pathologically. ALP is one of the potentially powerful markers of periodontal disease activity and ALP levels increases in periodontal diseases.⁸⁻¹⁰ Hence; the present study was undertaken for assessing the salivary alkaline phosphatase levels in oral leukoplakia patients.

In the present study, mean age of the patients of the oral leukoplakia group and the control group was 51.2 years and 55.4 years respectively. Among the oral leukoplakia group, there were 14 males and 6 females while in the control group, there were 12 males and 8 females. Mean salivary alkaline phosphatase levels among the patients of the oral leukoplakia group 55.25 U/L and 12.11 U/L respectively. While comparing statistically, significant results were obtained. Prakash AR et al determined the levels of S-ALP in diagnosing potentially malignant conditions and debilitating diseases in early stages of inflammation and altered cellular metabolism. The study groups include: (1) Group A - 10 smokers who are diabetic. (2) Group B - 10 smokers who are nondiabetic. (3) Group C - 10 nonsmokers who are diabetic. (4) Group D - 10 nonsmokers and nondiabetic as control. Unstimulated saliva samples are collected and run in auto-analyzer with ALP enzyme reagent to analyze ALP levels. Comparison is made between all the four groups. Results were statistically significant with increased activity of ALP levels in saliva from Group A when compared to Group D. The results are Group A > Group B > Group C > Group D. The results also revealed significant raise in levels of ALP levels in saliva from smokers when compared to diabetes. Thus explaining adverse effects of smoking. S-ALP can be considered to be the biomarker for evaluating adverse effects of smoking, diabetes and other debilitating diseases in early stages.¹⁰

Menaka TR et al compared the levels of S-ALP among tobacco users, nonusers and in individuals with OPMD. The study population comprised 42 individuals, categorized into four groups with/without tobacco usage habit and with/without lesion. 5 ml of unstimulated saliva sample was collected, centrifuged at 3000 rpm for 15 min and supernatant separated. S-ALP was estimated in the supernatant by using kinetic photometric method in an automatic analyzer. Data obtained were subjected to statistical analysis. The mean S-ALP was 18.00 IU/L for normal individuals without tobacco usage, 4.60 IU/L for smokers without lesion, 7.50 IU/L for tobacco chewers without any lesion and 64.90 IU/L for individuals with OPMD. The mean difference between the groups was statistically significant (P < 0.001) using Kruskal-Wallis' ANOVA. No statistically significant difference (P > 0.05) was

obtained in the S-ALP levels between tobacco users and nonusers and between smokers and tobacco chewers, using Mann–Whitney U-test. S-ALP levels in individuals with OPMD were statistically significantly higher ($P < 0.001$) than those without lesions, with or without tobacco usage habit, using Mann–Whitney U-test. They concluded that S-ALP could be used as a reliable noninvasive biomarker in monitoring OPMD.¹¹

CONCLUSION

Salivary alkaline phosphatase levels were significantly altered in oral leukoplakia patients.

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