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Original Research

Assessment of salivary alkaline phosphatase levels in oral potentially malignant disorders

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ABSTRACT:
Background: Saliva is a suitable alternative to blood as it is easy to collect and non-invasive and can serve as a tool for early detection of any disease. The present study was conducted to assess salivary alkaline phosphatase levels in oral potentially malignant disorders. **Materials & Methods:** 84 subjects of both genderswere divided into 4 groups of 21 each. Group I – individuals without the habit of smoking or chewing tobacco and without any lesion on intraoral examination, group II – individuals with the habit of chewing tobacco and without any lesion on intraoral examination, group III – individuals with the habit of smoking and without any lesion on intraoral examination and group IV – individualswith the habit of smoking/chewing tobacco and lesions. The saliva was collected through the split technique and the salivary alkaline phosphatase levels were analyzed through the auto-analyzer. **Results:** group I had 15 males and 26 female, group II had 28 males and 13 females, group III had 27 males and 14 females and group IV had 30 males and 11 females. The the mean (IU/L)salivary alkaline phosphatase level in group I was 19.3, in group II was 8.5, in group III was 4.9 and in group IVwas 65.2. The difference was significant (P< 0.05). **Conclusion:** Authors found that salivary alkaline phosphatase levels could be used as a reliable non-invasive biomarker in monitoring of oral potentially malignant disorders.
Key words:

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INTRODUCTION

Early detection of a disease determines the prognosis to a large extent. Saliva is a suitable alternative to blood as it is easy to collect and non-invasive and can serve as a tool for early detection of any disease.[1]Early detection by using saliva as a tool for early diagnosis has following advantages are as follows: readily available, safe, and non-invasive.Saliva plays a vital role in defining the biomarkers for cancer risk as it moistens the complete oral cavity and also reflects many oral diseases including oral cancer.[2]Various medical conditions such as malignancies, metabolic diseases, infections, and autoimmune disorders can all be detected early by salivary biomarkers, and with respect to dental aspect, salivary alkaline phosphatase (ALP) is of prime importance.[3]

In recent years, saliva which is an easily accessible oral fluid has gained acceptance as a diagnostic medium in many health conditions. As it is in close contact with the lesion, it stays to be potential to detect early mucosal changes in tobacco users and in individuals with OPMD.[4] Although few studies have been reported on using alkaline phosphatase (ALP) enzyme levels as a biomarker in serum and saliva of OSCC patients, sufficient studies need to be explored in OPMD.[5]The present study was conducted to assess salivary alkaline phosphatase levels in oral potentially malignant disorders.

MATERIALS & METHODS

The present study comprised of 84 subjects of both genders. The consent was obtained from all enrolled patients.

Data such as name, age, gender etc. was recorded. They were divided into 4 groups of 21 each. Group I – individuals without the habit of smoking or chewing tobacco and without any lesion on intraoral

examination, group II – individuals with the habit of chewing tobacco and without any lesion on intraoral examination, group III – individuals with the habit of smoking and without any lesion on intraoral examination and group IV – individualswith the habit of smoking/chewing tobacco and lesions. From all collection of 5 mL of unstimulated saliva was done from the patients under aseptic conditions. The saliva was collected through the split technique. The saliva samples were then subjected to centrifugation at 3000 rotations per minute for 15 min to separate the supernatant saliva. The 20 µL of the remaining sample was mixed with the ALP reagent in the ERBA Mannheim kit and the salivary alkaline phosphatase levels were analyzed through the auto-analyzer. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Male	Female
Group I	15	26
Group II	28	13
Group III	27	14
Group IV	30	11

Table I, graph I shows that group I had 15 males and 26 female, group II had 28males and 13 females, group III had 27males and 14 females and group IV had 30males and 11 females.

Graph I Distribution of patients

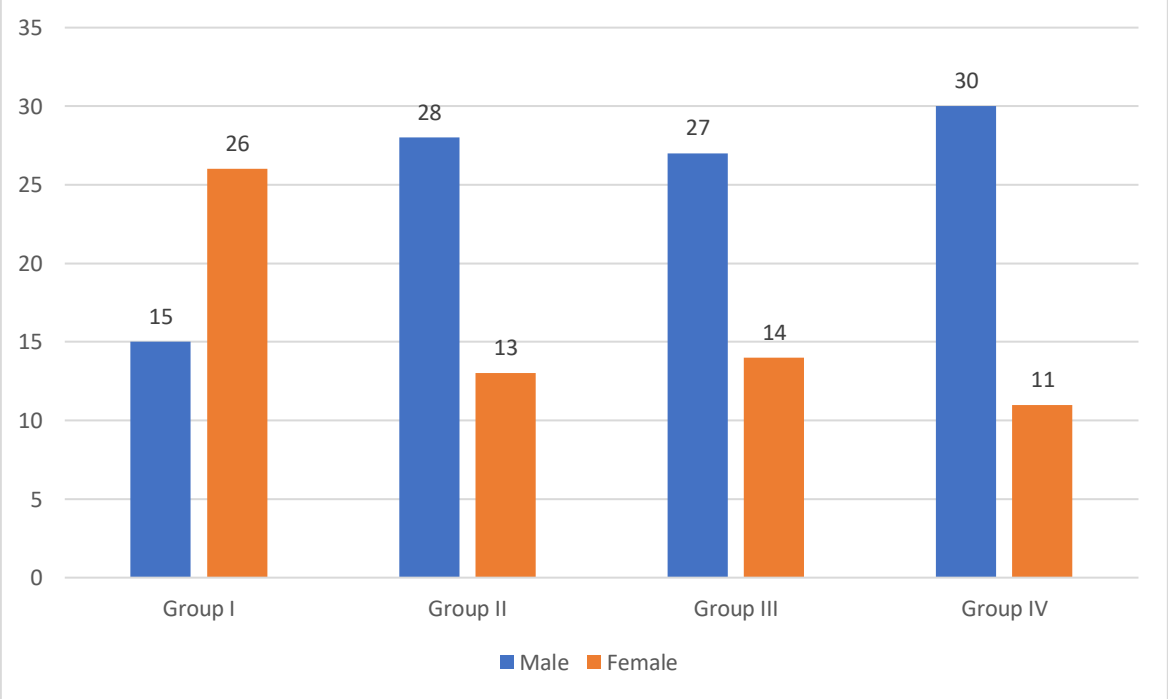
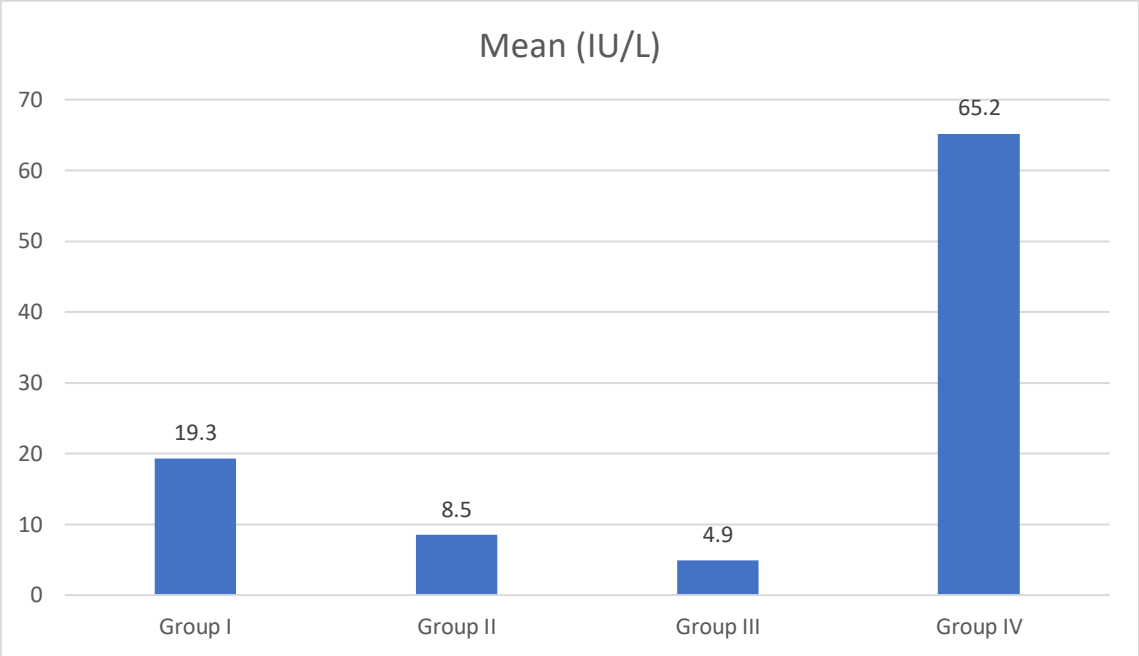


Table II Assessment of salivary alkaline phosphatase levels

Groups	Mean (IU/L)	P value
Group I	19.3	0.001
Group II	8.5	
Group III	4.9	
Group IV	65.2	

Table II, graph II shows that the mean (IU/L) salivary alkaline phosphatase level in group I was 19.3, in group II was 8.5, in group III was 4.9 and in group IV was 65.2. The difference was significant (P< 0.05).

Graph II Assessment of salivary alkaline phosphatase levels



DISCUSSION

Potentially malignant diseases (PMD) of the oral mucosa are relatively common, which include oral leukoplakia, erythroplakia, and oral submucous fibrosis. Leukoplakia is one of the most common potentially malignant lesions of the oral mucosa.[6] Diagnosis is made based on clinical history and examination of the lesion, though biopsy is necessary for the confirmation of the diagnosis. Biopsy is the gold standard for cancer diagnosis currently, but the process of biopsy has few pitfalls when diagnosing early-stage lesions.[7] There are various non-invasive techniques in detecting oral premalignancies, which include vital tissue staining with toluidine chloride, various visualization adjuncts, which include ViziLite, Microlux DL system, Orascoptic DK system, and VELscope system and cytopathology by OralCDx Brush Test system. But these techniques are expensive, and the patients will not be willing to afford it for an asymptomatic lesion. Several studies have been conducted to analyze the salivary biomarkers in oral cancer and oral precancer.[8,9]The present study was conducted to assess salivary alkaline phosphatase levels in oral potentially malignant disorders.

We found that group I had 15 males and 26 female, group II had 28 males and 13 females, group III had 27 males and 14 females and group IV had 30 males and 11 females. Prakash AR et al[10]evaluated ALP activity of smokers and healthy non-smoker along with patients who were diabetic, potentially malignant, and malignant. A total of 150 smokers, non-smokers, and patients who were diabetic, potentially malignant, and malignant were included. Collection of unstimulated whole saliva was done from each participant, and salivary ALP levels were measured by spectrophotometric assay. Mean salivary ALP levels were significantly higher in smokers compared to those in non-smokers. Mean ALP levels were also increased in patients who were diabetic, potentially malignant, and malignant compared to those in controls.

We found that the mean (IU/L) salivary alkaline phosphatase level in group I was 19.3, in group II was 8.5, in group III was 4.9 and in group IVwas 65.2. Menaka et al[11]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. 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. No statistically significant difference was obtained in the S-ALP levels between tobacco users and non-users and between smokers and tobacco chewers. S-ALP levels in individuals with OPMD were statistically significantly higher than those without lesions, with or without tobacco usage habit.

Sridharan et al[12]found that Alteration in activity enzymes such as ALP, serum glutamic oxaloacetic transaminase, and serum glutamic pyruvic transaminase, is a major feature in DM, which is caused due to insulin insufficiency. Increased susceptibility to infections due to increased activity of opportunistic microorganisms that are predominant in oral microflora is seen in DM.

CONCLUSION

Authors found that salivary alkaline phosphatase levels could be used as a reliable non-invasive biomarker in monitoring of oral potentially malignant disorders.

REFERENCES

1. Acharya S, Kale J, Rai P, Anehosur V, Hallikeri K. Serum alkaline phosphatase in oral squamous cell carcinoma and its association with clinicopathological characteristics. South Asian J Cancer 2017;6:125-8.
2. Muddugangadhar BC, Sangur R, Rudraprasad IV, Nandeeshwar DB, Kumar BH. A clinical study to compare between resting and stimulated whole salivary flow rate and pH before and after complete denture placement in different age groups. J Indian Prosthodont Soc 2015;15:356-66.
3. Prakash AR, Indupuru K, Sreenath G, Kanth MR, Reddy AV, Indira Y. Salivary alkaline phosphatase levels speak about association of smoking, diabetes and potentially malignant diseases??? J Oral MaxillofacPathol2016;20:66-70.
4. Bains SK, Bhatia A, Kaur M. Prevalence of tobacco usage & its deleterious effects among study population. Int J Res Health Allied Scie. 2017; 3 (5): 67-69.
5. Jazaeri M, Malekzadeh H, Abdolsamadi H, Rezaei-Soufi L, Samami M. Relationship between salivary alkaline phosphatase enzyme activity and the concentrations of salivary calcium and phosphate ions. Cell J 2015;17:159-62.
6. Mishra GA, Pimple SA, Shastri SS. An overview of the tobacco problem in India. Indian J Med Paediatr Oncol 2012;33:139-45.
7. Chadda R, Sengupta S. Tobacco use by Indian adolescents. Tob Induc Dis 2002;1:111-9.
8. Xue J, Yang S, Seng S. Mechanisms of cancer induction by tobacco-specific NNK and NNN. Cancers (Basel) 2014;6:1138-56.
9. Bains SK, Bhatia A, Kaur M. Prevalence of tobacco usage & its deleterious effects among study population. Int J Res Health Allied Scie. 2017; 3 (5): 67-69.
10. Prakash AR, Nahar P, Ashtekar M, Natarajan S, Singh R, Kulkarni G. Detection of salivary alkaline phosphatase levels in smokers, diabetic patients, potentially malignant diseases and oral malignant tumours. J Pharm Bioall Sci 2020;12, Suppl S1:430-5.
11. Menaka TR, Vasupradha G, Ravikumar SS,Dhivya K, Dinakaran J, Saranya V. Evaluation of salivary alkalinephosphatase levels in tobacco users to determine its role as a biomarker intaoral potentially malignant disorders. J Oral MaxillofacPathol2019;23:344-8.
12. Sridharan S, Sravani P, Satyanarayan A, Kiran K, Shetty V Salivary alkaline phosphatase as a non-invasive marker for periodontal disease in children with uncontrolled type 1 diabetes mellitus. J Clin Pediatr Dent 2017;41:70-4.