

ORIGINAL RESEARCH

Is salivary copper level a marker of oral pre-malignancy?

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ABSTRACT:

Background: Oral leukoplakia (OL) is the most common precancer representing bulk of such lesions. Alcohol, viruses, genetic mechanisms, candida and chronic irritation have modifying effects in the etiology of oral cancer. Hence; the present study was commenced undertaken for assessing the salivary copper levels in patients with oral pre-cancerous lesions. **Materials & methods:** 35 patients with histopathologic confirmed diagnosis of oral pre-malignant lesions and 35 Healthy controls with absence of any form of oral lesion. Unstimulated salivary samples were obtained from all the patients in sterilized vials. All the samples were sent to laboratory where an auto-analyser was used for assessing the salivary copper levels. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Mann Whitney U test was used for assessment of level of significance. **Results:** Mean copper concentration in the saliva among the patients of the premalignant lesion group was 70.69 ppb and found to be significantly higher in comparison to the patients of the healthy controls where it was found to be 20.13 ppb. **Conclusion:** Salivary copper levels are significantly altered in patients with premalignant lesions in comparison to healthy controls.

Key words: Copper, Pre-malignancy, Salivary

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INTRODUCTION

Oral leukoplakia (OL) is the most common precancer representing 85% of such lesions. Alcohol, viruses, genetic mechanisms, candida and chronic irritation have modifying effects in the etiology of oral cancer. Trace elements are regarded as versatile anti-cancer agents that regulate various biological mechanisms. Many researchers have observed association between trace elements and cancer mortality. Decrease in contents of Copper (Cu) and Zinc (Zn) in the blood of patients with head and neck cancer.¹⁻³

The aetiology of this high incidence is not fully known. The high incidence was attributed to several factors such as chewing, smoking and viral infections. Whatever may be the causative factors, very little information is available on the biochemical and immunological derangements.⁴ Hence; the present study was commenced undertaken for assessing the salivary copper levels in patients with oral pre-cancerous lesions.

MATERIALS & METHODS

Study population

35 patients with histopathologic confirmed diagnosis of oral pre-malignant lesions

35 Healthy controls with absence of any form of oral lesion

Ethical clearance

Ethical approval was obtained before the starting of the study and written consent was obtained from all the patients.

Salivary samples

Unstimulated salivary samples were obtained from all the patients in sterilized vials. All the samples were sent to laboratory where an auto-analyser was used for assessing the salivary copper levels.

Statistical analysis

All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Mann Whitney U test was used for assessment of level of significance.

RESULTS

In the present study, analysis of a total of 35 patients with presence of premalignant lesions and 35 healthy controls was done. Among the patients of the premalignant lesion group, 10, 14 and 11 patients belonged to the age group of less than 30 years, 30 to 40 years and more than 40 years respectively. Among the patients of the healthy control group, 12, 13 and 10 patients belonged to the age group of less than 30 years, 30 to 40 years and more than 40 years respectively. There were 21 males and 14 females in the premalignant lesion group and 19 males and 16 females in the healthy control group. Age and gender wise distribution of patients of both the study groups was comparable. In the present study, mean copper concentration in the saliva among the patients of the premalignant lesion group was 70.69 ppb and found to be significantly higher in comparison to the patients of the healthy controls where it was found to be 20.13 ppb.

Graph 1: Demographic profile

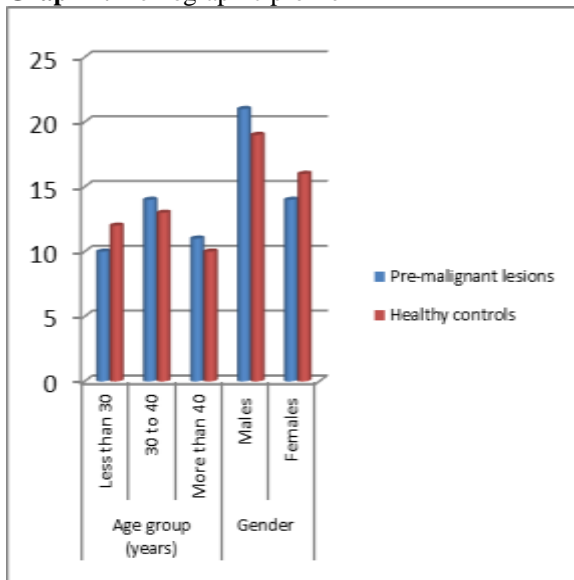


Table 2: Salivary copper levels

Salivary levels	Pre-malignant lesion group	Healthy control group
Copper (ppb)	70.69	20.13
U Value	-1.528	
p- value	0.000 (Significant)	

DISCUSSION

Trace element (TE) refers to the chemical elements, which are present or required in minute quantities. These TEs play an imperative role in numerous physiological and metabolic processes in humans. Metal ions are necessary for humans as >25% of the enzymes need to be activated by them. Recent technological advances have made saliva as a tool for the diagnosis of many things; among them are hormone imbalances, liver function, immunodeficiency and even cancer.⁵⁻⁹ Hence; the present study was commenced undertaken for assessing the salivary copper levels in patients with oral pre-cancerous lesions.

In the present study, analysis of a total of 35 patients with presence of premalignant lesions and 35 healthy controls was done. Among the patients of the premalignant lesion group, 10, 14 and 11 patients belonged to the age group of less than 30 years, 30 to 40 years and more than 40 years respectively. Among the patients of the healthy control group, 12, 13 and 10 patients belonged to the age group of less than 30 years, 30 to 40 years and more than 40 years respectively. There were 21 males and 14 females in the premalignant lesion group and 19 males and 16 females in the healthy control group. Age and gender wise distribution of patients of both the study groups was comparable. Hosthor SS et al estimated serum levels of trace elements (copper, iron, magnesium, zinc and calcium) using electronic absorption colorimetric method. These levels were compared with controls and statistically evaluated using ANOVA and POST-HOC TUKEY tests. The data analysis revealed that serum copper levels increased gradually from precancer to cancer, as the duration of betel quid chewing habit increased. However, serum iron, magnesium, zinc levels were decreased significantly in both the groups. Serum calcium levels were increased in the cancer group owing to bone resorption in the later stages of the disease, whereas it was close to normal in OSF patients. Among all the trace elements, the best predictor for occurrence of both the lesions was copper. Their study showed that the above trace elements may be associated with the pathogenesis and progression of OSF and OSCC.¹⁰

In the present study, mean copper concentration in the saliva among the patients of the premalignant lesion group was 70.69 ppb and found to be significantly higher in comparison to the patients of the healthy controls where it was found to be 20.13 ppb. Ayinampudi BK et al evaluated the levels of copper and zinc and copper/zinc ratio in saliva of premalignant and malignant lesions of oral cavity, because of the anatomical proximity of the saliva to both premalignant and malignant oral neoplasms. The levels of copper and zinc were estimated in the saliva of 5 patients with oral submucous fibrosis, 5 patients with oral leukoplakia, 5 patients with oral lichen planus and 10 patients with oral squamous cell carcinoma of oral cavity using inductively coupled mass spectrometry (ICP- MS). The values were compared with 6 normal age and sex matched control subjects. There was significant difference of the mean salivary copper and zinc levels of premalignant and malignant lesions when compared to the normal controls. In oral cancer patients there was significant difference in the copper levels according the histodifferentiaton in squamous cell carcinoma. Within the premalignant group the copper levels were more in the oral sub mucous fibrosis when compared to the leukoplakia and lichen planus. Copper zinc ratio decreased in premalignant and malignant group when compared to the normal group. Saliva may be used as a potential diagnostic tool, which can be efficiently employed to evaluate the copper and zinc levels in pre malignant and malignant lesions of oral cavity.¹¹

CONCLUSION

Salivary copper levels are significantly altered in patients with premalignant lesions in comparison to healthy controls. However; further studies are recommended.

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