International Journal of Research in Health and Allied Sciences

Journal home page: www.ijrhas.com

Official Publication of "Society for Scientific Research and Studies" [Regd.]

ISSN: 2455-7803

ORIGINAL RESEARCH

Estimation of salivary copper levels in patients with oral pre-cancerous and cancerous lesions: A comparative study

Spinder Kour[1], Adil Rasool Malik[2]

[1]MDS, Oral Pathology, Private Consultant, Srinagar, J&K, [2]MDS, Oral pathology, Working at directorate health services, Kashmir

ABSTRACT:

Background: A very high incidence of oral cancer has been reported from Kerala, South India, compared to other parts of the world. Altered trace element status has been reported in both the potentially malignant and malignant stages. Hence; under the light of above mentioned data, the present study was undertaken for estimating salivary copper levels in patients with oral pre-cancerous and cancerous lesions. **Materials & methods:** A total of 40 subjects were included in the present study. All the patients were broadly divided into two study groups as follows: Group 1: 20 patients with precancerous lesions, and Group 2: 20 patients with cancerous conditions. 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. **Results:** Mean copper levels of the subjects of group 1 and group 2 were 76.2 ppb and 95.8 ppb respectively. Significant results were obtained while comparing the mean salivary copper levels among subjects of group 1 and group 2. **Conclusion:** Alteration in salivary copper levels does occur in patients with premalignant and malignant disorders. However; further studies are recommended.

Key words: Copper, Malignant, Zinc

Received: 10 November, 2018 **Revised:** 18 November, 2018 **Accepted:** 22 November, 2018

Corresponding author: Dr. Spinder Kour, MDS, Oral Pathology, Private Consultant, Srinagar, J&K

This article may be cited as: Kour S, Malik AR. Estimation of salivary copper levels in patients with oral pre-cancerous and cancerous lesions: A comparative study. Int J Res Health Allied Sci 2018; 4(6):11-13.

INTRODUCTION

Oral cancer is one of the 10 most common forms of cancer among men in developed countries and is ranked as the sixth most common cancer around the world. Oral cancer accounts for approximately 4% of all cancers and 2% of all cancer deaths worldwide. A very high incidence of oral cancer has been reported from Kerala, South India, compared to other parts of the world. Similarly, the incidence of precancerous lesions of the oral cavity such as oral leukoplakia and oral submucous fibrosis is also very high.[1-3]

The etiology 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] Altered trace element status has been reported in both the potentially malignant and malignant stages. Microminerals are well established to be essential in metabolism as components of enzymes and hormones in the body.[5] Hence; under the light of above mentioned data, the present study was undertaken for estimating salivary copper levels in patients with oral pre-cancerous and cancerous lesions.

MATERIALS & METHODS

The present study was commenced with the aim of estimation of salivary copper levels in patients with oral pre-cancerous and cancerous lesions. A total of 40 subjects were included in the present study. All the patients were broadly divided into two study groups as follows:

- Group 1: 20 patients with precancerous lesions,
- Group 2: 20 patients with cancerous conditions

For the present study, inclusion of only those patients was done in which confirmatory diagnosis was based on histopathologic examination. 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

The present study was undertaken for estimating salivary copper levels in patients with oral pre-cancerous and cancerous lesions. A total of 20 patients with precancerous lesions and 20 patients with cancerous lesions were enrolled in the present study. Mean age of the patients of group 1 and group 2 was 39.8 years and 42.1 years respectively. There were 12 males and 8 females in group 1 while there were 13 males and 7 females in group 2.

In the present study, mean copper levels of the subjects of group 1 and group 2 was 76.2 ppb and 95.8 ppb respectively. Significant results were obtained while comparing the mean salivary copper levels among subjects of group 1 and group 2.

Table 1: Demographic profile

Parameter		Group 1	Group 2
Age group (years)	Less than 35	6	6
	35 to 45	8	7
	More than 45	6	7
Gender	Males	12	13
	Females	8	7

Table 2: Salivary copper levels

Salivary levels	Group 1	Group 2	p- value
Copper (ppb)	76.2	95.8	0.00 (Significant)

DISCUSSION

In India OSCC accounts for 50-70% of all cancers. Around 90-95% of oral cancers occur predominantly in alcohol and tobacco users, between the 6th and 7th decades of life. Despite the large amount of research data in cellular and molecular biology and advances in oncology and surgery, the mortality and morbidity rates in OSCC patients remain unchanged.[4- 6]

The present study was undertaken for estimating salivary copper levels in patients with oral pre-cancerous and cancerous lesions. A total of 20 patients with precancerous lesions and 20 patients with cancerous lesions were enrolled in the present study. Mean age of the patients of group 1 and group 2 was 39.8 years and 42.1 years respectively. There were 12 males and 8 females in group 1 while there were 13 males and 7 females in group 2. Varghese I et al assessed the serum copper and zinc levels in premalignant and malignant lesions of the oral cavity. Serum levels of copper and zinc were analysed in 50 patients with oral cancer, 50 patients with oral leucoplakia, and 50 patients with oral submucous fibrosis, and the values were compared with those of 50 normal healthy adult controls. There was a significant reduction in the serum copper and zinc levels in both oral submucous fibrosis and oral cancer. The copper/zinc ratio was found to be elevated in oral submucous fibrosis and depressed in oral cancer. The ratio may serve as a good indicator for the early detection of oral cancer.[9] Sachdev PK et al performed a meta-analysis to summarize studies that report zinc (Zn), copper (Cu), and iron (Fe) in patients, with and without OSF. A literature search of Embase, PubMed, Cochrane Library, and Web of Science electronic databases was conducted for studies up to January 2017. A total of 34 reports met the inclusion criteria. The standardized mean difference was utilized as the effect size. The robust variance estimation method was chosen to handle dependency of multiple related outcomes in meta-analysis. There was a significant increase in the levels of Cu and a significant decrease in levels of Zn and Fe in OSF patients. The estimation of Zn, Cu, and Fe levels may serve as additional biomarkers in the diagnosis and prognosis of OSF along with the clinical features.[10]

In the present study, mean copper levels of the subjects of group 1 and group 2 was 76.2 ppb and 95.8 ppb respectively. Significant results were obtained while comparing the mean salivary copper levels among subjects of group 1 and group 2. 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.[11]

CONCLUSION

From the above results, the authors concluded that alteration in salivary copper levels does occur in patients with premalignant and malignant disorders. However; further studies are recommended.

REFERENCES

1. Khanna S. Immunological and Biochemical Markers in Oral Carcinogenesis: The Public Health Perspective. Int J Environ Res Public Health 2008;5:418-22.
2. Nasulewicz A, Mazur A, Opolski A. Role of copper in tumour angiogenesis: Clinical implications. J Trace Elem Med Biol 2004;18:1-8.
3. Miceli MV, Tatejr DJ, Alcock NW, Newsome DA. Zinc deficiency and oxidative stress in the retina of pigmented rats. Invest Ophthalmol Vis Sci 1999;40:1238-44
4. WHO. Trace-Elements in Human Nutrition. Report of a WHO Expert Committee, WHO Technical Report Series, No. 532. Geneva, Switzerland: World Health Organization; 1973.
5. Tadakamadla J, Kumar S, GP M. Evaluation of serum copper and iron levels among oral submucous fibrosis patients. Med Oral Patol Oral Cir Bucal 2011;16:e870-3.
6. Hannen EJ, Riediger D. The quantification of angiogenesis in relation to metastasis in oral cancer: A review. Int J Oral Maxillofac Surg 2004;33:2-7.
7. World Health Organization. Trace Elements in Human Nutrition and Health. World Health Organization; 1996.
8. Ayinampudi BK, Narsimhan M. Salivary copper and zinc levels in oral pre-malignant and malignant lesions. J Oral

Maxillofac Pathol. 2012;16(2):178–182. doi:10.4103/0973-029X.98452
9. Varghese I, Sugathan CK, Balasubramoniyan G, Vijayakumar T. Serum copper and zinc levels in premalignant and malignant lesions of the oral cavity. Oncology. 1987;44(4):224-7.
10. Sachdev PK, Freeland-Graves J, Beretvas SN, Sanjeevi N. Zinc, Copper, and Iron in Oral Submucous Fibrosis: A Meta-Analysis. Int J Dent. 2018;2018:3472087. Published 2018 Jun 26. doi:10.1155/2018/3472087
11. Hosthor SS, Mahesh P, Priya SA, Sharada P, Jyotsna M, Chitra S. Quantitative analysis of serum levels of trace elements in patients with oral submucous fibrosis and oral squamous cell carcinoma: A randomized cross-sectional study. J Oral Maxillofac Pathol. 2014;18(1):46–51. doi:10.4103/0973-029X.131902