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Original Research

Analysis of salivary copper and zinc levels in oral cancer patients: A case control study

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ABSTRACT:
Background: In the head and neck, oral cancer is the most common malignant tumour, with more than 300,000 new cases and 145,000 fatalities each year worldwide. In order to determine if the trace elements had any part in the aetiology of cancer, they were thoroughly examined in recent years. Therefore, in consideration of the aforementioned information, the current study was conducted to measure the copper and zinc levels in patients with oral cancer who had saliva. **Materials & methods:** A total of 50 patients with oral cancer and 50 healthy controls were included in the study. Only individuals whose diagnosis of oral cancer was verified by a histological examination were included in the study. Salivary samples were taken from each patient who was summoned back in the morning. All samples were delivered to the lab, where the copper and zinc levels in the saliva were measured using an auto-analyser. SPSS software was used to record and interpret each outcome. **Results:** A total of 50 oral cancer patients and 50 healthy controls were included in the study. Patients in the oral cancer group and the control group had median ages of 44.2 and 47.9 years, respectively. The remaining patients were female, with 32 in the control group and 36 in the oral cancer group being men. Patients in the oral cancer group and the control group had mean salivary copper concentrations of 19.78 ppb and 83.67 ppb, respectively. Patients with oral cancer and controls had median salivary zinc levels of 131.56 ppb and 164.24 ppb, respectively. It was discovered through statistical comparison that the mean salivary zinc and copper levels among patients with oral cancer were considerably lower than those of the healthy controls. **Conclusion:** Copper and zinc are involved in the pathogenesis of head and neck malignancies.
Key words: Oral cancer, Salivary, Copper, Zinc

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INTRODUCTION

Oral cancer is a malignant neoplasia which arises on the lip or oral cavity. Is traditionally defined as a squamous cell carcinoma (OSCC), because in the dental area, 90% of cancers are histologically originated in the squamous cells.[1] It has different levels of differentiation and a propensity for lymph node metastasis.[2] Oral cancer is a preventable disease, where smoking and alcohol-considered major risk factors-are present in 90% of cases, having them both a synergic effect.[3,4]

Trace elements play, directly or indirectly, an important role in various physiological metabolic processes in humans. More than 25% of the enzymes in the body need to be activated by metal ions to carry out their metabolic functions.5 Bioelements e.g. Copper and zinc are involved in vital biochemical activities like different redox and free radical formation and in maintaining cellular proton homeostasis.[6] Copper is present in many enzymes involved in oxidation (Tyrosinase, ceruloplasmin, amine oxidase, cytochrome oxidase). Zinc is involved

in carbonic acid (carbonic anhydrase), in proteolysis (carboxy peptidase, leucine amino peptidase, etc.).[7]
Hence; under the light of abovementioned data, the present study was undertaken for assessing the salivary copper and zinc levels in oral cancer patients.

MATERIALS & METHODS

The present study was conducted with the aim of assessing the salivary copper and zinc levels in oral cancer patients. A total of 50 patients with oral cancer and 50 healthy controls were included in the study. Only individuals whose diagnosis of oral cancer was verified by a histological examination were included in the study. Salivary samples were taken from each patient who was summoned back in the morning. All samples were delivered to the lab, where the copper and zinc levels in the saliva were measured using an auto-analyser. SPSS software was used to record and interpret each outcome.

RESULTS

A total of 50 oral cancer patients and 50 healthy controls were included in the study. Patients in the oral cancer group and the control group had median ages of 44.2 and 47.9 years, respectively. The remaining patients were female, with 32 in the control group and 36 in the oral cancer group being men. Patients in the oral cancer group and the control group had mean salivary copper concentrations of 19.78 ppb and 83.67 ppb, respectively. Patients with oral cancer and controls had median salivary zinc levels of 131.56 ppb and 164.24 ppb, respectively. It was discovered through statistical comparison that the mean salivary zinc and copper levels among patients with oral cancer were considerably lower than those of the healthy controls.

Table 1: Comparison of salivary copper and zinc levels

Salivary levels	Oral cancer patients	Healthy controls	p- value
Copper (ppb)	19.78	83.670	0.03 (Significant)
Zinc (ppb)	131.56	164.24	0.02 (Significant)

DISCUSSION

India has one of the highest incidences of oral cancer in the world. The development of cancer is a multistep process arising from pre-existing potentially malignant lesions. 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.[8,9] 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.

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Amit kumar et al[10] suggested that zinc deficiency impair protective mechanism designed to protect against DNA damage, enhance susceptibility to DNA damaging agents and ultimately increased risk of cancer.
Yunus et al concluded that alterations in serum copper, zinc, copper zinc ratio can be used as potential biomarkers in early detection of oral pre-cancerous lesion and their malignant transformation to frank cancer at early stages.[11] In the present study the ratio was 1.43 in control, and increased to 2.86 in the study group, probably due to increased copper values. Other reports have shown that Cu/Zn ratio was 0.97 in health and 1.10 in cancer patients, but the diff was not statistically significant.[12,13]

CONCLUSION

Copper and zinc are involved in the pathogenesis of head and neck malignancies.

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