RELEVANCE OF TRACE ELEMENTS IN INITIATION AND PROGRESSION OF ORAL CANCER

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Despite great improvements in the oral health status of populations across the world, the burden and impact of oral cancer is high. This is particularly true among underprivileged groups in both developed and developing countries. The survival rate has not improved over past decades and an alarming increase in oral pre-cancer (Oral Submucous Fibrosis and Leukoplakia) in the youth has been documented. Recent research shows that variation in trace element profile has a broad impact in the process of oral carcinogenesis. In India excessive consumption of smokeless and smoked tobacco & associated products are prominent risk factors. Proactive intervention would help in early diagnosis, management and monitoring the efficacy of treatment. Our studies were designed to evaluate the variation of serum trace elements (Copper, Zinc, Iron, Selenium & Molybdenum) concentration in the oral cancer, oral submucous fibrosis and leukoplakia groups as compared to controls and assess the parameters as potential biomarkers for malignant transformation and progression. The results indicate socio-cultural factors and duration of use pertaining to tobacco related practices and bring forth stark grass root realities. We further characterized the role of Copper, Zinc, Iron, Selenium and Molybdenum in the regulation of trace elements in the groups. Flame Atomic Absorption Spectrometry, Oxalyl Dihydrazide method, Dipyridyl method, Differential Pulse Cathodic Stripping voltametry and Graphite Atomic Absorption Spectrometry techniques were employed. Data analysis revealed a progressive and remarkable alteration in serum trace element concentration as levels of copper was elevated, zinc was marginally elevated whereas Iron, Selenium and Molybdenum were lowered. We found an inverse association between Cu/Zn ratio in cancer as compared to cancer free controls. Furthermore there was a pattern evident in the fluctuation of levels among the histopathologically well-differentiated, moderately differentiated and poorly differentiated oral squamous cell carcinomas. Our results indicate overall that the alteration in the serum trace element profile may affect the initiation and progression of oral carcinogenesis. We recently reported that probable predictors for disease in pre-cancer group are serum Molybdenum and Selenium. In the cancer group age, Copper, Molybdenum & Selenium were identified as potential biomarkers for disease occurrence and progression. Further research with larger population would throw more light on these biochemical markers and their relevance in combating oral cancer.

Keywords: Oral cancer, oral submucous fibrosis, leukoplakia, trace element.