SERUM BIOMARKERS IN ORAL PRECANCER AND SQUAMOUS CELL CARCINOMA

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Abstract: Oral Cancer is the most common cancer in the Indian subcontinent mainly due to excessive use of smokeless tobacco and areca nut. Alteration in trace element profile, Circulating Immune Complexes (CIC) and its modifying effects in the process of carcinogenesis warrants further investigation. The aim was to evaluate the levels of Selenium (Se), Molybdenum (Mo), Copper (Cu), Zinc (Zn), Iron (Fe) and CIC in serum of patients of precancer (Submucous Fibrosis, Leukoplakia and Squamous Cell Carcinoma (SCC)} and analyze the alterations of these parameters. An attempt was also made to identify predictors amongst these parameters for disease occurrence and progression. Cu/Zn ratio was also determined in precancer and cancer. Proforma based evaluation formed a part of assessment of 180 subjects in two randomised controlled studies. Serum estimation of Selenium was carried out with Differential Pulse Cathodic Stripping Voltametry and Graphite Atomic Absorption Spectrometry. Estimation of Molybdenum was done by Graphite Atomic Absorption Spectrometry. Serum Copper and Zinc was determined using Flame Atomic Absorption Spectrometry and Oxalyl Dihydrazide methods. Levels of CIC were determined by Polyethylene Glycol serum precipitation. Assessment of age, gender, educational status, presence and duration of tobacco related practices brought forth stark socio-cultural challenges. Data analysis revealed serum levels of Mo and Se were significantly decreased in the precancer and SCC groups. There was marked and progressive increase in copper levels in precancer and SCC groups. Cu/Zn ratio was elevated in the cancer and precancer groups. The levels of Fe were significantly decreased in precancer and SCC groups. The levels of Zn were marginally elevated in the precancer and cancer. The potential predictors for disease occurrence and progression in precancer group were serum Mo and Se. In the SCC group age, Cu, Mo & Se were identified as probable predictors for disease progression. The levels of CIC were significantly increased in the precancer and SCC groups indicating an immunological perspective. These studies show alteration of serum levels of Se, Mo, Cu, Zn, Fe & CIC in precancer and SCC. An attempt was also made to identify these parameters as predictors for disease occurrence and progression. These serum biomarkers may be associated with pathogenesis of oral premalignant and malignant lesions and also serve as an additional tool for predicting the malignant potential of precancer.

Keywords: Oral Squamous Cell Carcinoma, Oral Submucous Fibrosis, Selenium, Molybdenum, Copper, Zinc, Iron and Circulating Immune Complexes