

Correlation between Serum Heavy Metals and the Risk of Oral Cancer and Premalignant Lesion Development

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Oral cancer is a malignant tumor that develops in the lip or oral cavity, is typically categorized as Oral squamous cell carcinoma (OSCC). The examination of the connection between exposure to heavy metals and the probability of developing oral cancer and oral potentially malignant disorders (OPMD) has been limited in its scope, and the overall consequences of such exposure remain largely unknown. Hence, this study was conducted to identify the serum levels of heavy metals and the risk of OSCC and OPMD development. The amounts of a panel of 7 heavy metals (Cr, Zn, As, Co, Cu, Cd, and Pb) in serum samples from 60 cases (15 from OSCC, Oral lichen planus, Oral submucous fibrosis and Oral leukoplakia) and 15 controls in the Sri Lankan cohort were determined using ICP-OES (Inductively coupled plasma-optical emission spectrometry). The cohort consisted of 48 men and 27 women, with 15 patients each diagnosed with OSCC, OSF, OLK, and OLP, and 15 healthy controls. The study used the Kruskal-Wallis Test to compare metal concentrations across groups, finding significant differences for all metals except As and Pb. Significant associations were observed between age, past medical history, drug history, gender, smoking, alcohol consumption, and betel chewing. The Spearman Correlation test showed significant correlations between the concentrations of Cr, Co, Cu, As, and Zn and the presence of cancer/precancer conditions. The study's findings suggest that heavy metal contamination may be linked to the development of OSCC and precancerous conditions. When comparing OSCC and OPMD cases with controls, the serum concentrations of As and Pb did not differ significantly. However, Cd, Cr, Co, Cu, and Zn exhibited significantly higher concentrations among cases compared to controls ($p < 0.05$). Moreover, we observed significant variations in the levels of five elements among cancerous, premalignant, and healthy, suggesting a potential role in the progression of malignancies.

Keywords: Heavy Metals, Blood, Oral Cancer, OPMD, ICP-OES