SDM College of Dental Sciences & Hospital

"DETERMINATION OF PLASMA HOMOCYSTEINE LEVELS IN ORAL SUBMUCOUS FIBROSIS & ORAL SQUAMOUS CELL CARCINOMA USING HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC) AND ITS PLAUSIBILITY AS A POTENTIAL BIOMARKER."

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ABSTRACT

Background and purpose:

Oral submucous fibrosis (OSF) has a high rate of morbidity because it causes a progressive inability to open the mouth, resulting in difficulty in eating and consequent nutritional deficiency. Soluble irritants like capsaicin and areca alkaloids bring about juxta-epithelial inflammation, causing burning sensation, vesiculation and ulceration thereby leading to inability to eat and results in nutritional deficiencies like iron and Vitamin B12. Nutrition is required to maintain the health and integrity of the mucosa and deficiency leads to increased susceptibility to carcinogens from the betel quid and areca nut. The deficiency of folate, developing secondary to iron deficiency causes hyperhomocysteinemia which brings about the oxidative DNA damage and altered metabolic states initiating carcinogenesis. Hyperhomocysteinemia has been recorded in premalignancies like OSF, laryngeal leukoplakia & cervical dysplasia; and in malignancies like carcinomas of the breast, lung, head & neck and colorectal region. Studies assessing the same are very minimal and the findings are inconsistent in OSF and OSCC (Oral squamous cell carcinoma). Biochemical alterations in patients of OSF and OSCC are quintessential in not only in early diagnosis, appropriate treatment but also as indicators of prognosis, as the disease progresses.

The purpose of this study was to determine and assess the plasma homocysteine level in healthy controls, OSF and OSCC patients. The plasma homocysteine levels were correlated with the age, gender, duration and frequency of various habits and the clinical stages in OSF and OSCC. The plausibility of homocysteine as a biomarker in OSF and OSCC was also evaluated.

Methods:

A detailed case history including demographic information, general history and details of diet, habits and socioeconomic status of the patients were recorded in the preformed Performa. 5ml of blood was collected in tubes containing EDTA from Controls (n=10), OSF (n=20) and OSCC patients (n=20) and centrifuged. The plasma thus obtained was stored at -20 degrees centigrade and the homocysteine levels were determined using High Performance Liquid Chromatography (HPLC) analysis. The data obtained was statistically analyzed using non parametric tests such as Mann Whitney U and Kruskal Wallis tests.

Results:

We observed that there was a difference noted in Controls, OSF and OSCC. The mean plasma homocysteine level was increased in OSF as compared to healthy controls and in contrast, the levels were decreased in OSCC. The plasma levels of Homocysteine were correlated amongst the three groups, but no statistically significant difference was noted. The plasma homocysteine levels did not have a significant relation with age, duration and frequency of habits and clinical stage of OSF and OSCC.

Interpretation and Conclusion:

The plasma homocysteine levels were elevated in OSF and OSCC groups as compared to controls but there was no statistically significant difference noted between the groups. The homocysteine levels were less in OSCC compared to the OSF group and it is probably due to the increased utilization by the tumor cells. The alteration in the homocysteine levels shows the plausible role in the pathogenesis of the disease processes, additionally, it is an indicator of levels of folate and Vitamin