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Estimation of serum level of Vitamin A and E in OSMF patients

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Abstract
Background & Objectives: Oral submucous fibrosis is a common precancerous condition. The primary factor considered in the etiogenesis of OSMF is the habitual use of betel nut. Hence this study is carried out to estimate the serum vitamin A and vitamin E levels in OSMF patients and to compare with the healthy controls.
Methods: A case control study was conducted on 60 cases of OSMF and 60 controls. The serum vitamin A and vitamin E of all 120 participants were estimated by using spectrophotometer.
Results: The mean Vit A value in the patient group was calculated to be 24.30 µg/dl where as in the control group it was 30.36 µg/dl. Comparing the values between different stages, there was a gradual reduction in the Vit A levels as the stage advanced. The mean Vit E value in the patient group was 6.03 µg/dl which was marginally lower than the mean Vit E levels in the control group 9.03 µg/dl. Comparing the values between different stages, there were almost similar values of the Vit E levels across all the stages.
Interpretation & Conclusion: The serum levels of vitamin A and vitamin E between subjects with OSMF and the healthy controls did not show any significant difference when statistically evaluated. Nor was there any considerable difference across different stages of the disease.

Keywords: Antioxidants, Vit A, Vit E, OSMF, Serum level

Introduction
Oral submucous fibrosis predominantly involves the oral cavity. The buccal mucosa, retromolar area, and the soft palate are the predominantly affected sites. The mucosa in the involved areas gradually becomes pale followed by progressive stiffness of sub-epithelial tissues [1]. In addition to the involvement of oral mucosa, this condition also involves the pharynx and esophagus especially in persons who chew and swallow the products of betel quid. The malignant transformation of OSF is reported to be between 2.3 and 7.6 %. The most ironical aspect of this condition is the lack of appropriate and satisfactory treatment modalities and lack of case control studies to show evidence of other contributing factors in the development and progression of fibrosis [2].
Oral submucous fibrosis is an established clinical entity, the etiology of which is obscure. There is no specific therapy, though various treatment modalities have so far been tried with varying degree of success. The incidence of Oral submucous fibrosis is increasing due to extensive use of gutkha and powdered betel nut and hence it has become a major public health problem. Since it is a known precancerous condition, it becomes essential that we understand the risk factors associated with this disease. Even though there were suggestions regarding vitamin deficiency in OSF patients and reports of clinical improvements following vitamin supplementations, well structured case controlled studies are lacking from this part of the country to demonstrate any such evidence [3, 4].
Antioxidant defense system includes certain vitamins like vitamin A, vitamin C, vitamin E and certain minerals such as selenium, copper, zinc and manganese. It is proved to be beneficial in patients with cardiovascular diseases, diabetes mellitus, and inflammatory diseases and for the prevention of chronic processes such as atherosclerosis and carcinogenesis [5]. A number of studies found that low intake of vitamins was associated with increased risk for carcinogenesis. There is an overwhelming response from the dentists to supplement OSF patients with vitamin preparations and antioxidants [6].

However, there have been very few studies to determine the nutritional aspect of this chronic insidious disease. Hence a case control study was carried out to estimate the serum vitamin A and vitamin E levels in OSMF patients and to determine their implications in the etiogenesis of OSF [7].

Materials & Methods

The present study was done in the department of oral medicine and radiology. The study group comprised of 60 patients who visited the department of oral medicine and radiology and were clinically diagnosed with oral submucous fibrosis. For further confirmation all the cases included in the study were also histopathological diagnosed with oral submucous fibrosis. The control group comprised of equal number of age matched healthy individuals. Presence of palpable bands, mucosal texture feeling tough and leathery and blanching of mucosa together with histopathological confirmation osmf was used for the diagnosis of the oral submucous fibrosis.

The age group of 20 to 60 years, clinically and histopathological diagnosed cases of osmf, no history of any medical condition and any oral mucosal disorder were included in the study. Patients with any oral disorder, presence of any vitamin therapy, undergoing treatment of oral submucous fibrosis, patient not willing to undergo incision biopsy and those who were not willing to undergo drawing of venous blood were excluded from the study.

The patients who fulfilled the criteria were included in the study. The informed consent was signed by the patients included in the study. The included patients were informed about the study. The study group was examined and the history recording was done in the case sheet. The detail history was noted and history of chewing habit was noted in relation to frequency and duration of tobacco habit. Incisional biopsy was carried out under local anaesthesia for histopathological evaluation. Patient consent was taken for biopsy. The tissue obtained for the biopsy was preserved using 10% formalin solution and subjected for histopathological evaluation. Venous blood of 3 ml was obtained from venipuncture of the median cubital vein with aseptic precautions. The blood samples were subjected for biochemical evaluation of Vit A and Vit E.

Statistical Analysis: the data obtained were subjected for the statistical analysis to find the significance. Unpaired t test and ANOVA test were used for the statistical analysis.

Result

The present case control study comprised of 60 patients diagnosed with OSMF and 60 healthy individuals with absence of any oral problems. In the study group the age of the subjects ranged from 20 to 60 years. Majority (60%) of these cases were within 26-35 years, followed by below 25 years (20%). The mean age was 33.4 years. Males comprised majority of the study group (90%), while females formed the remaining 10% of the group. The control group also comprised of patients with similar age and sex distribution.

The vit A analysis shows the mean value of 24.30 ug/dl in the study group, which was found to lower when compared with control group where the it was found to be 30.36 ug/dl. When the values with respect to different clinical stages were compared there was reduction in the level of vit A as the stage advanced. The mean vit A was found to be 34.45 ug/dl in stage 1, in stage 2 it was found to be 26.34 ug/dl and was found to be 22.34 ug/dl in stage 3. When statistical comparison using unpaired t-test was made between the study group and the controls for the serum vitamin A levels, statistical difference was not significant (p=0.100) [Table 1]. The values between the stages of OSF were assessed using anova test.

Table 1: serum level of Vit A in various stages

	Number of patients	Mean	Std. Deviation	P value
Stage 1	18	34.45 ug/dl	7.90	0.100 (ns)
Stage 2	24	26.34 ug/dl	6.98	
Stage 3	18	22.33 ug/dl	7.95	

The vit E analysis shows the mean value of 6.30 ug/dl in the study group, it was found to lower; compared with control group where the it was found to be 9.03 ug/dl. When the values with respect to different clinical stages were compared there was reduction in the level of vit E as the stage advanced. The mean vit E was found to be 8.01 ug/dl in stage 1, in stage 2 it was found to be 7.10 ug/dl and was found to be 6.90 ug/dl in stage 3. Statistical comparison made between the study group and the controls for the serum vitamin E levels using unpaired t-test; statistical difference was not significant (p=0.094) [Table.2]. The values between the stages of OSF were also not significant (p= 0.562) by ANOVA

Table 2: serum level of Vit E in various stages

	Number of patients	Mean	Std. Deviation	P value
Stage 1	18	8.01ug/dl	0.54	0.430 (ns)
Stage 2	24	7.10 ug/dl	0.91	
Stage 3	18	6.90 ug/dl	1.54	

Discussion

Oral submucous fibrosis (OSMF) is a chronic mucosal disease considered a potentially malignant disorder (PMD). It was first described by Schwartz in 1952. Etiology of OSMF is obscure [8]. Habits like betel nut, tobacco chewing and eating spicy foods are thought to be the predisposing factors. There are various treatment modalities for this entity [9]. One of the widely accepted treatments is intralesional dexamethasone infusion with fibrinolytic agents like hyaluronidase along with vitamin therapy [10].

Vitamin-E exhibit antioxidant properties by acting as a lipid-soluble free radical scavenger in cell membranes. Thus, Vitamin-E may involve in both initiation and promotion stages [11, 12]. Among the other potentially anticarcinogenic effects of Vitamin E are its ability to inhibit formation of the carcinogenic chemical nitrosamine from nitrites in some foods, and its ability to promote immune system function [13, 14].

Since long time there is strong association between areca nut chewing and oral submucous fibrosis. The areca nut ingredients are known to induce reactive oxygen species that can cause the genetic damage to the cells [15]. Increased in the level of ROS activity in the oral cavity of the areca nut chewing quid have been noted which has lead to increase in damage of DNA in the buccal pouch exposed. Collectively the results indicate the crucial role of ROS in areca nute induced cytotoxic effects [16].

All the patients in our study had at least any one of the areca nut based chewing habits. Similar observations were made in larger studies by van wyk CW *et al*. (1990) and various others. It has been identified as the most important etiological factor. The younger age group and high number of paan chewers compared to conventional betel quid chewers is reflected in the present study as well.

The mean serum vitamin A levels in the patient group was

24.30 µg/dl and the controls 30.36 µg/dl. Metkari SB *et al*. (2007) found vitamin A level of 18.22 µg/dl in the patients compared to 37.85 in controls. It is to be noted that there was a reduction of vitamin A levels in patients compared to controls in our study, but it was not statistically significant (P=0.103). Similarly a gradual reduction in the vitamin A levels was found as the clinical stage progressed, but not evident statistically (P= 0.100). the explanation for the reduction stats that explains that the observed decrease in SOD and vitamin A in OSF can be due to utilization of these antioxidants by affected tissues or in combating the excessive oxidative stress in circulation.

Comparing the vitamin E levels between patients and controls, only a marginal difference was found i.e. 7.57µg/dl in patients against 8.05µg/dl in controls which was statistically non significant (P= 0.094). Comparing the same between the three stages also found a marginal difference that was not significant. Gupta S *et al*. (2004) found plasma beta carotene and vitamin E levels to be decreased significantly in OSF patients with respect to healthy controls. The decrease in beta-carotene and vitamin E was found to be more significant in OSMF grade II and III than in grade I. They also proceeded with oral administration of beta-carotene and vitamin E, which resulted in increase in plasma level of these two antioxidants and associated clinical improvement of OSF. As β-carotene is a provitamin-A carotenoid that is efficiently converted to vitamin A than other carotenoids, it can be directly compared to vitamin A.

The available data is sufficient to establish that oxidative stress plays an important role in the pathogenesis and progression of OSMF. In this study, we failed to establish any association of OSMF with vitamin A or vitamin E deficiency. Other studies in this regard give varying results. The variation in the results may be a population or geographic variance. Newer laboratory procedures like liquid and gas chromatography could give more accurate estimation compared to conventional methods like calorimetry and spectrophotometry. More over, concentration should be focused on the total antioxidant capacity rather than individual vitamins so that the antioxidant enzymes like Serum malondialdehyde and superoxide dismutase are also estimated.

Conclusion

The serum levels of vitamin A and vitamin E between subjects with OSMF and the healthy controls did not show any significant difference when statistically evaluated. Nor was there any considerable difference across different stages of the disease. Therefore, we could not arrive at any evidence for the vitamin deficiency among this population of OSMF patients. However, studies involving larger samples and more accurate methods are suggested in the future.

References

1. Bhonsle R, Murti P, Daftary D, Gupta P, Mehta FS, Sinor P *et al*. Regional variations in oral submucous fibrosis in India. Community dentistry and oral epidemiology. 1987; 15:225-9.
2. Mufeed A. Estimation of serum levels of vitamin a and vitamin e in oral submucous fibrosis patients-a case control study, 2009.
3. Aziz SR. Coming to America: betel nut and oral submucous fibrosis. The Journal of the American Dental Association. 2010; 141:423-8.
4. Javed F, Chotai M, Mehmood A, Almas K. Oral mucosal disorders associated with habitual gutka usage: a review. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2010; 109:857-64.
5. Opara E. Oxidative stress, micronutrients, diabetes mellitus and its complications. The journal of the Royal Society for the Promotion of Health. 2002; 122:28-34.
6. Matough FA, Budin SB, Hamid ZA, Alwahaibi N, Mohamed J. The role of oxidative stress and antioxidants in diabetic complications. Sultan Qaboos University Medical Journal. 2012; 12:5.
7. Wojcik M, Burzynska-Pedziwiatr I, Wozniak L. A review of natural and synthetic antioxidants important for health and longevity. Current Medicinal Chemistry. 2010; 17:3262-88.
8. More CB. Etiopathogenesis And Clinical Man Potentially Malign, 2018.
9. Arshad O, Siddiqi KM, Rana ZA. Oral Submucous Fibrosis: Comparison of Different Treatment Modalities. Pakistan Oral & Dental Journal. 2015, 35.
10. Nallapu V, Balasankulu B, Vuppalapati HB, Sambhana S, Mala D, Koppula SK. Efficacy of vitamin E in oral submucous fibrosis: A clinical and histopathologic study. Journal of Indian Academy of Oral Medicine and Radiology. 2015; 27:387.
11. McCay PB. Vitamin E: interactions with free radicals and ascorbate. Annual review of nutrition. 1985; 5:323-40.
12. Serbinova E, Kagan V, Han D, Packer L. Free radical recycling and intramembrane mobility in the. Free Radic Biol Med. 1991; 10:263-75.
13. Chow C, Hong C. Dietary vitamin E and selenium and toxicity of nitrite and nitrate. Toxicology. 2002; 180:195-207.
14. Kagan VE, Shvedova A, Serbinova E, Khan S, Swanson C, Powell R *et al*. Dihydrolipoic acid—a universal antioxidant both in the membrane and in the aqueous phase: reduction of peroxyl, ascorbyl and chromanoxyl radicals. Biochemical pharmacology. 1992; 44:1637-49.
15. Lai K-C, Lee T-C. Genetic damage in cultured human keratinocytes stressed by long-term exposure to areca nut extracts. Mutation Research/Fundamental and Molecular Mechanisms of Mutagenesis. 2006; 599:66-75.
16. Garg A, Chaturvedi P, Gupta PC. A review of the systemic adverse effects of areca nut or betel nut. Indian Journal of Medical and Paediatric Oncology: Official Journal of Indian Society of Medical & Paediatric Oncology. 2014; 35:3.