

# Evaluation Of Serum Antioxidant Enzymes In Oral Submucous Fibrosis And Oral Squamous Cell Carcinoma- A Clinical And Biochemical Study

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## ABSTRACT

**Background:** The present study evaluated serum antioxidant enzymes in oral submucous fibrosis and oral squamous cell carcinoma.

**Materials & Methods:** 30 cases of OSMF and 25 cases of OSCC of both genders. 30 healthy subjects were also enrolled. 6 ml of blood samples were collected with a tourniquet applied 1½-2 inch above the antecubital fossa. The collected blood was centrifuged and the plasma separated was analyzed for vitamin E, beta carotene, MDA.

**Results:** The mean vitamin E level was 7.19 in group I, 6.52 in group II and 9.12 in group III. Beta carotene level was 70.3 in group I, 62.3 in group II and 114.5 in group III. MDA level was 9.16 in group I, 13.4 in group II and 2.91 in group III. The difference was significant ( $P < 0.05$ ).

**Conclusion:** There was increased level of MDA and decreased level of vitamin E and beta carotene in OSMF and OSCC patients.

**Key words:** Oral submucous fibrosis, Oral squamous cell carcinoma, MDA

## 1. INTRODUCTION

Oral submucous fibrosis (OSMF) is an insidious, chronic disease affecting any part of the oral cavity, sometimes pharynx and esophagus. It is characterized by mucosal rigidity of varying intensity due to the fibro-elastic transformation of the juxta-epithelial layer, resulting in a progressive inability to open the mouth.<sup>1</sup> The first complete description of disease was defined by Schwartz (1952) as "Atrophia Idiopathica (tropica) Mucosae Oris" on five Indian

women in Kenya. However, the existence of such a disease and its presentation in oral cavity was also evident in ancient Indians, which was documented by Sushruta who described it as “VIDARI,” a disease of mouth and throat in which progressive narrowing of mouth opening, depigmentation of oral mucosa and pain on taking food were noted.<sup>2</sup>

Oral malignancies are debilitating disorders of the oral cavity. Etiopathogenesis of these disorders is multifactorial. The prognosis of these disorders depends upon early diagnosis and management. Diagnosis is made by biopsy of these disorders, which has certain shortcomings in the form of being invasive and a time-consuming technique.<sup>3</sup> Sometimes due to incorrect site selection or insufficient tissue depth, the results of biopsy are misleading. Therefore, continuous research in this issue has raised interests of the scientific community to find an accurate, yet simpler, less invasive, less time consuming, easily interpretable, and economical technique.<sup>4</sup> Biochemical investigations are one such alternative and have the above-mentioned advantages. They may also be used to monitor the response of therapy for these disorders. These investigations reflect tissue changes at a cellular level and thus aid in early diagnosis of these conditions.<sup>5</sup> The present study evaluated serum antioxidant enzymes in oral submucous fibrosis and oral squamous cell carcinoma.

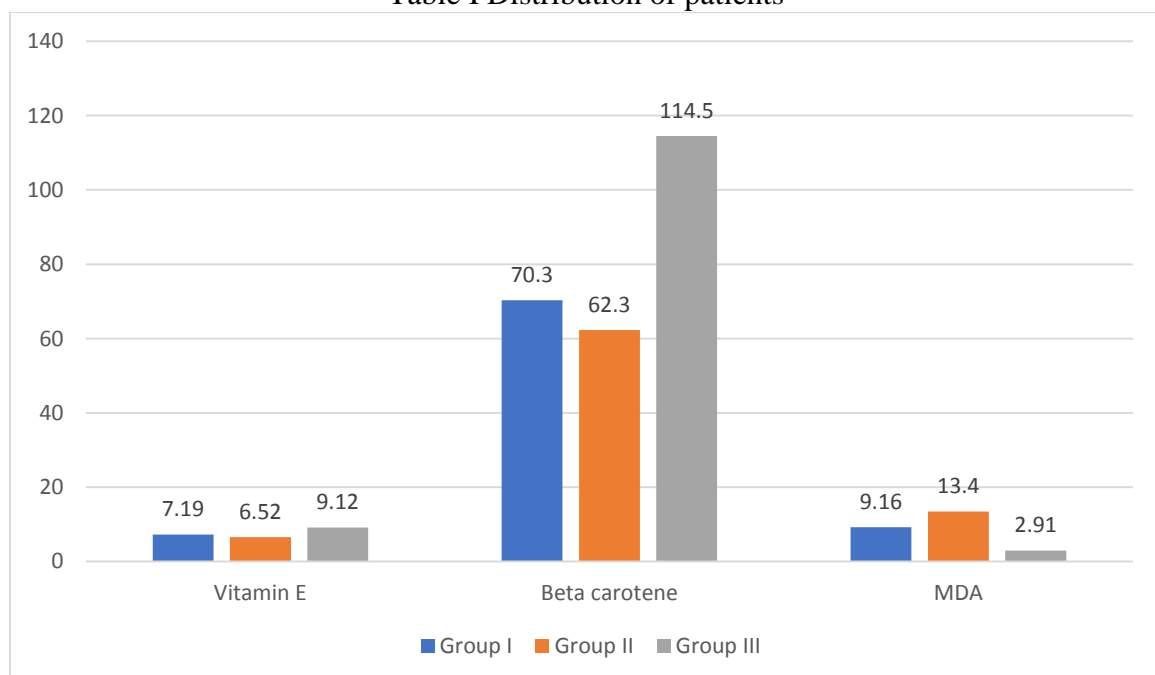
## 2. MATERIALS & METHODS

The present study comprised of 30 cases of OSMF and 25 cases of OSCC of both genders. 30 healthy subjects were also enrolled. Diagnosis of OSMF, and OSCC was made on the basis of history and characteristic clinical features. All were informed regarding the study and their consent was obtained.

Data such as name, age, gender etc. was recorded. A thorough oral examination was performed in all patients. 6 ml of blood samples were collected with a tourniquet applied 1½-2 inch above the antecubital fossa. The collected blood was centrifuged and the plasma separated was analyzed for vitamin E, beta carotene, MDA. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

## 3. RESULTS

Table I Distribution of patients



Groups	Group I	Group II	Group III
Status	OSMF	OSCC	Control
M:F	20:10	15:10	15:15

Table I shows that M:F ratio was 20:10 in group I, 15:10 in group II and 15:15 in group III.

Table II Assessment of serum antioxidants level

Groups	Group I	Group II	Group III	P value
Vitamin E	7.19	6.52	9.12	0.05
Beta carotene	70.3	62.3	114.5	0.001
MDA	9.16	13.4	2.91	0.04

Table II, graph I shows that mean Vitamin E level was 7.19 in group I, 6.52 in group II and 9.12 in group III. Beta carotene level was 70.3 in group I, 62.3 in group II and 114.5 in group III. MDA level was 9.16 in group I, 13.4 in group II and 2.91 in group III. The difference was significant ( $P < 0.05$ ).

*Graph I Assessment of serum antioxidants level*

#### 4. DISCUSSION

Oxidative damage as a result of reactive oxygen species (ROS) is responsible for these disorders.<sup>6</sup> The extent of oxidative damage caused by ROS directly depends on body antioxidant defense mechanism.<sup>7</sup> Literature reports reveal reduction in the levels of nonenzymatic antioxidants like vitamin E and beta carotene and the enzymatic antioxidant superoxide dismutase (SOD), and an increase in antioxidants like malondialdehyde (MDA) in these disorders.<sup>8</sup> To the best of our knowledge, in spite of the high prevalence of these disorders, very few studies have been done to assess the oxidative damage caused by ROS and the role of antioxidants and their relation with histopathologic grading of these disorders.<sup>9</sup> The present study evaluated serum antioxidant enzymes in oral submucous fibrosis and oral squamous cell carcinoma.

In present study, M:F ratio was 20:10 in group I, 15:10 in group II and 15:15 in group III. Rai et al<sup>10</sup> conducted a study on 40 patients who were divided into three groups: Group I as control with 20 normal individuals, group II with histopathologically confirmed different stages of OSMF and OL, and group III with histopathologically confirmed different stages of oral squamous cell carcinoma (OSCC). The mean levels of vitamin E, beta carotene, MDA, and SOD among Group I subjects were  $9.89 \pm 0.75$ ,  $112.10 \pm 11.97$ ,  $2.92 \pm 0.36$ , and  $189.45 \pm 14.17$ , respectively. In group II patients with OL having mild dysplasia, serum vitamin E, beta carotene, MDA, and SOD levels were found to be  $7.89 \pm 0.87$ ,  $70.75 \pm 2.82$ ,  $9.89 \pm 0.92$ , and  $119.63 \pm 24.97$ , respectively. In moderate dysplasia, these values were  $7.16 \pm 0.55$ ,  $69.80 \pm 5.54$ ,  $10.56 \pm 0.46$ , and  $115.20 \pm 23.03$ , respectively. Serum vitamin E, beta carotene, MDA, and SOD levels were  $7.70 \pm 0.57$ ,  $70.50 \pm 3.54$ ,  $9.81 \pm 0.11$ , and  $115.00 \pm 8.49$ , respectively, in grade I OSMF and  $7.32 \pm 0.29$ ,  $69.67 \pm 3.43$ ,  $9.76 \pm 0.38$ , and  $113.67 \pm 8.32$ , respectively, in grade II OSMF. In group III patients with well-differentiated squamous cell carcinoma (WDSCC), serum vitamin E, beta carotene, MDA, and SOD levels were  $7.01 \pm 0.36$ ,  $64.32 \pm 3.42$ ,  $12.98 \pm 0.67$ , and  $59.22 \pm 4.01$ , respectively, and in patients with moderately differentiated squamous cell carcinoma (MDSCC), the values were  $6.54 \pm 0.41$ ,  $61.87 \pm 2.03$ ,  $13.34 \pm 0.42$ , and  $58.43 \pm 2.26$ , respectively.

We found that mean vitamin E level was 7.19 in group I, 6.52 in group II and 9.12 in group III. Beta carotene level was 70.3 in group I, 62.3 in group II and 114.5 in group III. MDA level was 9.16 in group I, 13.4 in group II and 2.91 in group III. Bale et al<sup>11</sup> evaluated the serum malondialdehyde (malondialdehyde [MDA]), and Superoxide dismutase (SOD) in oral

sub mucous fibrosis cases and compare clinical stages. Thirty cases of clinical and histopathological established oral submucous fibrosis and thirty cases of nonsymptomatic features of oral submucous fibrosis preferred as controls. Venous blood was collected and separation of serum for estimation of MDA and SOD levels was done using an ultraviolet spectrophotometer. Serum MDA levels were elevated when clinical staging increases, whereas SOD levels were decreased when clinical stage increases when compared with control cases and it showed statistically significant. Metkari et al<sup>12</sup> showed that the mean level of MDA was elevated and the mean levels of SOD were decreased in oral submucous fibrosis patients, whereas mean MDA was decreased and SOD levels were elevated in control participants. MDA levels were increased when the clinical stage increases and SOD levels were decreased when the clinical stage was increased.

## 5. CONCLUSION

Authors found that there was increased level of MDA in OSMF and OSCC patients whereas decreased level of vitamin E and beta carotene.

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