

Estimation of Serum Iron, TIBC and Albumin in cases of Oral Submucosal Fibrosis

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ABSTRACT

Background: Oral submucosal fibrosis (OSMF), being a chronic insidious oral mucosal condition, affect most parts of the oral cavity and has a high malignant transformation rate, which is triggered by betel nut and tobacco chewing, nutritional deficiencies, immunological processes and genetic predisposition. **Aims and Objectives:** To determine the levels of iron, TIBC and albumin in serum of patients diagnosed as OSMF and in healthy individuals; and to evaluate the importance of these parameters in the management of OSMF. **Methods:** 30 age and sex matched individuals of OSMF and healthy individuals were taken for this study. Under aseptic precautions 5ml of venous blood was collected. Serum iron and TIBC was estimated by ferrozine method and serum albumin by BCG method in semiauto analyzer (MICROLAB 300). The data collected was compiled, tabulated, analyzed and subjected to statistical tests. Analysis was done using SPSS 21. **Results:** The mean of serum iron and albumin levels in OSMF patients were significantly decreased when compared to the healthy individuals and the mean serum TIBC levels were significantly increased when compared to the healthy individuals. **Conclusion:** From the results and observations, it seems possible that various biochemical factors associated with betel nut and tobacco, and the deficiency of serum iron and albumin, may have some role to play in the causation of or be the result of oral submucosal fibrosis.

Keywords: Iron, TIBC, Albumin, OSMF.

INTRODUCTION

Oral cancer is a disfiguring and potentially fatal disease that continues to rise in incidence between younger and older people alike.^[1] The age-old saying - "Prevention is better than cure" still holds true in the contemporary world. Therefore, detection of pre-cancerous conditions and preventing them on time is the best available tool in the fight against cancer.^[1] Oral submucous fibrosis (OSMF) is a very well-recognized potentially malignant condition of the oral cavity. The association of the habit of consuming betel nut (areca catechu) has now been widely recognized as causative factor of OSMF. It shares a unique predisposition of occurrence in the Indian subcontinent, parts of Asia and among individuals of Indian origin. An increase in the incidence of oral cancer has been observed in the northeastern region of India in the recent times.^[2] Measurement of iron, TIBC and albumin levels in the serum of the patients with oral premalignancies may clarify the pathogenesis, establishing the prognosis and thereby rendering effective treatment of these lesions.^[3] Many trace elements have been already critically examined in etiology of various diseases, especially for cancer.^[4] Hence, the present study was conducted to estimate the levels of iron,

TIBC and albumin in serum of patients diagnosed clinically as Oral submucous fibrosis (OSMF) and to compare them with healthy individuals.

MATERIALS AND METHODS

The present study was hospital based, cross-sectional comparative study conducted in Department of Biochemistry in Advanced Clinical Biochemistry Laboratory and Department of ENT, Assam Medical College and Hospital; Dibrugarh over the period of 1 year from June 2018 to May 2019. Before the commencement of study Ethical Clearance certificate from the Institutional Ethics (H) Committee of AMCH was obtained prior to the commencement of the study. 30 patients who were clinically diagnosed as Oral Submucosal Fibrosis (OSMF) attending the Out Patient and Inpatient Department of ENT, Assam Medical College & Hospital and in the age group of 20 – 60 years were included in the study. 30 normal healthy persons without any oral diseases or any other clinically diagnosed diseases, within same age group and sex (as of the cases) were also included in the study as controls. Cases of oral submucosal fibrosis in association with any other clinically diagnosed diseases, oral submucosal fibrosis with malignant transformation, oral submucosal fibrosis in association with other oral mucosal lesions and patients with the history of any iron and protein supplementation in any form, oral or parenteral, in the past one year were excluded from the study. 5ml

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of blood sample was collected aseptically in clotted vial from the study groups. Serum iron and TIBC was estimated by ferrozine method and serum albumin by BCG method in semiauto analyzer (MICROLAB 300). Ruler and divider were used to measure mouth opening. The data collected was compiled, tabulated, analyzed and subjected to statistical tests. Analysis was done using SPSS 21.

RESULTS

In the present study out of the 60 study subjects (including OSMF patients and healthy individuals), the mean age is 37 years. Maximum no. of cases (n =12) (63%) belongs to the age group 31 to 40 years. Most of the patients suffering from OSMF were males (n=21) (70%) while females were (n=9) (30%). The ratio of M: F is 7:3.

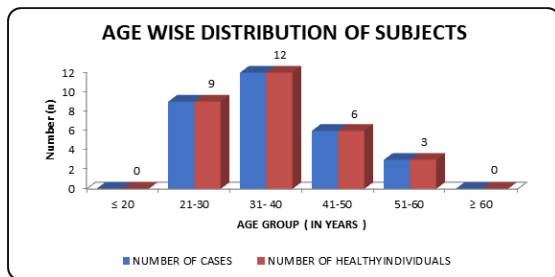
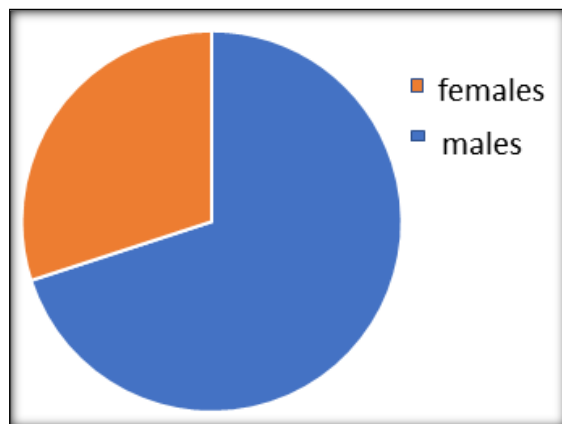


Figure 1: Age distribution of subjects



Pie Diagram 1: Sex Distribution in OSMF Cases

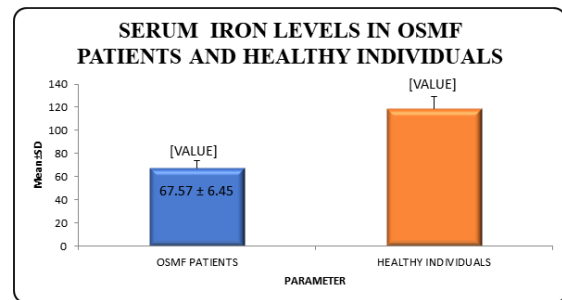


Figure 2: Serum Iron levels in OSMF patients and healthy individuals

The mean serum iron in OSMF patients is significantly lower $p < 0.001$ (significant), than the healthy individuals.

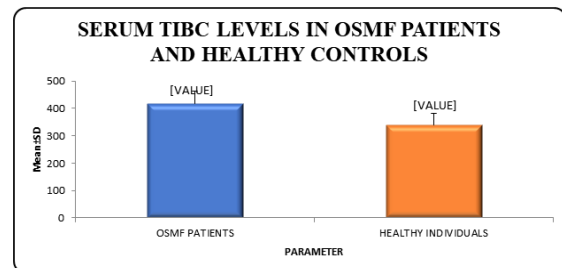


Figure 3: Serum TIBC levels in OSMF patients and healthy individuals

The mean serum TIBC in OSMF patients is significantly higher $p < 0.001$ (significant), than the healthy individuals.

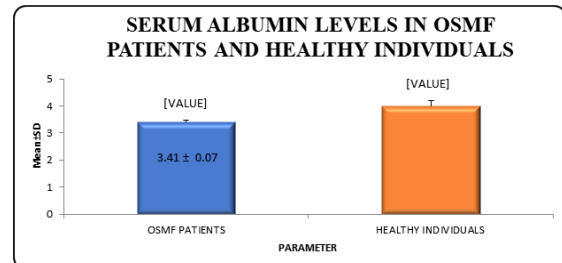


Figure 4: Serum Albumin levels in OSMF patients and healthy individuals

The mean serum albumin in OSMF patients is significantly lower $p < 0.001$ (significant), than the healthy individuals.

Table 1: Comparative Analysis Of Biochemical Parameters With Various Studies

| Comparison of the Various Parameters with Results of Other Studies | Mean serum iron levels | | Mean serum TIBC levels | | Mean serum albumin levels | |
|--|------------------------|---------------------|---|--|---------------------------|---------------------|
| | OSMF patients | Healthy individuals | OSMF patients | Healthy individuals | OSMF patients | Healthy individuals |
| Present study | 67.57±6.45 | 118.53±10.97 | 418.13±42.99 | 338.70±41.89 | 3.41±0.07 | 4.01±0.17 |
| Yadav A et al (2015), ^[7] | 66.57±27.76 | 94.19±35.70 | - | - | - | - |
| Saurabh S et al (2015), ^[10] | 44.6±8.3526 | 126.87±28.22 | - | - | - | - |
| Thakur M et al (2017), ^[11] | - | - | 415.50±46.52 | 336.50±37.11 | - | - |
| Rajendran R et al (1994), ^[12] | - | - | Male (n= 25) 382±3.3 Female (n=25) 393±2.9 | Male (n=25) 370±3.4 Female (n=25) 361±2.9 | 3.4±0.08 | 3.9±0.07 |
| Singh P et al (2012), ^[13] | - | - | - | - | 3.5±0.13 | 3.4±3.5 |
| P value (*P<0.05=significant) | significant | | significant | | significant | |

DISCUSSION

In the present study, all the patients of OSMF, presented with appearance of fibrous bands in and around the buccal mucosa, which is a sign of healing vesicles and ulcers. This is a Hallmark for the stage 2 of Pindborg classification.^[5] On measuring the mouth opening, the measurements were found to be in the range of 26-35mm, with 31 mm being the mean of all. Which corresponds to Grade II of Khanna Classification.^[6] Although the disease i.e. OSMF can present or affect most parts of the oral cavity till the pharynx and upper one-third of the esophagus, in the present study all the OSMF patients had a uniform presentation i.e. in the buccal mucosa.

In the present study out of the 60 study subjects (including OSMF patients and healthy individuals), the mean age is 37 years. Maximum no. of cases (n=12) (63%) belongs to the age group 31 to 40 years. Most of the patients suffering from OSMF were males (n=21) (70%) while females were (n=9) (30%). The ratio of M: F is 7:3. The mean serum iron in OSMF patients is significantly lower $p<0.001$ (significant), than the healthy individuals. The mean serum TIBC in OSMF patients is significantly higher $p<0.001$ (significant), than the healthy individuals. The mean serum albumin in OSMF patients is significantly lower $p<0.001$ (significant), than the healthy individuals.

Yadav A (2015) et al observed the serum iron level lower among the cases (66.57 ± 27.76) as compared to controls (94.19 ± 35.70), and the difference was statistically significant.^[7] It was similar to the study done by Balpande et al.^[8] Shetty et al.^[9] Decreased iron levels in OSMF patients might be due to utilization of iron in collagen synthesis.^[8]

Saurabh S (2015) evaluated the serum iron levels & showed that in the study group; the mean level of iron was 44.6 with a standard deviation (SD) of 8.35, whereas in the control group the mean value of iron was 126.86 with an SD of 28.22.^[10]

Thakur M et al (2017) evaluated the serum TIBC levels and showed that in the study group the mean levels of TIBC was 415.50 ± 46.52 whereas in the control group the mean value of TIBC was 336.50 ± 37.11 .^[11]

Rajendran R et al (1994) evaluated the serum TIBC levels and showed that in the study group the mean levels of TIBC in males was 382 ± 3.3 and in females it was 393 ± 2.9 whereas in the control group the mean value of TIBC in males was 370 ± 3.4 and in females it was 361 ± 2.9 .^[12] They evaluated the serum albumin levels and in the study group the mean levels of albumin was 3.4 ± 0.08 whereas in the control group the mean value of albumin was 3.9 ± 0.07 .^[12]

Singh P et al (2012) evaluated the serum albumin levels and showed that in the study group the mean levels of albumin was 3.5 ± 0.13 whereas in the

control group the mean value of albumin was 3.4 ± 3.5 .^[13]

CONCLUSION

- From the present study, it was observed that serum iron, and serum albumin levels were significantly decreased and serum TIBC levels were significantly increased in the patients with oral submucosal fibrosis.
- Estimation of serum iron and TIBC may predict the course and progression of the condition of OSMF and so these biochemical parameters can be recommended at the time of diagnosis of OSMF.
- If the levels were found to be altered, replacements by means of oral supplementation of iron, could be a possible deterrent to the progression of the disease and further prevent from severe outcome of oral cancer.
- Decreased appetite due to excess consumption of betel nut and its products leads to malnutrition and decreased serum protein levels. Therefore, recommendations for serum analysis of total protein and fractions will throw a light to the nutritional status of the patient. This in turn can be corrected with oral nutritional therapy, improving lifestyle and food quality.
- So regardless of the underlying etiology, it is recommended that routine biochemical assessment of serum iron, TIBC with total protein and fractions in the patients of OSMF, may complement the management protocol of OSMF. In keeping with the modern-day concept of evidence-based medicine, this study may help future researchers to find newer strategies to arrest progression of this very common disease to its severest forms.

Limitations:

- However, the present study was constrained by the limitation of time, relatively smaller sample size and no follow up was done.
- So, it would probably be more predictive with a larger sample size and longer period of study with follow up, which will address the problem for better management of the patients indisposed with oral submucosal fibrosis.

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