

Estimation of Serum Iron in the Patients of Oral Submucous Fibrosis

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ABSTRACT

Objective: To compare the serum levels of iron in Oral Submucous Fibrosis (OSMF) and normal healthy subjects.

Subject and Methods: A total of 120 patients with symptoms and signs suggestive of OSMF equally divided into two groups named group A and B. Patients satisfying the insertion norms and those who has oral sub mucous fibrosis and the control group who are willing to get participate and getting done their blood tests for other purpose were asked for additional iron serum test for our research purpose. The demographic and medical factors like gender, pain, age, and medical record was known and logged in proforma. Diagnosis was done on clinical basis and was categorized according to progress then blood sample was obtained. The data was examined using SPSS version 20.0.

Results: Control group's descriptive (standard/healthy) statistics indicate the mean iron levels of iron 94.13 ug/dl, while standard deviations are 17.57ug/dl. On the 1st day, 2nd day and 3rd day serum levels are examined, which reveal the mean values of 28.02, 22.81 and 24.0 ug/dl, respectively. The findings indicate a greater average of iron (17.57) in the healthy group (group B), while considerably less mean of iron level (6.47) in patients who have OSMF (group A).

Conclusion: The study concluded that OSMF have lower levels of the iron in the serum while higher levels in the healthy group.

Keywords: Serum Iron Level, Oral Submucous Fibrosis, Estimation

INTRODUCTION

Oral sub mucous fibrosis is a precancerous condition that causes immuno-inflammatory activities. If left untreated, it may activate oncogenes and cause the loss of tumour suppressor genes, which increases the likelihood of malignancy.¹

OSMF is a chronic, progressive illness whose clinical manifestations vary subject on the level of the disease at the time of diagnosis. The majority of patients have a spicy food intolerance as well as tongue, lip, and palate stiffness, limiting mouth opening and tongue mobility to different degrees.² The disease's hallmark is sub mucosal fibrosis, which effects the majority of the oral hollow, pharynx, and upper piece of the throat. The illness is most prevalent in India, Southern China Bangladesh, Pakistan, Sri Lanka, Taiwan, Micronesia, and Polynesia. There have been many case studies of Asian immigration to the United Kingdom and South and East Africa published. The incidence of OSMF has varied significantly between countries.³

Areca nut chewing, dietary inadequacies, immunologic procedures, and genetic predisposition are all thought to be etiological factors that start the illness process.⁴ The aetiology of OSMF has been linked to nutritional deficits, particularly iron and vitamin deficiencies. The general health and integrity of the epithelia of the digestive tract, as well as its involvement to proper enzymatic activities, are all dependent on iron. OSMF is also known as an Asian variant of iron deficiency a condition in which lingering iron deficiency causes mucosal irritability to irritations like chilies and areca nut goods.⁵

Sub mucosal fibrosis that starts in the oral depression and advances to the pharynx throat, is the sickness' trademark. This delivers a burning inclination in the mouth, just as solidness and whitening of the oral mucosa and oropharynx, bringing about a restricted face, which limits food consumption, makes it hard to keep up with dental wellbeing, and influences speech.⁶

The trace elements have important role in the pathogenesis of oral sub mucous fibrosis, the elements which are required in minute quantities are known as trace elements. The trace elements play an important role in numerous physiological and metabolic processes in humans. In the diagnosis and prognosis of OSMF, trace elements may be utilised as an adjunct testing to clinic pathology diagnosis and/or in conjunction with other biochemical tests.⁷ Iron is a trace element whose levels will be observed in relation to clinical staging. Serum iron may be

employed as a possible prognostic and diagnostic marker in OSMF sufferers, according to the study's calculations.⁸ The greatest existing weapon in the battle against oral cancer seems to be the early identification of pre-malignancies and stopping them from developing into malignancy. A thorough research may be conducted to determine the serum iron levels in individuals with OSMF. According to some reports, a drop in iron concentration might cause a drop in epithelial vascularity, which causes an elevation in arecoline permeation and fibrosis.⁹ Since both an excess and a deficit of iron have been associated with an enhanced probability of getting carcinoma, the function of iron in carcinogenesis is still up for debate.¹⁰ The susceptibility of the oral mucosa to areca nut irritants may worsen with time if there is a persistent iron shortage. Additionally, oral cancers and irregularities of the epithelium have been linked to iron deficiency.¹¹ Chronic inflammation and epithelial dysfunction, the two main characteristics of OSMF, have been seen in people who are iron deficient.¹² However no conclusive evidence has been started regarding the role of the trace elements. The role of iron in the tracking of oral cancer and pre-cancer can be important, and serum iron levels could be used as a potential prognostic and diagnostic marker in OSMF patients. It is important to estimate and compare the levels of iron between subjects with oral sub mucous fibrosis of varying stages and healthy controls.¹³

The evaluation of trace elements put the clinician in a better position to determine the stage of precancerous condition and also highlights the importance of iron supplementation and healthy diet as a part of overall treatment of this disease.

MATERIAL AND METHODS

From April 2021 to December 2021, the department of oral and maxillofacial surgery at Liaquat University of Medical and Health Sciences in Jamshoro/Hyderabad, Sindh, Pakistan, conducted a comparative cross-sectional study with consecutive/non-probability sampling. The research included 120 patients, 60 of whom had clinically confirmed oral sub mucosal fibrosis, and 60 controls, who had no obvious lesions of the oral mucosa and no oral habits connected to areca nuts. The sample size was calculated by epitools online calculator.

Total Sample size will be categorized into two Groups:

Group A: Oral sub mucous fibrosis = 60 patients

Group B: Healthy subjects = 60 patients

Inclusion Criteria:

- Either gender
- Patient age range from 18 to 60 years
- Patient who presented with signs and symptoms suggestive of OSMF
- Burning sensation on eating spicy foods
- Restricted mouth openings, the presence of palpable vertical fibrous bands, stiffness and blanching
- Healthy patients who will be willing to participate in study will be considered as control group

Exclusion Criteria:

- Pregnant patients
- Subjects having any systemic disorder
- Previous history of treatment for the same condition
- History of drug intake containing iron

Data Collection: This study was conducted after ethical approval of research ethics committee of the university. Patients fulfilling the inclusion criteria and those who has oral sub mucous fibrosis and the control group who are willing to get participate and getting done their blood tests for other purpose were asked for additional iron serum test for our research purpose and were included in the study. An informed written consent was taken before enrollment of study. The demographic and clinical parameters like age, gender, pain, medical history were identified and recorded on proforma. The history, clinical examination was performed by principal investigator or supervisor and recorded on proforma, diagnosis was made on clinical basis and was categorized according to progress and then blood sample was obtained.

Procedure: Venipuncture of the median cuboidal vein under aseptic circumstances resulted in the collection of 5 ml of venous blood, which was then left to stand for 30 minutes at room temperature. The serum was then separated by centrifugation at 3000 rpm for 15 minutes, and it was kept frozen at 2-8°C for 5 days prior to analysis. According to the producer 's recommendations, the estimate serum sample was combined in the clean glass tubes with the buffer and colour reagents included in the estimation kits. The absorption of these specimens was matched with the reference solution given in the kit using a colorimeter. Statistical techniques were used to tabulate and evaluate the data that the operations produced.

Data Analysis Procedure: The Data was analyzed by statistical software package SPSS version 20.0. Qualitative variables were expressed as absolute frequencies and percentages. Descriptive statistics including patient's age, gender, medical history, serum iron level were calculated by t-test. AP value of less than or equal to 0.05 was considered statistically significant.

RESULTS

Descriptive statistics are used to describe the age distributions among the study's collected data, both of the groups are calculated to describe the age, which shows a mean values of 34 years. The descriptions of which are given in the table 1.

Gender of the study is investigated using frequency analysis and in percentages, which shows the overall 78 males and 41 females which accounts for 65.5% of male, while 34.5% of females of overall population of the study, which are being given in the table 2

Descriptive statistics of the control group (normal/healthy group) shows the mean values of the iron 94.13 ug/dl, while standard deviations are 17.57ug/dl. And the study group, patients with OSMF, are investigated the serum values on 1st day, 2nd day and 3rd day which shows the mean values of 28.02, 22.81 and 24.0 ug/dl respectively. See table 3 and 4

T test is used to compare the means of the both the groups in order to evaluate the difference and significance of the tests, the results shows a higher mean of about 17.57 in the healthy group (Group B) while very less mean of 6.47 in the patients with OSMF (Group A), the results are significant at p<0.000. Details are shown in table 5.

Table 1: Descriptive Statistics of Age

	N	Minimum	Maximum	Mean	Std. Deviation
Age	120	10.00	81.00	34.7833	11.01197
Valid N (listwise)	120				

Table 2: Frequency Distributions of Gender

Gender	Count		Table N %	
	Male	78	65.5%	
Female	41	34.5%		

Table 3: Descriptive Statistics Serum Iron in Control Group

	N	Minimum	Maximum	Mean	Std. Deviation
VAR00005	60	59.88	168.22	94.1343	17.57878
Valid N (listwise)	60				

Table 4: Descriptive Statistics Serum Iron in OSMF Patients

	N	Minimum	Maximum	Mean	Std. Deviation
Clinical Stage 1	32	20.20	57.14	28.0238	6.59814
Clinical Stage 2	20	10.30	36.97	22.8150	4.76848
Clinical Stage 3	8	19.50	39.20	24.0000	6.88145
Valid N (listwise)	0				

Table 5: Independent sample t-test

	Group	N	Mean	Std. Deviation	Std. Error Mean
	VAR00001	Group A	60	25.751	6.47725
	Group B	60	94.1343	17.57878	2.26941

DISCUSSION

OSMF was described as a chronic, gradually chronic oral cavity illness. It was formerly believed to be confined in the Indian Subcontinent, in China and in other areas of Asia but nowadays, owing to the increasing number of migratory people, it was deemed to be of worldwide significance.¹⁴ OSMF is a well-known organism with the potential to change malignantly. For prevention of oral cancer, therefore, it is important to investigate oral premalignant diseases since such condition may be treated to avoid their development to oral cancer or utilized as (intermediate) surrogate indicators for intervention in oral cancer.¹⁵

Moos KS and Madan DK first examined the function of iron in OSMF.¹⁶ Trace elements have recently received considerable interest in the diagnosis of oral cancer and precancer as they were substantially changed in carcinoma of the head, lung and breast. It must be assessed if iron modifies the aetiology of OSMF, so there have been few research globally to figure out its function in OSMF.⁷

The blood iron levels were found to be lower for OSMF patients than the iron deficient anemia. The fact that a higher production of collagen in OSMF uses more serum iron and thus the value is less than the iron deficit of the patient may be attributable to it. There was a statistically significant difference from control and one another between the average serum iron levels of OSMF and iron deficient anemia (p<0.05). The findings achieved in our research are consistent with previous studies.^{17,18,19}

The levels of serum iron are regarded as biochemical markers for nutritional tests and their low value may signal progression from oral pre-cancer to mouth malignancy.⁵ In our research, serum iron was low in the OSMF group compared with anemia control and iron deficiency. This reduction in blood iron levels from control to iron deficient anemia group was progressive to OSMF. It is possible to explain that gutkha and its similar goods include fine grain of areca nut and pulverized tobacco, which inflict mechanical harm to oral tissues and create an inability to eat

properly.⁹ The poor socio-economic position and lack of proper nutrition may cause deficiencies in iron, vitamin B12 and folic acid, all of which may damage oral mucosa resulting in a low level of Serum iron in the body.

In literature, people with severe iron deficiency conditions are more likely to develop oral, post-cricoidal and esophageal carcinoma.²⁰ Although osmf is a clinically benign illness, it is a potentially infectious tumor that is 2 to 10% malignant.²⁰ The growing incidence of oral precancerous lesions and cancer may only be decreased by appropriate training, in particular by raising knowledge of the harmful consequences of such behaviors, particularly in the culturally and economically poorer parts of society.

CONCLUSION

Oral Submucous Fibrosis (OSMF) is a pre-malignant disease with a possible malignant behavior defined by oral cavity juxta-epithelium fibrosis. In collagen production, the hydroxylation of cysteine and lysine uses iron to lower serum iron concentrations. In the diagnosis of oral cancer and precancerous diseases such as OSMF, trace elements such as iron get great attention, since these situations have been substantially changed. The assessment of trace elements has enabled the physician to identify the precancerous stage and also emphasizes the need of iron supplements and healthy diets to be used in the overall treatment of this illness.

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