

RESEARCH ARTICLE

Estimation of Iron and Ferritin Levels in Oral Submucousfibrosis (OSMF) Patients

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ABSTRACT

Oral submucous fibrosis, with mucosal sensitivity to irritants such as areca nuts and chilly items due to chronic iron deficiency, is a form of sideropenic dysphagia. Serum iron is used for nutritional evaluation as a biochemical measure and serves as a predictor for the progression of the disease as there is a correlation between the quality of serum iron and oral carcinogenesis. Early diagnosis and prognosis can also be carried out by the assessment of biochemical parameters. The purpose of the research was to test OSMF patients with serum iron and ferritin. After prior consent, 50 participants were included in the study. They've been split into two classes. The research group consisted of 25 average, healthy individuals and a further 25 OSMF patients. 5 ml of blood was collected using a centrifuge and the serum was separated. Using the ERBA CHEM 5 plus analyser, serum iron was estimated using the Ferrozine/MgCO₃ method and Ferritin by the Immunoturbidimetric Latex Assay method. It was found that serum iron and serum ferritin levels decreased significantly compared to control levels in OSMF patients. In OSMF patients, serum iron was 84.29 ± 19.35 and 24.64 ± 19.35 compared to control 121.21 ± 19.35 and serum ferritin was 77.14 ± 17.26 and 134.69 ± 31.3 respectively. The current study concludes that serum iron and ferritin levels in OSMF patients are decreased relative to control levels that can be used to distinguish such patients as an indicator.

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Introduction

As a form of sideropenic dysphagia, oral submucous fibrosis is considered. Chronic iron deficiency leads to the susceptibility of the mucosa to irritants such as chillies and products of isca nuts (Ramanathan 1981). For nutritional assessment, haemoglobin (Hb) levels, in particular serum iron levels, are considered to be biochemical indicators. An association between the content of serum iron and oral carcinogenesis is found (Guruprasad 2014). Therefore by prior biochemical assessment, early diagnosis and prognosis of oral precancerous conditions can be done.

Oral submucous fibrosis (OSMF) is a chronic, premalignant oral mucosa condition that Schwartz first described in 1952 (Schwartz, 1952). The significance of this disease lies in its inability to open the mouth and the highest rate of malignant transformation (7%-13%) (Gupta et al., 2008). With a few cases reported from South Africa, Greece and the United Kingdom, it is mainly seen in Southeast Asia and the Indian subcontinent. In India, the prevalence rate of OSMF is around 0.2%-0.5%. Although the etiological factor in the cause of OSMF is known to be multifactorial, areca nuts play an important role in the manifestation of the disease (Rajalalitha and Vali, 2005). (More et al 2008; Gupta et al., 2012). Deficiency of iron and vitamins is also implicated in the etiology of OSMF. As an Asian variant of sideropenic dysphagia, OSMF is also considered. In this state, the chronic iron deficiency seen contributes to mucosal sensitivity to irritants. Biochemical markers for nutritional evaluation are known to be haemoglobin or serum iron levels (Ganapathy et al., 2011). OSMF can also use amino acids such as valine, methionine and phenylalanine as markers (Richa et al., 2014).

In OSMF patients, the use of iron in collagen synthesis leads to decreased serum iron levels. In certain cases, clinical anemia may be a contributing factor (Khanna and Karjodkar., 2006).

When the iron reserves in the body are depleted, serum iron often starts to decrease. Reports show that once the stocks are exhausted, the transferrin concentration increases while the ferritin concentration falls (Dhakrayet al., 2012). Therefore the current research was performed in patients with OSMF to test serum iron and serum ferritin.

Method and Materials

After prior consent, 50 participants were included in the study. They've been split into two classes. The research group consisted of 25 average, healthy individuals and a further 25 OSMF patients. The research omitted participants with diabetes mellitus, CVD, hypertension, endocrine disorders, reported cases of anemia, and immunocompromised individuals.

Sample Collection and Procedure

After informed consent, 5 ml of blood was obtained from the subject and centrifuged at 2500 rpm to isolate serum and used to estimate iron using the Ferrozine/MgCO₃

system and Ferritin by quantitative immunoturbidimetric latex assay using the ERBA CHEM 5 plus analyzer method.

Results

It was noted that serum iron and serum ferritin levels decreased significantly compared to control levels in OSMF patients (Table 1). The iron in the serum was 84.29 ± 19.35 . In OSMF patients, 35 was 121.21 ± 24.64 (Figure 1) compared with control, and serum ferritin was 77.14 ± 17.26 and 134.69 ± 31.3 respectively (Figure 2).

Table 1. Iron and ferritin level in Control and Study groups

PARAMETERS	Control		OSMF		P value
	Mean	SD	Mean	SD	
Iron($\mu\text{g/dl}$)	121.21	24.64	84.29	19.35	0.0001
Ferritin(ng/dl)	134.69	31.3	77.14	17.26	0.0001

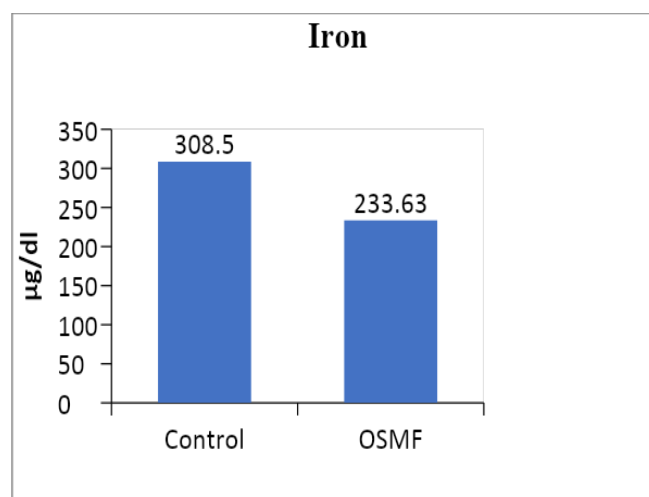


Figure 1. Graph showing iron level in study groups

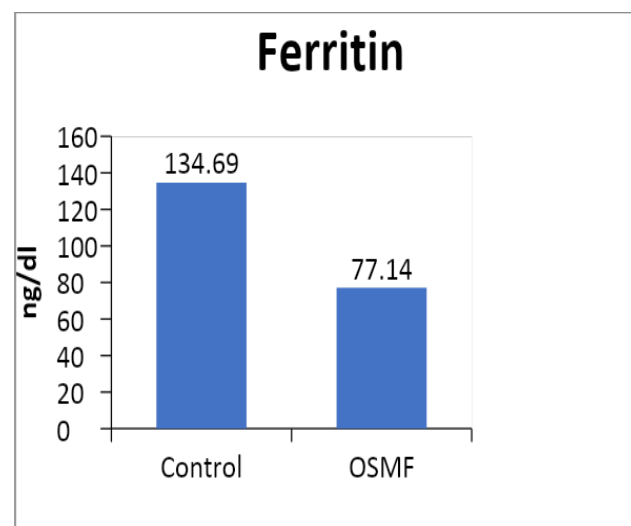


Figure 2. Graph showing ferritin level in study groups

Discussion

Twenty-five clinically diagnosed OSMF patients and twenty-five regular subjects with no pernicious oral habits

were included in the current research. OSMF patients reported a substantial reduction in serum iron and serum ferritin levels compared with placebo, which may be a result of a disease induced by the use of body iron stores. A statistically significant difference was shown by all the values. In this study, serum iron and serum ferritin showed a statistically significant decrease relative to the control groups in OSMF patients. The findings of the present study have coincided with other studies (Utsunomiya H, Tilakaratne WM, et al., 2005) in which the mean total serum iron in OSMF patients was significantly reduced compared with the control group.

In India, the prevalence of OSMF is around 0.5 percent (Angadi PV, Rao SS, Kumar 2011, 2016). The rise in the number of OSMF cases in India is due to the popularity of and use by young people of commercially prepared isca nut preparations (Kallalli et al 2016). OSMF's etiology is various, but the key explanation for isca nut chewing is stated (Ramachandran et al., 2012). The preconditioning of the oral mucosa by a prolonged, chronic iron or vitamin B complex deficiency, anemia and genetic predisposition to the disease are equally significant (Saba et al., 2012). The pathogenesis of OSMF was linked with the continuous and prolonged action of mild irritants on the oral mucosa such as tobacco and areca nut. Pungent and spicy foods, alcohol and iron deficiency have also been suggested. (Sanjiv et al., 2013). Actually, OSMF is a collagen disorder. Hydroxyproline present in the collagen requires iron for its hydroxylation. The decrease in iron levels may be due to the utilization of iron (Karthik et al., 2012). Iron dependent enzyme, cytochrome oxidase and hydroxylation of proline to hydroxyproline are responsible for the decrease in iron levels in OSMF patients. Assessment of iron status may be of proactive intervention to identify the high risk groups. The level of serum iron also declines as the disease progresses, and there seems to be a link between the content of serum iron and oral carcinogenesis. Therefore, in early diagnosis and prognosis, biochemical assessment of oral precancerous conditions can assist (Karthik et al 2012).

Conclusion

The present study concludes that serum iron and ferritin levels in OSMF patients would be decreased relative to control levels that can be used as an indicator to classify such patients. It is possible to use a broad sample size to verify the results.

Conflict of Interest: Nil

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