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An institutional study for determining the correlation of oral submucous fibrosis with serum haemoglobin level: A retrospective analysis of 100 cases

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ABSTRACT

Aim: Oral submucous fibrosis (OSF) is a potentially malignant, chronic progressive disorder affecting most parts of the oral cavity with different clinical presentation depending upon the stage of the disease. It has multifactorial aetiology triggering the disease process. Aetiological factors that have been attributed are areca nut chewing, nutritional deficiencies, immunological processes and genetic predisposition. Patients with OSF show significant decrease in the level of haemoglobin causing anaemia. The aim of this study was to find for any correlation between the serum haemoglobin level and OSF.

Materials and methods: In this institutional study, 100 clinically diagnosed and histopathologically confirmed OSF patients were retrieved, of which 68 patients were included in the study along with 30 healthy controls. Serum haemoglobin levels were retrieved retrospectively from the haematological records.

Results: The study showed no significant correlation between OSF and serum haemoglobin. Serum haemoglobin in the study group and the control group did not show any significant difference.

Conclusion: There is no significant correlation between the serum haemoglobin level with OSF and also with control groups. Further large-scale prospective studies with different stages of OSF are indicated to find a correlation between the level of serum haemoglobin and OSF in this part of the country.

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1. Introduction

Oral submucous fibrosis (OSF) was first described in the 1950s and is well recognised as a potentially malignant disorder according to the WHO Collaborating Centre for Cancer and Precancer in 2005. It is a chronic, insidious, progressive disease affecting any part of the oral cavity and oropharynx characterised by fibroelastic change and inflammation of mucosa leading to progressive inability to open mouth, swallow or speak.[1] The disease is predominantly seen among the people of Asian decent, viz. India, Bangladesh, Sri Lanka, Pakistan, Taiwan, Southern China, Polynesia and Micronesia.[2] The aetiology of OSF is multifactorial and a variety of factors trigger the disease process. Important aetiological factors attributed to the pathogenesis of the disease include areca nut chewing, chilli consumption, nutritional deficiency states and genetic susceptibility. The deficiency of iron and vitamins has been implicated in the aetiology of OSF. Iron is essential for the overall integrity and health of epithelia of digestive tract and also plays a role in the normal enzymatic functions.[2] OSF is considered as an Asian version of sideropenic dysphagia, wherein chronic iron deficiency leads to increased mucosal susceptibility to irritants, like areca nut and chilli products.[3] Haemoglobin levels, in particular serum iron levels, are considered as biochemical indicators for nutritional assessment.[4] The present study is an institutional study conducted to find if there is any correlation between the serum haemoglobin level and OSF.

2. Materials and methods

The present study was done in the Department of Oral and Maxillofacial Pathology, The Oxford Dental College and Hospital, Bangalore, Karnataka. Hundred clinically diagnosed and histopathologically confirmed cases of OSF were retrieved from the Department of Oral and Maxillofacial Pathology. All the biopsies were taken from buccal mucosa in patients who presented with bilateral fibrosis; the site of the buccal mucosa used habitually for placing areca nut with or without tobacco was selected. The study group comprised those who did not have any other systemic conditions. The haematological records for the 100 cases were retrieved from the Haematology Laboratory Archives. Of the 100 OSF cases, only 68 were included in the test group, as there were no records for the remaining 32 cases. Among the 68 cases, 59 were males. Of the 68 OSF cases, there were 22 cases of stage-I, 41 cases of stage-II and 5 cases of stage-III. 30 healthy controls were also included in the study.

2.1. *Statistical analysis*

Student's *t*-test was applied to compare test and the control groups in terms of serum haemoglobin. ANOVA statistical test was applied to compare different stages of OSF. The correlation between serum haemoglobin and OSF was evaluated using Pearson's correlation test. SPSS software version 14.0 was used for statistical analysis.

3. Results

The test group (OSF) comprised of 68 patients with an age range of 19–50 years with a mean age of 30.63 years. The OSF group showed male predominance with 59 males and 9 females. Mean value of serum haemoglobin level of test group was 13.63 ± 1.4 and that of the control group was 13.62 ± 1.7. No significant difference was found between the serum haemoglobin and OSF with the p value of 0.993 (Table 1, Fig. 1). In the present study, mean value of haemoglobin in stage-I OSF was 13.2 ± 1.03, stage-II 13.6 ± 1.4 and stage III 15.07 ± 1.6 (Table 2, Fig. 2). Inter-stage comparison of the OSF with control group also showed no significant difference in the serum haemoglobin level. It was found that there was no significant difference between males and females. However, it was found that the serum haemoglobin level in 3 female patients with stage II OSF was decreased though not significant. On analysing the values by Pearson's correlation test, it was observed that there was no correlation between OSF and serum haemoglobin levels (correlation value: 0.163) (Table 3).

Table 1 – Mean haemoglobin (%) level in OSMF and control groups (t test).

	Number	Mean haemoglobin	*p* value
OSMF group	68	13.63 ± 1.4	0.993
Control group	30	13.62 ± 1.7	

Table 2 – Comparison of mean HB level with different stages of OSMF (ANOVA).

OSMF	Mean (SD)	*p* value
STAGE I	13.2 (1.03)	0.023
STAGE II	13.6 (1.4)	
STAGE III	15.07 (1.6)	

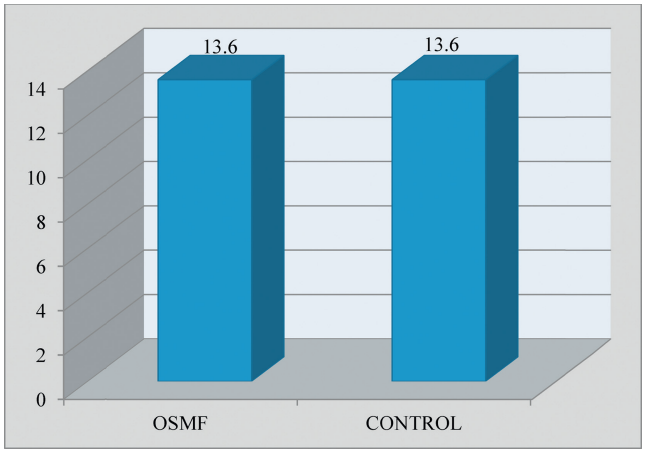


Fig. 1 – Mean haemoglobin (%) level in OSMF and control groups.

Table 3 – Correlation of OSMF with haemoglobin level.

		hb level (gm/dl)
OSMF stage	Pearson correlation	0.163
	p value	0.184

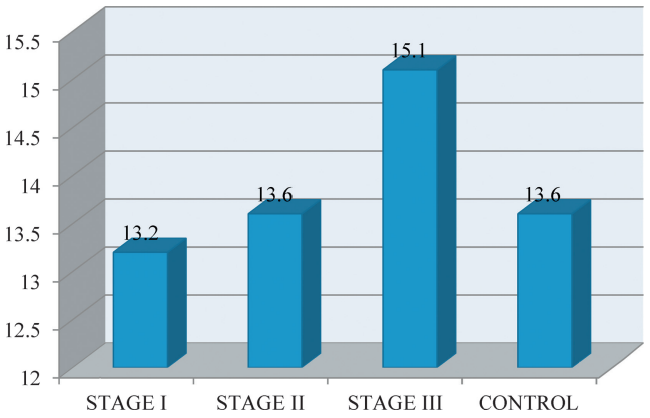


Fig. 2 – Mean HB level with different stages of OSMF and control group.

4. Discussion

OSF is a unique, chronic debilitating potentially malignant disorder of the oral mucosa, which predominantly occurs in Indians and South East Asians.[5] The test group was in the age range of 17–50 years with a mean age of 30.64 years. The maximum numbers of cases were reported in the age group of 20–30 years, which is in accordance with the study conducted by Kumar et al. and Ranganathan et al. Of the 68 cases of OSF studied, male predominance was seen with 86.7% males and 13.23% females, which is in accordance with studies conducted by Kumar et al., Sinor et al. and Hazarey et al.[6] Male-to-female ratio was 6:1. Few studies have shown female predominance in the occurrence of OSF.[7] The peculiarity of the disease is that it is confined to a particular geographic region, which has led to the concept that dietary or cultural habits prevalent in the region can act as an aetiological factor for the disease process. It is characterised by mucosal rigidity of varying intensity due to the fibroelastic changes of the juxtaepithelial layer resulting in fibrosis and progressive inability to open the mouth, which is the hallmark of the disease.[5] Other symptoms of the disease are burning sensation, vesiculation, ulceration and stiffening of oral mucosa and oropharynx, resulting in restricted mouth opening, which render a phase wherein the patient has difficulty in consumption of the normal diet leading to poor nutrition. Several investigators have reported anaemia, vitamin, iron and protein deficiencies among OSF patients, which may be due to the limited food consumption.[8] Iron deficiency anaemia is associated with low levels of haemoglobin and iron.[9] Iron is an important factor that helps in the synthesis of haemoglobin, which is a component of red blood cells, and in the depletion of which, the body cannot synthesise haemoglobin thereby causing anaemia. Iron deficiency anaemia can be the direct cause for mucous membrane atrophy since the integrity of the epithelium is dependent on adequate serum iron levels.[10] Reduction in serum iron level will affect the activity of cytochrome oxidase, an iron-dependant enzyme, which is required for normal maturation of the epithelium.[11] The mucous membrane atrophy may attribute to its increased permeability to areca nut products further progressing the disease process. In the present study, though, there was no significant difference in the levels of serum haemoglobin while comparing the control and OSF groups, which contradicts with findings of other studies in the literature. However, there was decreased level of serum haemoglobin in female patients with stage II OSF. A literature survey has shown that there is a significant difference between OSF and serum haemoglobin level, which is in contrary to our results. This may be due to the reason that it is a retrospective study along with improper distribution between gender, age group and stages of OSF.

In conclusion, there was no correlation found between the OSF and serum haemoglobin. To get a better understanding of the correlation between OSF and serum haemoglobin level, a large-scale prospective study has to be conducted with equal sample size of gender, age group and stages of OSF.

Conflicts of interest

The authors have none to declare.

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