Alteration of Serum Lipid in Oral Sub Mucous Fibrosis in Central India

J. K. Yashveer¹ · Devendra Pankaj²

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Abstract Oral sub mucous fibrosis is the most common precancerous lesion in India. Lipids are the major cell membrane components essential for various biological function including cell growth and division for the maintenance of cell integrity of normal and malignant tissue. Low levels of lipids serves as a marker and prognostic indicator in the early detection of oral precancerous and cancerous states. In spite of high prevalence and its potential to undergo malignant transformation, this condition has not widely been investigated with respect to serum lipid levels. In present study an attempt is made to analyze the complete serum profile, total cholesterol, triglycerides, high density lipoprotein. Low density lipoprotein, and very low density lipoprotein in oral precancerous lesion and control. Study was conducted in 30 clinically and histopathologically diagnosed cases of premalignant lesion and 30 age and sex match controls. The complete lipid profile including TC, TG, HDL, LDL, and VLDL was analyzed. Serum lipid levels were significantly lower in patients with oral lesion than in controls. From the finding it appears that the decreases in the lipid levels may be considered as useful marker in the early diagnosis of oral premalignant lesion.

Keywords Oral sub mucous fibrosis · Serum lipid · Premalignant condition

Introduction

Oral submucous fibrosis is a chronic debilitating and premalignant condition of oral cavity [17]. Earlier confined to the Indian subcontinent, it is now often seen in the Asian population of UK, USA, and other developed countries, therefore, it is a serious health problem for global region.

Lipids are important component of living cell. Lipids are major cell membrane components required for various biological functions, including growth of cell and cell division [6]. Few reports are available on plasma lipid profile in head and neck cancer [12]. Oral cancer is the leading cause of morbidity and mortality in India and most commonly preceded by clinically definable premalignant lesions [8].

Oral submucous fibrosis is chronic disease of the oral cavity which is characterized by an epithelial and subepithelial inflammatory reaction followed by fibroelastic changes in the submucosa [6]. OSMF is regarded as a precancerous condition and shows a significant tendency to develop cancer [9]. Murti et al. [11] demonstrated a malignant transformation rate of 7.6% over a 17 year observation period. Tilakratne et al. [20] reported that areca nut is the main etiological factor for OSMF. The direct contact of quid mixture with oral tissue results in their continuous irritation by various components, including biologically active alkaloids and copper [2]. Consumption of chillies, nutritional deficiency, chewing tobacco, smoking, alcohol, genetic susceptibility, altered salivary constituents, autoimmunity and collagen disorders may be involved in the etiopathogenesis of this condition [16].

✉ Devendra Pankaj
dvineetpankaj@gmail.com

J. K. Yashveer
yash045@yahoo.com

¹ Department of ENT – Head and Neck Surgery, Gandhi Medical College, Room No. 35, Bhopal, Madhya Pradesh 462001, India

² Department of ENT – Head and Neck Surgery, AIIMS, Bhopal, Madhya Pradesh 462020, India

OSMF is now considered a collagen metabolic disorder [17]. Excessive use of areca nut may also induced the production of free radical and reactive oxygen species, which are responsible for high rate of oxidation/peroxidation of polyunsaturated fatty acid which affect essential constituents of cell membrane and might be involved in tumorigenesis [3]. Rose et al. [18] reported an inverse association between blood cholesterol level and risk of cancer, Mehrotra et al. [10] reported inverse relation between blood cholesterol and OSMF and provided a base for further epidemiological research.

Studies shows that the levels of fasting blood lipids are lower among people with head and neck malignancy [15]. However, these previous studies were limited by the fact that they evaluated lipid profile only in cancer patients, while the present study evaluated lipid profile in the oral premalignant condition like OSMF.

In spite of high prevalence and its potential to undergo malignant transformation, OSMF has not widely been investigated with respect to the serum lipid. In present study, an effort is done to analyze the complete serum lipid profile in OSMF patients.

Material and Method

The study was conducted in 30 clinically and histopathologically diagnosed cases of OSMF who attended the Department of otorhinolaryngology and Head and Neck surgery in between 1 January 2016 to 31 August 2016, Gandhi Medical College Bhopal, Madhya Pradesh India. All the patients underwent recording of detailed history, and clinical diagnosis was made on the presence of characteristic features like ulceration, mucosal blanching, burning sensation, stiffness of oral mucosa, presence of characteristic fibrous bands and progressive inability to open mouth. Also histopathological examination was carried out in all the cases by incisional biopsy from the buccal mucosa of most affected area of buccal mucosa. OSMF was divided clinically and functionally into three stages according to the criteria reported by Haider et al. [7], based on the presence of fibrous band on various anatomical sites, and functional staging was based on degree of mouth opening.

Clinical staging

- Stage 1: Faucial band only
- Stage 2: Faucial and buccal band
- Stage 3: Faucial, buccal and labial band

Functional staging

- Stage 1: Mouth opening > 20 mm
- Stage 2: Mouth opening 11–19 mm
- Stage 3: Mouth opening < 10 mm

30 healthy individual, matched for age and sex, who consecutively presented at the department without any other major illness were included in control. Informed consent was taken in both case and control groups. The study was approved by the institutional ethical committee.

Exclusion criteria were patients with systemic disease, conditions that may altered the serum lipid profile, known case of uncontrolled diabetes, thyroid disorder, cardiac problem or liver dysfunction.

For serum lipid profile patients were called again with 12 h of fasting venous blood was collected using a sterile disposable syringe and blood sample was sent for estimation in department of pathology. The statistical analysis was done (Figs. 1, 2, 3).

Fig. 1 Mean age of population

Fig. 2 Age and sex matched group with male female ratio

Fig. 3 Grading of OSMF**Table 1** Mean age of population

Group	Mean age of group
Cases (study group)	32.1
Control	32.8

Table 2 Age and sex matched group with male female ratio

Age group	Cases		Control	
	Male	Female	Male	Female
11–20	3	1	2	2
21–30	7	5	6	8
31–40	3	3	2	3
41–50	4	2	0	1
>51	2	0	6	0
Total	19	11	16	14
Male/female	1.72/1		1.14/1	

Table 3 Grading of OSMF

Grade of OSMF	No. of patient	Percentage (%)
Grade 1	8	26.66
Grade 2	10	33.33
Grade 3	12	40

Grading of OSMF in study group

Table 4 Statistical analysis

Serum lipid	N	Cases (Mean $\pm$ SD)	N	Control (Mean $\pm$ SD)	P value	Statistical significance
Total Cholesterol	30	146 $\pm$ 32.31	30	192.6 $\pm$ 53.25	*P < 0.01	Highly significant
Triglyceride	30	121.8 $\pm$ 45.32	30	127.53 $\pm$ 40.77	P > 0.05	Non significant
HDL	30	49.06 $\pm$ 16.08	30	60.63 $\pm$ 17.41	*P < 0.01	Highly significant
LDL	30	60.7 $\pm$ 30.71	30	98.63 $\pm$ 19.41	P > 0.05	Non significant
VLDL	30	23.06 $\pm$ 10.34	30	34.6 $\pm$ 12.09	*P < 0.01	Highly significant

*P value < 0.01 highly statistical significance, P value > 0.05 non significant

Result

The present study comprises of 30 OSMF cases and control group comprised of 30 age and sex matched healthy individuals without any contributory habits or premalignant lesions, whom 36 were male and 24 were female. The mean age in study group was 32.1 ± 10.99 year and in the control group was 32.8 ± 14.68 year with most patients in the second and third decade of life (Table 1).

Mean age of study is 32.1 ± 10.99 year (Table 1).

Mean age of control is 32.8 ± 14.68 year (Tables 1, 2).

Minimum age 17 year

Maximum age 47 year

In study group Grade 1 OSMF seen in 8 (26.6%), Grade 2 OSMF in 10 (33.33%), Grade 3 OSMF seen in 12 (40%) patients (Table 3).

The mean serum TC, serum TG, serum HDL, serum LDL, serum VLDL levels in Oral submucous fibrosis group were 146 ± 32.31 , 121.8 ± 45.32 , 49.06 ± 16.08 , 60.7 ± 30.71 , 23.06 ± 10.34 mg/dl (Table 4).

However, in the control group these values are respectively 192.6 ± 53.25 , 127.53 ± 40.77 , 60.63 ± 17.41 , 98.63 ± 19.41 , 34.6 ± 12.09 mg/dl (Table 4).

A statistically significant reduction [$P < 0.01$] was noted between the control group and study group (Table 4).

Discussion

Oral submucous fibrosis is one of the most poorly understood and unsatisfactorily treated condition. An estimated 2.5 million people suffer from the disease in India. In spite of high prevalence in India and potential to undergo malignant transformation, this condition has not widely been investigated with relation to the serum lipid level. Early diagnosis is used for secondary prevention. It is therefore important to identify new diagnostic and predictive approaches.

The mean age of our study group patients is 32.1 years. Most of them were in second and third decades of life. Among our 30 OSMF patients, 19 were male and 11 were female. All the patients of study group had the habit of

chewing Areca. A statistical significant reduction [$P < 0.01$] was noted in serum TC, serum HDL, and serum VLDL and P value for serum TG and serum LDL [$P > 0.05$] that is statistically non significant, between the control group and OSMF cases.

The reduction in serum lipids in OSMF patients may be a consequence of, probably mediated by greater utilisation of lipid for new cell membrane synthesis.

Tilakratne et al. reported that Areca nut is the main etiological factor for OSMF. In our study most of the patients were in second to third decade of life which is similar with previous study carried by Ajai et al. [1], Haider et al. [7], Phatak et al. [13], Sinor et al. [19], Balaji Rao et al. [4], Ceena et al. [5]. Pindborg and Sirsat [14] reported maximum patients 40 to 49 years of age.

In our study serum lipids are significantly reduced in OSMF patients group when compared with control, shows similar results as Study carried out by Ajai et al. [1] reported significant reduction in serum TC, serum TG, serum HDL, serum LDL and serum VLDL. Patel et al. [12] showed similar results in patients with oral squamous cell carcinoma. Poorey et al. [15] showed significant reduction in serum TC, serum TG and serum HDL in the subject of head and neck malignancy as compared to control group. Similarly Lohe et al. [9] reported a significant reduction in serum TC and HDL in oral precancerous conditions; however LDL, VLDL and serum TG did not reveal any significant difference.

Conclusion

The result of present study shows the evidence of an inverse relationship between serum lipid profile and OSMF. The change in lipid level may have a diagnostic or prognostic role in the early diagnosis or prognostication of premalignant condition like OSMF. It appears that lower serum lipid level may be considered as a useful indicator for the changes occurring during carcinogenesis with other factors. The present findings are drawn from a smaller sample size but finding strongly suggests to do deeper study from a larger size sample.

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