Research Article

Evaluation of Lipid Profile in Oral Submucous Fibrosis and Oral Squamous Cell Carcinoma Patients

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ABSTRACT

The objective of this study is to evaluate and compare lipid profile level in oral submucous fibrosis & oral squamous cell carcinoma patients with the control group (without an oral habit). The concentration of lipid parameters was estimated by Auto span reagent kit using Screen Master 3000 Autoanalyzer and Apoprotein A1 was estimated by Immunoturbidometric assay using INTEGRA 400/400 PLUS analyzer. This study corroborates the significant difference of Apoprotein A1 not only in between oral submucous fibrosis & oral squamous cell carcinoma but also when they compared to control samples individually. A significant difference of High Density Lipoproteins in oral squamous cell carcinoma has been shown as compared to control samples. Decreased levels of High Density Lipid and Apoproteins A1 act as a useful indicator reflecting initial changes occurring in potentially malignant & in malignant conditions. It suggests an inverse relationship between lower serum lipid profile levels & head & neck cancer & potentially malignant condition.

Keywords: Oral Submucous Fibrosis, Oral Squamous Cell Carcinoma, Lipid Profile, Apo-A1 etc.

INTRODUCTION

Cancer is a major health problem worldwide. More than 11 million people are diagnosed with cancer every year. "Amongst all oral malignancies, the most common malignancy which contributes about 90% is oral squamous cell carcinoma". Globally, it is the sixth most common cancer and a major problem in regions where oral habits are common.[1] In India; cancer registries have confirmed a high incidence of oral cancer due to intense use of tobacco products. Therefore, here cancer of the oral cavity is one of five leading sites of cancer in either sex.[2] A variety of tobacco habits are prevalent in India and they differ from region to region. The most widespread is the chewing of betel-quid with tobacco and this has been demonstrated as a major risk factor for cancers of the oral cavity. Not only oral squamous cell carcinoma, but the use of Tobacco and Arecanut can also lead to precancerous lesions and conditions.[3] Oral cavity cancer is currently the most frequent cause of cancer-related deaths among Indian men, which is usually preceded by oral potentially malignant disorder like leukoplakia and/or oral submucous fibrosis.[4] Oral submucous fibrosis were first described by Schwartz in 1952 and its precancerous nature reported by Paymaster in 1956. Its prevalence ranges up to 0.4% in Indian rural population and it had been shown in one study that malignant transformation rate is of 7.6%.[3] Majority of the patients were in the 21-30 years of age group with a male to female ratio 6.8:1 in India.[5] There are various biochemical markers available for the precancer & cancerous patients; out of which one such tumor marker is serum lipid profile. Lipids are major cell membrane components essential for various biological functions including cell growth and division of normal and malignant tissue. Although its prime role in pathogenesis of coronary heart disease has been consistently found,[6] researchers have reported an association of serum lipids and lipoproteins with different cancers.[7] Thus, In our present study, we are attempting to evaluate the different biochemical lipid parameters such as total cholesterol, triglyceride, HDL, LDL, VLDL & Apo-A1 lipoprotein levels in oral submucous fibrosis and oral squamous cell carcinoma. To correlate, the lipid profile parameters studied in 3 groups oral submucous fibrosis, oral squamous cell carcinoma and in control individuals.

MATERIALS AND METHODS

Sample Size

This study has been conducted with 20 Oral submucous fibrosis patients (Group I), 20 Oral squamous cell carcinoma patients (Group II) and 20 controls (without any oral habit) (Group III).

Blood Sample Collection

Blood samples were collected after taking signed consent form from the patients. This study was conducted under the ethical supervision of the Department of Oral and Maxillofacial Pathology, V.S.P.M's Dental College and Research centre, Nagpur. About 4ml of (12-14hrs) fasting Blood samples were collected from venous arm puncture from each of the subjects. The sample was then kept in a plain sterile glass bulb and allowed to clot for 1 hour at room temperature, followed by centrifugation at 3000 RPM for 10 minutes. To avoid possible diurnal variation the samples were drawn between 8.45 a.m. and 9.30 a.m.

The serum samples were separated and stored at -20 degree C until assayed.

Inclusion Criteria

Patients with Oral Submucous Fibrosis (OSMF) and Oral Squamous Cell Carcinoma (OSCC).

Exclusion Criteria

Patients with Nephrotic Syndrome, Hyperthyroidism, Diabetes Mellitus, Blood Disorders, Heart Diseases etc.

Lipid Profile

The concentration of Cholesterol, HDL, LDL, VLDL was estimated by Autospan reagent kit using Screen Master 3000 Autoanalyzer. Protocols were run as per the manufacturer's instruction. Apoprotein A1 was estimated by Immunoturbidometric assay using INTEGRA 400/400 PLUS analyzer.

Statistical Analysis

All statistical analysis was done using SPSS 11.0 © (statistical package for social science) software. One-way analysis of variance (ANOVA) was used to determine significance of difference of mean levels of parameters across the three groups.

The post-hoc analysis was carried out using Tukey's HSD to determine significance of pairwise difference in the mean levels. The significance was tested at 5% level (p = 0.05).

RESULTS AND DISCUSSION

In the present study, the mean serum total cholesterol in OSMF was observed 138.745 ± 34.39, in OSCC it was 147.38 ± 52.01 and for the control group it was 162.25 ± 32.03.

In all groups first parameter was found to be statistically non significant, p-value 0.1872 ($p > 0.05$) [Table 2; Fig A]. The Second parameter was the mean of HDL value; in OSMF group HDL was found to be 33.22 ± 8.93, in OSCC group it was 30.84 ± 7.678 and in the control group it was

39.3 ± 12.00. Across the three groups HDL showed statistically significant difference with p-value 0.0227 ($p < 0.05$) [Table 2; Fig B]. Third parameter was the mean of triglycerides. In OSMF TG was found 110.7 ± 45.6, in OSCC it was 113.4 ± 35.79 and in the control group, it was 114.1 ± 23. So, the difference in the mean triglyceride level across three groups was found statistically insignificant with p-value 0.9516 ($p > 0.05$) [Table 2; Fig C].

Fourth parameter was mean VLDL value, in OSMF VLDL was 22.138 ± 9.11, in OSCC it was 22.7 ± 7.16 and in the control group it was 23.02 ± 6.43, which differed insignificantly in three groups with p-value 0.9351 ($p > 0.05$) [Table 2; Fig D]. Subsequently, the fifth parameter was the mean of LDL values. In the control group it was 103.87 ± 24.69, in OSMF it was 83.39 ± 27.95 and in OSCC the level of LDL was 80.69 ± 48.59, also differed insignificantly across three groups; as indicated by p-value of 0.1844 ($p > 0.05$) [Table 2; Fig E].

Sixth parameter was the significance of difference in the ratios of TG and HDL. The mean of TG/HDL ratio in the control group was estimated 1.483 ± 0.26, in OSMF it was 1.4 ± 0.4 and in OSCC the TG/HDL ratio was found to be 1.4 ± 0.7.

The TG/HDL ratio differed insignificantly across the study group and this was observed with p-value of 0.6827 ($p > 0.05$) [Table 2; Fig F].

On similar lines, next seventh parameter was the mean of the LDL/HDL ratio. In the control group the mean was found to be 2.817 ± 0.90, in OSMF it was 2.7 ± 1.3 and in OSCC 2.4 ± 1.4. There was an insignificant difference across study groups with p-value of 0.6835 [Table 2; Fig G].

Table 1: Age Profile of Subjects in Three Groups

S. No.	Groups	No. Obs.	Mean ± SD
1	Group I	20	29.65 ± 7.63
2	Group II	20	48.85 ± 10.81
3	Group III	20	30.25 ± 10.59

No. Obs = Number of Observations.

Table 2: Statistical analysis between Control samples, OSF and OSCC patients.

S. No.	Biochemical Parameter (Mg/DL)	Control	OSF Patients	OSCC Patients	P-Value
1	Total Cholesterol	162.25 ± 32.03	138.74 ± 34.39	147.38 ± 52.01	0.1872
2	HDL	39.3 ± 12	33.22 ± 8.93	30.84 ± 7.67	0.0227*
3	TG	114.1 ± 23	110.7 ± 45.6	113.4 ± 35.79	0.951
4	VLDL	23.02 ± 6.43	22.13 ± 9.11	22.7 ± 7.16	0.935
5	LDL	103.87 ± 24.69	83.39 ± 27.95	80.69 ± 48.59	0.184
6	TG/HDL	1.48 ± 0.26	1.4 ± 0.4	1.4 ± 0.7	0.682
7	LDL/HDL	2.81 ± 0.90	2.70 ± 1.3	2.4 ± 1.4	0.683
8	APO-A1	108.11 ± 18.64	95.13 ± 19.02	81.81 ± 10.90	0.0000**
9	TG/APO-A1	1.09 ± 0.33	1.23 ± 0.64	1.39 ± 0.43	0.1434

*p<0.05; ** p<0.0001

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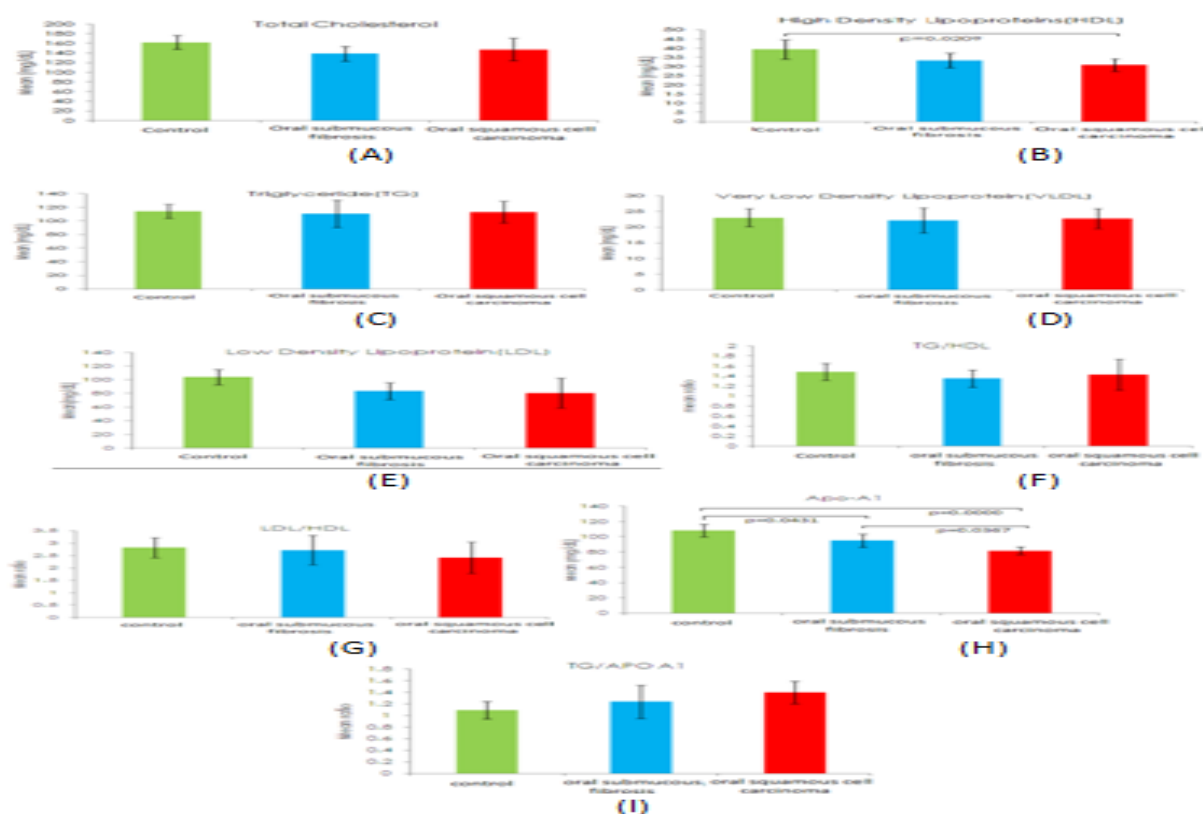Available online at www.globalresearchonline.net
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Table 3: Pairwise comparison of HDL and Apo-A1 between groups using Tukey's HSD.

Study Parameters	Pair Wise Comparison		
	Control Vs. OSF	Control Vs. OSCC	OSF Vs. OSCC
HDL	0.1249	0.0209*	0.7215
Apo-A1	0.0431*	0.0000**	0.0367*

*p<0.05; ** p<0.0001

The mean value of eight parameter; Apo-A1 in the control group was 108.11 ± 18.64, in OSMF it was 95.1345 ± 19.02 and in OSCC it was 81.81 ± 10.90. As regards Apo-A1 protein, its mean expression levels showed a highly significant difference across three groups with p-value of 0.0000 ($p < 0.0001$) [Table 2; Fig H]. The last parameter was the mean value of TG/Apo-A1. In the control group the ratio of TG/Apo A1 was 1.09 ± 0.33, in OSMF it was 1.2342 ± 0.6406 and in OSCC it was 1.3971 ± 0.43. A p-value of 0.1434 ($p > 0.05$) indicate that the difference in ratio is insignificant [Table 2; Fig I].

To determine a mean value of which groups differ significantly, *Tukey's post-hoc test* was used with the results obtained as shown in Table 3. It reveals that for HDL, the difference of mean value between Control and oral squamous cell carcinoma is statistically significant with p-value 0.0209; while the differences between control and oral submucous fibrosis; oral submucous fibrosis and oral squamous cell carcinoma was statistically not significant with p- values 0.1249 and 0.7215 respectively ($p > 0.05$).

As regards the Apo-A1 protein, its mean expression levels showed a highly significant difference across three groups with p-value of 0.0000 ($p < 0.0001$). To determine, which groups contribute to this difference, *Tukey's post-hoc test*

was used with the results obtained as shown in Table 3. It is evident from the table that Apo-A1 levels vary significantly between control and oral submucous fibrosis group ($p = 0.0431$). Also, the difference between oral submucous Fibrosis and oral squamous cell carcinoma was statistically significant with p-value of 0.0367 ($p < 0.05$). The difference between control and oral squamous cell carcinoma was highly significant with p-value of 0.0000 ($p < 0.0001$).

In India, It is found that tobacco consumption is a known etiological factor for development of oral precancerous lesion / condition and head and neck cancer. Patients with oral precancerous conditions have also been reported to show a significant tendency to develop cancer. The data were generated on 9 biochemical parameters for control group and patients with oral submucous fibrosis and oral squamous cell carcinoma these three groups were used for statistical analysis.

The level of serum cholesterol in Group I was slightly less than in both the group III and group II, respectively, and which were found to be statistically insignificant p-value 0.1872 ($p > 0.05$). Similar finding was observed by **Gupta S**.[8] The level of HDL significantly decreased in group II than group I but when compared to group II and group III, group II was significantly decreased across three groups

which shows statistically significant difference with *p*-value of 0.0227 (*p* < 0.05), representation done in Graph B. Similarly, findings were observed by **Lohe**.[9] Third biochemical parameter was the mean value of triglyceride level across the three groups, group I was 110.7 ± 45.6, group II was 113.4 ± 35.79 and group III was 114.1 ± 23, which were found statistically insignificant with *p*-value 0.9516. Similar finding was stated by **Nayak P**.[10] However, triglyceride level was found statistically significant in other studies conducted by **Lohe**,[9] **Gupta S**.[8] Fourth biochemical parameter was the mean value of VLDL levels in control group 23.02 ± 6.431, OSMF group was 22.138 ± 9.11 and in OSCC group was 22.7 ± 7.16 it was slightly lower in group (I) than the group (II) and group (III) but statistically values across three group was insignificant with *p*-value 0.9351. Similar finding were observed by **Nayak P**[10] in their study with values in control group as 23.1 ± 3.2 and in oral submucous fibrosis as 23.4 ± 4.3 p= 0.74 whereas, contrast findings were observed by **Lohe**.[9] The mean value of LDL level in control group was 103.87 ± 24.695, OSMF was 83.39 ± 27.953 & in OSCC was 80.69 ± 48.59 the level of LDL in group II is slightly decreased than group I but in relation to group III it was considerably decreased but when statistically analyzed; all the values were insignificant indicated by *p*-value of 0.1844 (*p* > 0.05). Similar finding was observed by **Chawda J**,[11] whereas, **Nayak P**[10] stated contrast findings.

An association of Triglyceride–to–HDL Cholesterol Ratio was found with Heart Rate, there was no such relation or significance found in between potentially malignant and in oral cancer patients. In the present study our objective was to see any change in a ratio of LDL/HDL level, which may assign to the new possibility for better interpretation of the data in potentially malignant and in oral cancer patients. This study corroborated no significant difference between the three groups, this was according to the **Mehrotra R**.[12] The eighth parameter was the evaluation of Apo A1. In the present study the difference between control and oral squamous cell carcinoma was highly significant with *p*-value of 0.0000 (*p* < 0.0001). In short, all the three groups differed significantly from each other. The similar significant finding was observed by **Mehrotra R** in the lipid profile of oral submucous fibrosis Apo-A1 (1.033 ± 0.169).[12]

The ratio TG/Apo-A1 mean value of control group was 1.09 ± 0.33, in OSMF it was 1.2342 ± 0.64 and in OSCC it was 1.3971 ± 0.43. The TG/Apo-A1 ratio was less in group III in relation to group I and II which were calculated for statistical significance across three groups which gave the *p*-value of 0.1434. The relation of this ratio was not observed in any cancer related study. In brief, our study showed insignificant changes in Total cholesterol, triglyceride, LDL, VLDL & the ratio of TG/HDL, LDL/HDL parameters amongst the three groups, (Table 2) while, significant changes was observed in HDL & in Apoprotein–A1 (Table 2) which was in accordance to the **Mehrotra R**.[12]

CONCLUSION

The findings of this study suggested that HDL and Apo-A1 decreased levels act as a useful indicator reflecting initial changes occurring in potentially malignant & in malignant conditions. Our findings come together to give out results that show the evidence of an inverse relationship between lower serum lipid profile levels & head & neck cancer & potentially malignant condition. The change in lipid levels may have a diagnostic or prognostic role in the early diagnosis.

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