

International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
 ISSN Online: 2617-4707
 IJABR 2022; 6(2): 127-129
www.biochemjournal.com
 Received: 26-04-2022
 Accepted: 05-06-2022

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Biochemical profile alterations of lipids in oral submucous fibrosis

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DOI: <https://doi.org/10.33545/26174693.2022.v6.i2b.149>

Abstract

Oral Submucous Fibrosis (OSMF) in India has been attributed to the increased consumption of areca nut. Oral Submucous Fibrosis (OSMF) is a chronic disease of the oral cavity which is characterized by an epithelial and sub epithelial inflammatory reaction followed by fibro elastic changes in the mucosa. The present study was aimed to estimate serum lipid profile *i.e.* Total cholesterol (TC), Triglycerides (TG), High Density Lipoprotein (HDL-C), Low Density Lipoprotein (LDL-C), Very Low Density Lipoprotein (VLDL-C) in Moderate Oral Submucous Fibrosis and compared with controls. The study subjects were divided into 2 groups *i.e.* Group-I (Moderate Oral Submucous Fibrosis), Group-II (controls). Group-I includes n=50 patients of clinically diagnosed and histopathologically proven of Moderate Oral Submucous Fibrosis. They were in the age group of 20-45 years. Group-II (controls) were age and sex-matched, apparently healthy volunteers (n=50) were included in this study. Serum lipid profile was analyzed in all study subjects using by Randox Rx daytona Auto Analyzer. The present study showed statistically significant decreased serum levels of Total Cholesterol (TC), Triglycerides (TG), High Density Lipoprotein Cholesterol (HDL-C), Low Density Lipoprotein Cholesterol (LDL-C) and Very Low Density Lipoprotein Cholesterol (VLDL-C) levels in group-I when compared with group-II. The changes in lipid profile have long been associated with cancer because lipids play key role in maintenance of cell integrity.

Keywords: Areca nut chewing, oral submucous fibrosis, lipid profile, oral cancer

Introduction

Oral Submucous Fibrosis (OSMF) is a disease associated with the chewing of areca nut, an ingredient of betel quid and is prevalent in South East Asian populations. Pindborg in 1966 defined OSMF as “An insidious chronic disease affecting any part of the oral cavity and sometimes pharynx, although occasionally preceded by and/or associated with vesicle formation, it is always associated with Juxtaepithelial inflammatory reaction followed by fibro elastic changes in the lamina propria, with epithelial atrophy leading to stiffness of the oral mucosa causing trismus and difficulty in eating”. The association of betel quid chewing, oral submucous fibrosis and oral squamous cell carcinoma is quite profound in Indian subcontinent ^[1].

Areca nut chewing is known to cause local trauma and injury to the oral mucosa due to its abrasive nature. This could be more severe in users of pan masala and gutkha due to their fine particulate nature, with the high probability of particle adhesion to the traumatized mucosa, leading to morphological changes and membrane damage. This continuous local irritation by pan masala, gutkha (or) areca nut can lead to injury related chronic inflammation, oxidative stress and subsequent Reactive Oxygen Species (ROS) generation can induce cell proliferation, cell senescence (or) apoptosis, depending upon the level of ROS production. During chronic exposure, these events can lead to preneoplastic lesions in the oral cavity and subsequently to malignancy ^[2].

Lipids are an important part of living cells. Cholesterol and triglycerides are easily stored in the body. They serve as a source of fuel and are important constituent for the structure of cells. These are major cell membrane components essential for various biological functions, including cell growth and division of normal and malignant tissues ^[3].

The decrease in the level of cholesterol has been associated with an increased risk of cancer ^[4]. Cellular uptake and regulation of cholesterol is mediated by lipoprotein receptors, especially located on the surface of the cells.

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For transport in plasma, triglycerides and cholesterol are packaged into lipoprotein which are then taken up and degraded by cells to fulfil demands for cellular functions. In some malignant diseases, blood cholesterol undergoes early and significant changes. Low level of cholesterol in the proliferating tissues and in blood compartments could be due to carcinogenesis. Usefulness of variations in tissues/blood cholesterol levels in diagnosis and treatment of various disease has been proved [5].

The present study was taken up to estimate lipid profile *i.e.* TC, TG, HDL-C, LDL-C, VLDL-C in Moderate Oral Submucous Fibrosis and compared with controls.

Materials and Methods

This study was carried out in the Department of Biochemistry (2018-19) at College of Dental Science and Hospital, Bhavnagar, Gujarat, India. The study protocol was approved by the institutional ethics committee.

Inclusion Criteria

1. The all study subjects were males. All study subjects divided into 2 groups *i.e.* Group-I (Moderate Oral Submucous Fibrosis), Group-II (controls).
2. Group-I includes n=50 patients of clinically diagnosed and histopathologically proven of Moderate Oral Submucous Fibrosis (OSMF). They were in the age group of 20-45 years.
3. Group-II includes n=50 Moderate OSMF with following symptoms difficulty in mouth opening (trismus), sinking of the cheeks out of proportion to age, stiff and small depapillated tongue, blanched floor of mouth, fibrotic gingival tissues, stiff soft palate with reduced mobility and shrunken bud-like uvula, and

blanched and atrophic tonsils.

4. Group-II (controls) were age and sex-matched, apparently healthy volunteers (n=50) were included in this study.

Exclusion Criteria

1. Patients with systemic disease or any major illness
2. Subjects with cardiovascular diseases

Biochemical Analysis

Blood samples were obtained following an overnight fasting (12 hours). 5 ml of blood with drawn from a cubital vein into blood tubes. The serum was then separated from the cells by centrifugation at 3000 rpm for 10 min and analyzed immediately. Serum Total Cholesterol, Triglyceride, HDL-C, LDL-C, VLDL-C was measured by end-point method using Randox Rx daytona Auto Analyzer.

Reference values: Total cholesterol: <200 mg/dl, Triglycerides: 0-150 mg/dl, HDL-C: 30-60 mg/dl, LDL-C: 0-100 mg/dl, VLDL-C: 20-50 mg/dl.

Results

The results of this study showed that the decrease in serum lipid profile levels of Total Cholesterol, Triglycerides, HDL-C, LDL-C, VLDL-C in Moderate Oral Submucous Fibrosis when compared with controls.

The statistical analysis was performed using SPSS software version 11.0. The descriptive results were expressed as Mean and Standard deviation. Significance of the difference between the patient and control groups observed was assessed by using the student t-test.

Table 1: Comparison of serum lipid profile in Group-I (Moderate Oral Submucous Fibrosis) with Group-II (Controls)

| Lipid Profile In Serum | Group-I (Moderate Oral Submucous Fibrosis) | Group-II (Controls) | p-value |
|---------------------------|--|---------------------|---------|
| Total Cholesterol (mg/dl) | 107.46±14.13 | 159.48±19.06 | <0.05 |
| Triglycerides (mg/dl) | 87.53±8.28 | 135.65±11.3 | <0.05 |
| HDL Cholesterol (mg/dl) | 28.98±8.17 | 53.96±3.88 | <0.05 |
| LDL Cholesterol (mg/dl) | 64.26±6.16 | 90.96±5.95 | <0.05 |
| VLDL Cholesterol (mg/dl) | 17.96±4.50 | 41.36±3.95 | <0.05 |

p-value ≤ 0.05 was considered statistically significant

Table-1: Shows that statistically significant decreased serum lipid profile in moderate oral submucous fibrosis when compared to controls. In this observed that levels of total cholesterol shown decreased mean (107.46) when compared to controls mean (159.48), levels of triglycerides shown decreased mean (87.53) when compared to controls mean (135.65), levels of total HDL Cholesterol shown decreased mean (28.98) when compared to controls mean (53.96), levels of LDL cholesterol shown decreased mean (64.26) when compared to controls mean (90.96), levels of VLDL cholesterol shown decreased mean (17.96) when compared to controls mean (41.36).

Discussion

Oral cancer quite common in India. Several thousands of persons are affected by oral submucous fibrosis, Oral cancer developing from a precancerous lesion is quite common phenomenon these days. The harmful habits such as use of tobacco intake in both smoking and smokeless forms, pan masala and Gutkha chewing and products which contain

areca nut are the main causative agent for premalignant disorders [6].

Lipids are major cell membrane components essential for various biological functions including cell growth & division of normal & malignant tissues. The habit of areca nut chewing with betel quid, tobacco smoking & alcohol consumption are the most important etiological factors for the development of oral submucous fibrosis [7].

The present study selected 50 study subjects (Moderate Oral Submucous Fibrosis) and 50 healthy subjects (controls) in the comparable group. The study population comprised fully of males. The present study was aimed to estimate lipid profile in Moderate Oral Submucous Fibrosis and compared with controls.

In the present study, comparison of the serum lipid profiles among Moderate OSMF groups and corresponding controls showed that there was a decrease in TC, TG, HDL, LDL, VLDL levels in the study group compared to controls. These findings were consistent with the studies done by Patel *et al.* [8], Lohe *et al.* [9] and Ravi *et al.* [10] who also observed

decrease in TC, TG, HDL, LDL, VLDL levels in OSMF patients.

The present study observations were supported by various authors which may occur due to reason that the lipids are major cell membrane components required for growth and division of normal cells. In 1999, Grieb *et al.* ^[11] showed a relatively high risk of cancer with a significant lower total cholesterol and HDL. A similar study by Sharma *et al.* ^[12] showed a significant decrease in serum cholesterol, LDL in OSMF patients. Gupta and Gupta ^[13] observed a significant decrease in plasma TC and HDL in patients with the precancerous lesions and conditions as compared to the controls.

Conclusion

High prevalence of premalignant condition like OSMF and their potential to undergo malignant transformation, this condition has not widely been investigated with respect to the serum lipid levels. Early detection is also called as secondary prevention. It is, therefore, important to identify new diagnostic and predictive approaches. The low levels of serum lipid profile serves as a diagnostic indicator or marker in early detection of oral precancerous and cancerous states.

Acknowledgment

We, authors are thankful to subjects for their cooperation to finish this study.

Conflict of Interest

Not available

Financial Support

Not available

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How to Cite This Article

Vikram B, Dharwadkar AA. Biochemical profile alterations of lipids in oral submucous fibrosis. *National Journal of Clinical Orthopaedics*. 2022;6(2):127-129.

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