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Assessment of serum lipid profile in patients with oral potentially malignant disorders

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Abstract

Background: To assess the serum lipid profile in oral potentially malignant disorder patients.

Materials & methods: A total of 40 subjects were enrolled. Age of the patients was 40 to 70 years. 20 clinically diagnosed with oral potentially malignant disorders were included in this study. 20 healthy individuals, who had no complaint or any major illness in the recent past, were included in the study as controls. Laboratory investigations were done. Blood samples were collected. Plasma levels of cholesterol, triglycerides, and HDL were calculated. Result was analysed using SPSS software.

Results: In group I, the triglycerides level was 135.62 mg/dl and in group II, the triglycerides level was 195.3 mg/dl. A statistically significant $P < 0.001$, decrease in mean plasma triglyceride level is observed in the oral potentially malignant disorder (OPMD) group as compared with the control group. In group I, levels of HDL, LDL and VLDL were 50.62 mg/dl, 90.36 mg/dl and 22.63 mg/dl whereas in control group the levels were 74.82 mg/dl, 108.46 mg/dl and 34.66 mg/dl respectively. Statistically significant $P < 0.001$ decrease of plasma LDL levels is observed in the oral potentially malignant disorder as compared to the control group.

Conclusion: The change in lipid levels can have a diagnostic role in oral potentially malignant disorder patients.

Keywords: HDL, pre cancer, lipid levels

Introduction

Early detection is the key for oral cancer control. Oral potentially malignant disorder usually precede oral cancer [1]. Oral cancer is one of the most prevalent cancers and is the tenth most common causes of death [2]. Oral squamous cell carcinoma is often preceded by specific potentially malignant disorders; the most common among them are the oral leukoplakia and oral submucous fibrosis (OSMF). Well-known risk factors are consumption of tobacco, areca nut and alcohol, which result in increased free radicals production. Free radicals cause lipid peroxidation, which in turn affects various cellular vital activities including growth, differentiation and gene expression [3]. Potentially malignant oral epithelial lesions (PMOELs) are a group of oral conditions and diseases that can be present before the onset of OSCC and include a group of clinically suspect oral mucosal lesions such as leukoplakia, erythroplakia, submucosal fibrosis, and lichen planus. The majority of OPMDs, however, do not progress to cancer [4].

Lipids are essential biomolecules for maintenance of various biological functions including stabilization of deoxyribonucleic acid helix, cell growth and division in normal as well as in malignant tissues [5]. The usefulness of variations in blood cholesterol levels in diagnosis and treatment of various diseases have been studied by several workers. An increase in the level of cholesterol is a major risk factor for coronary heart diseases; on the other hand, the decrease in the level of cholesterol has been associated with an increased risk of cancer.

Cholesterol is an amphipathic lipid and it is an essential structural component of all cell membranes and of the outer layer of plasma lipoproteins. It is present either as free cholesterol or combined with a long-chain fatty acid, as cholesterylester in tissues and in plasma lipoprotein [6]. Fundamentally the development of a malignancy requires the uncontrolled and excessive proliferation of cells [7]. These rapidly forming cells need many basic components well above the normal limits which are used in physiological process. One such component

which forms major cell membrane components essential for various biological functions including cell division and growth of normal and malignant tissues is lipids. Lipid stores are diminished due to increased use of lipids by this rapidly dividing cells^[8]. Hence, this study was conducted to assess the serum lipid profile in oral potentially malignant disorder patients.

Materials & methods

A total of 40 subjects who visited to the post graduate department of Oral Medicine and Radiology, Government Dental College and Hospital Srinagar, during time period of (Oct 2020 -dec 2021) were enrolled in this study. The age of the patients was in the range of 40 to 70 years. The study includes 20 patients with clinical diagnosis of various oral potentially malignant disorders and 20 healthy individuals, who had no complaint or any major illness in the recent past, as controls. Signs, symptoms, and detailed history including habits, histopathology, and extended lipid profile estimation were recorded in all patients. Laboratory investigations were done. Blood samples were collected. Plasma levels of cholesterol, triglycerides, and HDL were calculated. Result was analysed using SPSS software.

Results

The study comprised of 40 patients who were divided into 2 groups. In Group I (OPMD group), total number of patients were 20 out of which 8 were females and 12 male subjects. In Group II (control group), total number of patients were 20 out of which 5 were females and 15 male subjects.

In group I, the triglycerides level was 135.62 mg/dl and in group II, the triglycerides level was 195.3 mg/dl. A statistically significant $P < 0.001$, decrease in mean plasma triglyceride level is observed in the OPMD group as compared with the control group. In group I, levels of HDL, LDL and VLDL were 50.62 mg/dl, 90.36 mg/dl and 22.63 mg/dl whereas in control group the levels were 74.82 mg/dl, 108.46 mg/dl and 34.66 mg/dl respectively. Statistically significant $P < 0.001$ decrease of plasma LDL levels is observed in the OPMD group as compared to the control group. The total cholesterol level was 170.40mg/dl for OPMD group and 218.56 mg/dl for control group. Statistically significant ($P < 0.001$) decrease of plasma TC level is observed in the OPMD group as compared to the control group.

Table: Comparison of lipid profile

Lipid Parameters	Group I	Group II	Significance
Triglycerides (mg/dl)	135.62	195.3	<0.001*
HDL (mg/dl)	50.62	74.82	<0.001*
LDL (mg/dl)	90.36	108.46	<0.001*
VLDL mg/dl)	22.63	34.66	<0.001*
Total cholesterol (mg/dl)	170.40	218.56	<0.001*

*: significant

Discussion

The habit of tobacco consumption is a known etiologic factor for development of oral potentially malignant disorders and head/neck cancer^[3]. It is believed that tobacco carcinogens induce generation of free radicals and reactive oxygen species, which are responsible for high rate of oxidation/peroxidation of polyunsaturated fatty acids^[9]. Lipid peroxidation further releases peroxide radicals. There is substantial evidence that the hydroxyl radical generated, can destruct tissue by initiation and propagation of lipid

peroxidation by abstracting hydrogen from unsaturated fatty acids. This affects essential constituents of the cell membrane and might be involved in carcinogenesis/tumorigenesis^[10]. In this study comprising of 40 patients who were divided into 2 groups. In Group I (OPMD group), total number of patients were 20 out of which 8 were females and 12 male subjects. In Group II (control group), total number of patients were 20 out of which 5 were females and 15 male subjects. In group I, the triglycerides level was 135.62 mg/dl and in group II, the triglycerides level was 195.3 mg/dl. A statistically significant $P < 0.001$, decrease in mean plasma triglyceride level is observed in the OPMD group as compared with the control group.

A study by Mehta R *et al.*, the study comprised of 60 patients with oral precancerous lesions/conditions, 60 patients with oral potentially malignant disorder and a control group of 60 healthy individuals. Under aseptic condition 5 ml venous blood of overnight fasting patient was withdrawn from each individual. Serum was separated by centrifugation and plasma levels of TC, LDL, HDL, VLDL and triglycerides were estimated. Descriptive statistical analysis has been carried out in the present study. Statistically significant decrease in levels of plasma TC, LDL, HDL, VLDL and triglycerides was observed in the OPMD and cancerous groups as compared to the control group. On comparison between OPMD and cancerous groups, significant decrease was observed in cancerous group^[11]. In our study, in group I, levels of HDL, LDL and VLDL were 50.62 mg/dl, 90.36 mg/dl and 22.63 mg/dl whereas in control group the levels were 74.82 mg/dl, 108.46 mg/dl and 34.66 mg/dl respectively. Statistically significant $P < 0.001$ decrease of plasma LDL levels is observed in the OPMD group as compared to the control group. The total cholesterol level was 170.40 mg/dl for pre cancer group and 218.56 mg/dl for control group. Statistically significant ($P < 0.001$) decrease of plasma TC level is observed in the OPMD group as compared to the control group.

Another study by Garg D *et al.*, 20 clinically and histopathologically proven patients of OPMD and oral cancer each were compared with 20 healthy controls. In these groups, serum lipids including: (i) Total cholesterol. (ii) Triglycerides (TGL). (iii) High density lipoprotein cholesterol (HDL), low density lipoprotein cholesterol (LDL) and very low density lipoprotein cholesterol (VLDL) were analyzed. Decrease in plasma total cholesterol, triglycerides, HDL, LDL, VLDL in the subjects with the OPMD and oral cancer as compared to the controls was statistically significant. There was also decrease in plasma levels of TGL and VLDL in oral cancer subjects as compared to OPMD subjects. Thus, it was found that there is an inverse relationship between plasma lipid levels and patients^[12].

Another study by Subbulakshmi *et al.*, study was done in three groups of patients - OSMF, OSCC, and control. There are twenty participants in each group. Calorimetric method using semi-autoanalyzer was used for analyzing the lipid levels (cholesterol, triglycerides [TGL], and high-density lipids [HDL]) after collecting 2 ml of fasting blood from these patients. Low-density lipid [LDL] values were obtained by calculator method. There was a significant decrease in serum lipid levels of patients with OSMF and OSCC. The decrease in lipid levels in OSMF and OSCC patients is due to its utilization by the cells during the cancer process^[13].

Gupta *et al.* observed a significant decrease in plasma total cholesterol, HDLC, and triglycerides in the patients with the oral potentially malignant disorders as compared to the

controls. They showed a higher levels of cholesterol and lower levels of HDLC and triglycerides as compared to the OSCC group. The decrease in plasma cholesterol in squamous cell carcinoma cases may be due to enhanced lipid peroxidation due to decline in antioxidants [14]. Subapriya *et al.* have reported enhanced lipid peroxidation with decline in antioxidants in venous blood of patients with OSCC at different intraoral sites [15].

Conclusion

The change in lipid levels can have a diagnostic role in patients suffering from various oral potentially malignant disorders.

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