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Original Research

Assessment of serum lipid profile in patients with oral precancer lesions

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ABSTRACT:
Background: The study was conducted for the assessment of serum lipid profile in patients with oral precancer lesions. **Material and methods:** This study was conducted for the assessment of serum lipid profile in patients with oral precancer lesions. The study comprised of 135 participants who underwent oral clinical examination. The subjects had been asked for consent before proceeding with the study. The subjects who gave consent had been enrolled in the study. However, 35 out of 135 participants did not consent for the study and hence they were excluded from the trial. So finally, there were 100 participants who had been enrolled in the study and went oral clinical examination. The subjects had been divided into 2 groups of 50 each. Group 1 comprised of 50 controls and Group 2 comprised of 50 subjects with oral precancer lesions. The serum lipid profile of these 100 participants had been compared and the results had been tabulated. Statistical analysis was conducted using SPSS software. **Results:** In this study, there were 63 male and 37 female with oral precancer lesions. There were 50 subjects with oral precancer lesions in Group 2 and 50 controls in Group 1. The study's results indicated that individuals with a diagnosis of oral precancer exhibited an average plasma triglyceride concentration of 157.8 mg/dl, which is significantly lower than the control group's average of 117.9 mg/dl. Furthermore, the mean total cholesterol (TC) level in the precancer cohort was noted to be 154.2 mg/dl, in stark contrast to the non-cancer group, which presented a considerably higher mean of 213.7 mg/dl. The average levels of high-density lipoprotein (HDL) were recorded at 85.5 mg/dl for the non-cancer group, whereas the precancer group showed a markedly lower average of 34.1 mg/dl. Additionally, the mean plasma low-density lipoprotein (LDL) levels were 103.4 mg/dl in the non-cancer group compared to 56.2 mg/dl in the precancer group. The findings also revealed that the average plasma very low-density lipoprotein (VLDL) levels were 48.4 mg/dl in the control group, while the oral precancer group had an average of 8.57 mg/dl. Lastly, the ratio of total plasma cholesterol to HDL was determined to be 3.69 in the healthy cohort and 8.64 in the oral precancer group. **Conclusion:** The association between the risk of oral cancer and serum lipid profiles seems to exhibit a negative correlation. Studies suggest that a decrease in blood lipid levels may act as an early marker for neoplastic cellular changes before the onset of clinical symptoms.
Keywords: precancer, serum lipid profile, triglycerides

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INTRODUCTION

In recent years, head and neck cancer has emerged as a significant contributor to morbidity and mortality rates. Oral carcinoma, in particular, ranks among the most common cancers and is listed among the top ten causes of death. Consequently, earlier diagnosis of this cancer correlates with improved patient outcomes. Typically, oral cancer is preceded by initially non-cancerous lesions, which are classified as precancerous. A range of premalignant lesions and conditions with the potential for malignancy primarily

includes leukoplakia, erythroplakia, oral lichen planus, and oral submucous fibrosis.[1,2]

Biochemical investigations into cancer have revealed that various substances exhibit quantitative alterations in serum during tumor progression, known as tumor markers. Therefore, if these biochemical changes manifest prior to the onset of overt cancer, it becomes possible to assess the risk associated with specific individuals who present with oral precancerous lesions and conditions.[3-5]

Cholesterol, an amphipathic lipid, serves as a crucial structural element of all cell membranes and the outer layer of plasma lipoproteins. It exists in two forms: free cholesterol and cholesteryl ester, the latter being a combination with long-chain fatty acids found in tissues and plasma lipoproteins. The development of malignancy fundamentally necessitates the uncontrolled and excessive proliferation of cells.[6-8]

These rapidly dividing cells require an abundance of essential components that exceed normal physiological levels. Among these components, lipids play a vital role as major constituents of cell membranes, which are critical for various biological functions, including cell division and the growth of both normal and malignant tissues. The lipid reserves are often depleted due to the heightened demand for lipids by these rapidly proliferating cells.[8,9] This study was conducted for the assessment of serum lipid profile in patients with oral precancer lesions.

Material and methods

This study was conducted for the assessment of serum lipid profile in patients with oral precancer lesions. The study comprised of 135 participants who underwent oral clinical examination. The subjects had been asked for consent before proceeding with the study. The subjects who gave consent had been enrolled in the study. However, 35 out of 135 participants did not consent for the study and hence they were excluded from the trial. So finally, there were 100 participants who had been enrolled in the study and went oral clinical examination. The subjects had been divided into 2 groups of 50 each. Group 1 comprised of 50 controls and Group 2 comprised of 50 subjects with oral precancer lesions. The serum lipid profile of these 100 participants had been compared and the results had been tabulated. Statistical analysis was conducted using SPSS software.

Results

Table 1: Gender-wise distribution of subjects

Gender	Number of subjects	Percentage
Male	63	63
Female	37	37
Total	100	100

In this study, there were 63 male and 37 female with oral precancer lesions.

Table 2: Group-wise distribution of subjects

Groups	Number of subjects	Percentage
Group 1 (Controls)	50	50
Group 2 (Oral precancer lesions)	50	50
Total	100	100

There were 50 subjects with oral precancer lesions in Group 2 and 50 controls in Group 1.

Table 3: Serum lipid profile of subjects with oral precancer.

Lipid parameters (mg/dl)	Control group	Oral precancer group
Triglycerides	157.8	117.9
Total cholesterol (TC)	213.7	154.2
HDL	85.5	34.1
LDL	103.4	56.2
VDL	48.4	8.57
Cholesterol-HDL ratio	3.69	8.64

The study's results indicated that individuals with a diagnosis of oral precancer exhibited an average plasma triglyceride concentration of 157.8 mg/dl, which is significantly lower than the control group's average of 117.9 mg/dl. Furthermore, the mean total cholesterol (TC) level in the precancer cohort was noted to be 154.2 mg/dl, in stark contrast to the non-cancer group, which presented a considerably higher mean of 213.7 mg/dl. The average levels of high-density lipoprotein (HDL) were recorded at 85.5 mg/dl for the non-cancer group, whereas the precancer group showed a markedly lower average of 34.1 mg/dl. Additionally, the mean plasma low-density lipoprotein (LDL) levels were 103.4 mg/dl in the non-cancer group compared to 56.2 mg/dl in the precancer group. The findings also revealed that the average plasma very low-density lipoprotein (VLDL) levels were 48.4 mg/dl in the control group, while the oral precancer group had an average of 8.57 mg/dl. Lastly, the ratio of total plasma cholesterol to HDL was determined to be 3.69 in the healthy cohort and 8.64 in the oral precancer group.

Discussion

In recent years, detection of molecular markers is being emphasized. Body fluids such as saliva, blood, urine and others are used for early diagnosis, predicting prognosis and monitoring the progression of diseases. Blood based tests is more appealing; with the view of its ease, economic advantage and possibility to repeat sampling.[10]

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.[11] 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.

Oral cancer is one of the most prevalent cancers and is the tenth most common causes of death. 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. [12,13]

This study was conducted for the assessment of serum lipid profile in patients with oral precancer lesions.

In this study, there were 63 male and 37 female with oral precancer lesions. There were 50 subjects with oral precancer lesions in Group 2 and 50 controls in Group 1. The study's results indicated that individuals with a diagnosis of oral precancer exhibited an average plasma triglyceride concentration of 157.8 mg/dl, which is significantly lower than the control group's average of 117.9 mg/dl. Furthermore, the mean total cholesterol (TC) level in the precancer cohort was noted to be 154.2 mg/dl, in stark contrast to the non-cancer group, which presented a considerably higher mean of 213.7 mg/dl. The average levels of high-density lipoprotein (HDL) were recorded at 85.5 mg/dl for the non-cancer group, whereas the precancer group showed a markedly lower average of 34.1 mg/dl. Additionally, the mean plasma low-density lipoprotein (LDL) levels were 103.4 mg/dl in the non-cancer group compared to 56.2 mg/dl in the precancer group. The findings also revealed that the average plasma very low-density lipoprotein (VLDL) levels were 48.4 mg/dl in the control group, while the oral precancer group had an average of 8.57 mg/dl. Lastly, the ratio of total plasma cholesterol to HDL was determined to be 3.69 in the healthy cohort and 8.64 in the oral precancer group.

This study by Garg D et al[14] evaluated the alterations in serum lipid profile in untreated patients of oral submucous fibrosis (OSMF), oral leukoplakia, and oral lichen planus and proven cases of oral cancer with respect to healthy controls. In this case control study, 20 clinically and histopathologically proven patients of oral precancer 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 analysed. Decrease in plasma total cholesterol, triglycerides, HDL, LDL, VLDL in the subjects with the oral precancer 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 precancer subjects. Thus, it was found that there is an inverse relationship between plasma lipid levels and patients. Post operative morbidity was increasing along with more operating time and increase in the depth of mandibular third molar impaction.

Mehta R et al.[15] The present study was undertaken to estimate and compare the levels of plasma total cholesterol (TC), low density lipoprotein (LDL), high density lipoprotein (HDL), very low-density lipoprotein (VLDL) and triglycerides in patients with oral precancerous lesions/conditions, oral cancer and normal subjects. The study comprised of 60 patients with oral precancerous lesions/conditions, 60 patients with oral cancer and a control group of 60 healthy individuals. The diagnosis of oral precancerous lesions/conditions and oral cancer was confirmed histopathologically. 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. Analysis of variance has been used to find the significance of study parameters between three or more groups of patients, Post-hoc test as Tukey has been used to find the pair wise significance. Significance is assessed at 5% level of significance. Statistically significant decrease in levels of plasma TC, LDL, HDL, VLDL and triglycerides was observed in the precancerous and cancerous groups as compared to the control group. On comparison between precancerous and cancerous groups, significant decrease was observed in cancerous group. The change in lipid levels may have an early diagnostic or prognostic role in the oral premalignant lesions/conditions and oral cancer. The presence of decreased plasma lipid profile should increase the suspicion of these lesions to be investigated further.

Conclusion

The association between the risk of oral cancer and serum lipid profiles seems to exhibit a negative correlation. Studies suggest that a decrease in blood lipid levels may act as an early marker for neoplastic cellular changes before the onset of clinical symptoms.

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