

Estimation of Serum Lipid Profile Patterns As A Diagnostic Marker In Oral Cancer and Precancer

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ABSTRACT

Background: Lipids play a main role in maintenance of cell membrane integrity. Variation in serum lipid levels has been related with cancers. **Aims and Objectives:** To estimate serum lipid profile levels in oral cancer and precancer patients and to find out their role as a diagnostic and prognostic marker. **Materials and Methods:** Our study included 20 patients with oral cancer, 20 with precancerous lesions and 10 normal patients. In all these 50 subjects, serum lipid profile: Total cholesterol, Triglycerides (TGL), High density lipoprotein cholesterol (HDL), low density lipoprotein cholesterol (LDL) and very low density lipoprotein cholesterol (VLDL) were analyzed using automatic analyzer. **Results:** When compared with controls, there was a significant decrease in levels of TC, TGL, HDL, LDL and VLDL in oral cancer and precancer patients. The mean serum lipid profiles were not statistically significant with respect to the oral cancer and precancer groups. **Conclusion:** There is a significant inverse relationship between serum lipid profile and oral cancer and precancer.

Keywords: leukoplakia, lipid, oral cancer, triglycerides, total cholesterol

Introduction

Lipids are main components of cell membrane essential for diverse biological activities like cell growth and division of both normal as well as malignant cells. Lipid profile in normal individuals depends on the function of specific receptors on the cell surface.[1, 2] Incidence of oral cancer has been in rise in recent times and is considered as one of the most common causes of the death worldwide.[3] To reduce the morbidity and mortality rates of oral cancer, early diagnosis and prompt treatment play a crucial role. Oral cancers are usually preceded by precancerous lesions and conditions like oral submucous fibrosis, leukoplakia etc. now referred as potentially malignant conditions.[3,4]

Altered blood cholesterol levels has been found to be increased in diseases like coronary heart disease, cancers like breast cancer and colorectal cancer.[5] Where as only few studies have been conducted estimating serum lipid profiles in oral cancers. Studies have shown that patients with low serum lipid levels were at increased risk for cancer.[4-6] This study was done to find out the serum lipid profile levels in patients with oral cancer and oral precancer patients and to assess its role as diagnostic and prognostic marker.

Materials and method

We carried our study in 50 subjects, 20 clinically and histopathologically diagnosed as oral cancer (**Fig 1 and 2**), 20 as precancer (**Fig 3 and 4**) and 10 controls, reported to S.B Patil Dental College and Hospital, Bidar, Karnataka, India.

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Fig 1: Oral cancer on left lateral border of tongue

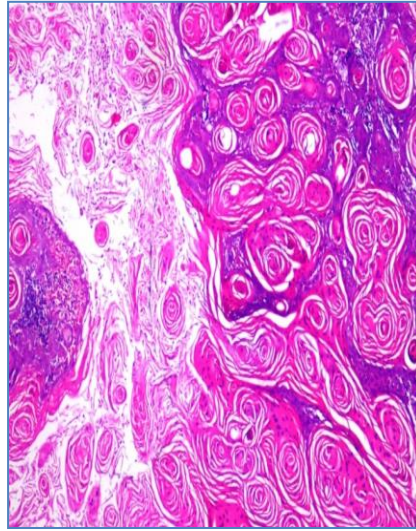


Fig 2: Photomicrograph showing well differentiated squamous cell carcinoma



Fig 3: Oral leukoplakia in left buccal mucosa

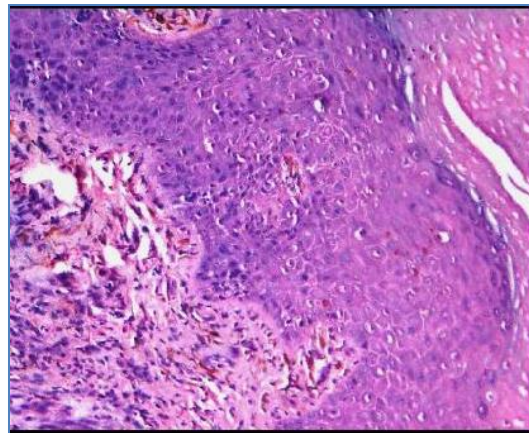


Fig 4: Photomicrograph of leukoplakia as mildly dysplastic oral epithelium

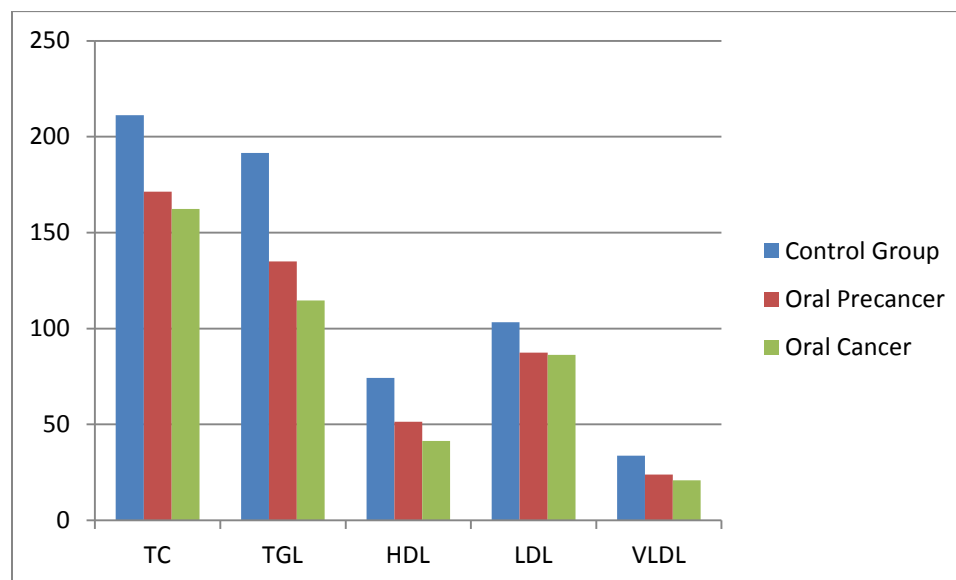
Initially all the patients were explained about the procedure and their consent was taken. After obtaining institutional ethical clearance, 5 ml of blood was drawn from each patient and incubated at 37⁰ C for 1 hour. Serum lipid profile was estimated by using kits obtained from ERBA diagnostics (Transasia Bio-Medicals Ltd., Mumbai, India) and analysis was done on a automatic analyzer.

Results

Statistical product and service solutions (SPSS) version 14.0 was used for computation of statistical tests. There was a statistically significant decrease in TC, TGL, HDL, LDL and VLDL levels in oral cancer and oral precancer group when compared to controls (**Table 1 and Graph 1**).

Table 1: Comparison of mean lipid profile values between three groups

Lipid Parameter	Control (Mean± SD)	Oral Precancer (Mean±SD)	Oral Cancer (Mean±SD)	P value
TC	211.25±10.15	171.30±12.24	162.42±30.11	<0.0001
TGL	191.56±12.34	134.98±8.11	114.63±32.43	<0.0001
HDL	74.35±6.20	51.44±4.36	41.34±6.90	<0.0001
LDL	103.30±7.41	87.45±5.06	86.35±24.45	<0.0001
VLDL	33.69±4.14	23.96±3.45	20.90±6.90	<0.0001

**Graph 1: Comparison of mean lipid profile values between three groups**

Discussion

Cholesterol has a critical role in maintenance of the structural and functional integrity of all biological membranes. It is a vital component of lipoprotein fractions LDL, HDL and VLDL.[1] Tobacco consumption in various forms has been considered as the main etiologic factor in the development of oral precancers and cancers.[7, 8] It is believed that various carcinogens in tobacco induce generation of free radicals and reactive oxygen species, which in turn are responsible for oxidation / peroxidation of polyunsaturated fatty acids. This lipid peroxidation affects the essential components of cell membrane of various cells. For new membrane biosynthesis there is greater utilization of lipids like TC, TGL and lipoproteins. Such lipid requirement is fulfilled either from circulation, by synthesis through metabolism or from degradation of major lipoprotein fractions like VLDL, LDL or HDL.[9, 10] Many studies reported low serum cholesterol to be associated with increased

risk of cancer occurrence and mortality.[11] Williams et al suggested that lower level of serum cholesterol levels in cancer patients may be due to increased membrane permeability to carcinogens induced by trans fatty acids.[12]

It is not clear whether lower serum lipid profile in oral cancer and oral precancer patients was a cause or an effect of cancer. But serum cholesterol levels returning to normal in patients who are responding to cancer treatment suggested that tumor burden was inversely related to cholesterol levels rather than the tendency of individuals with lowered cholesterol to develop cancer.[13, 14]

In the present study there was a significant decrease in TC, TGL, HDL, LDL and VLDL, TG levels in oral cancer and precancer group compared with controls. which is in accordance to study of Garg et al, Mehta et al, Singh et al and Lohe et al, This low lipid levels might be due to utilization of cholesterol

for membrane biogenesis and thus may act as an early indicator of oral cancer and precancer.[5-8]

Several studies have shown that altered lipid levels may have a diagnostic or prognostic role in oral premalignant and malignant lesions. They suggest for future studies regarding lipoprotein transport and the efficiency of the receptor system, which might facilitate us in understanding the exact mechanisms that regulate cholesterol concentrations in various cancers.[12-15] Our study adds to the evidence of previous studies that showed an inverse relationship between serum lipid profile values and oral cancer and oral precancerous conditions and affirms that serum lipid profile patterns may act as a diagnostic marker in these lesions.

Conclusion

We found an inverse relationship between serum lipid profile and oral cancer and precancer and suggest that serum lipid profile may act as a useful indicator for initial changes occurring in malignant cells, thus acting as a diagnostic marker. However, further studies with a larger sample should be carried out to find out whether serum lipid profile can act as a potential biochemical indicator in early detection of oral cancer and precancer.

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