Correlation Between Of Lipid Profile And Progression Of Oral Cancer In The Population Of Madhya Pradesh

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ABSTRACT

Oral cancer is the rising public health concern in India, particularly in central state of India; Madhya Pradesh where tobacco consumption is prevalent and this habit is common among both males and females. Alterations in lipid profile have been associated with tobacco consumption and cancer pathogenesis, which could be potentially served as biomarkers for oral cancer risk.

This study evaluates and compares lipid profiles among tobacco chewers, oral cancer patients, and a healthy control group. A total of 450 participants were divided into three groups: Group A (tobacco chewers), Group B (healthy controls), and Group C (oral cancer patients). The findings revealed significant variations in lipid profiles, indicating a probable relationship between lipid metabolism and oral cancer development.

INTRODUCTION

In India oral cancer accounts for 30% of total cancer which is rising every year, incidence rate of this disease is expected to be 20 per 100,000 population. It has a high gender bias with male being affected at least three times as often as females. Factors such as tobacco chewing, tobacco smoking, and alcohol play an important role in development of oral cancer and potentially malignant disorders like OSMF, Lichen planus. Such habits are common in males than females. Although oral cancer in females is also associated with consumption of tobacco. It is believed that the initiation and progression of these conditions involves production of free radicals. Free-radicals are highly reactive species that could be found in the nucleus as well as membranes of cells and are instrumental in causing damage to DNA, proteins, carbohydrates and lipids.[1-4] 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 requirement of lipid for growth and proliferation of cancer cells alters the lipid values in an individual.[6] The decrease in the level of cholesterol has been associated with an increased risk of cancer. Changes in lipid profile have been associated with malignancy because of their key role in the maintenance the integrity of the cell membrane. The development of a malignancy requires uncontrolled and excessive proliferation of cells. As the neoplastic disease is related to new growth, there is a greater utilization of lipid, including total cholesterol (TC), lipoproteins and triglycerides (TGs) for new membrane biogenesis. In this study corelation between lipid profile and its association with progression of oral cancer is done.

MATERIALS AND METHODS

Aims and Objectives:

To evaluate if any of the abo blood groups are associated with an increased risk of oral cancer

To evaluate serum lipid profile in patient having habit of tobacco consumption

To assess whether serum lipid could be used as biomarker for Oral cancer

To estimate serum lipid profile in different histological grades of Oral cancer

Study Population: A total of 450 participants from Madhya Pradesh were included.

- Group A: 150 tobacco chewers.
- Group B: 150 healthy controls.
- Group C: 150 oral cancer patients.

Inclusion Criteria:

- Group A: Habitual tobacco chewers without oral cancer.
- Group B: Healthy individuals without tobacco habits.
- Group C: Diagnosed cases of oral cancer confirmed histopathologically.

Exclusion Criteria: Individuals with systemic diseases affecting lipid metabolism.

- Sample Collection and Analysis: Fasting blood samples were collected to analyze total cholesterol (TC), triglycerides (TG), low-density lipoprotein (LDL), and high-density lipoprotein (HDL). Lipid- blood is centrifuged for 15 mins at 3000rpm to separate the serum, it is done on chemical analyzer based on spectrometric principle.[6]

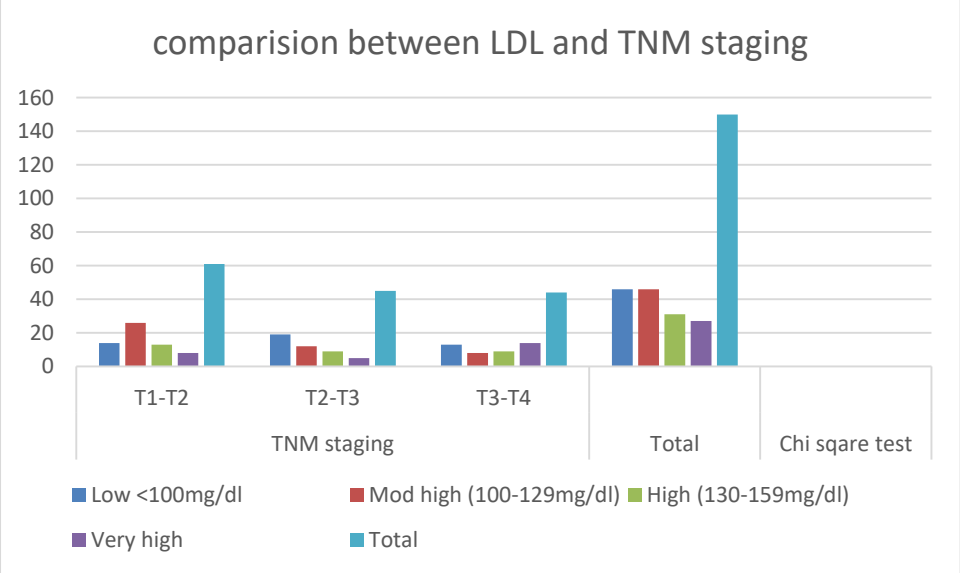
RESULTS

Association between LDL and TNM Staging

LDL	TNM staging			Total	Chi sqare test
	T1-T2	T2-T3	T3-T4		
Low <100mg/dl	14	19	13	46	
Mod high (100-129mg/dl)	26	12	8	46	
High (130-159mg/dl)	13	9	9	31	
Very high	8	5	14	27	χ^2=15.161, df=6, p=0.019
Total	61	45	44	150	

Association Total cholesterol between and TNM Staging

Cholestrol	TNM Staging			Total	Chi square test
	T1-T2	T2-T3	T3-T4		
Low	10	8	7	25	
Mod high	16	11	10	37	
High	17	14	16	47	
Very high	18	11	12	41	χ^2=0.9615, df=6, p=0.987
Total	61	44	45	150	



Statistical analysis revealed a significant difference ($p < 0.05$) in lipid profiles between the groups. Oral cancer patients exhibited the most pronounced dyslipidemia, followed by tobacco chewers.

DISCUSSION

LDL is a key component of lipid metabolism, and its levels are often altered in cancer patients. Dysregulated lipid metabolism may contribute to cancer progression by supporting rapid cell proliferation and membrane synthesis.[1] TNM staging reflects tumor size (T), lymph node involvement (N), and distant metastasis (M). The association between LDL and TNM staging may indicate significant results establishing its positive relation with alterations in LDL levels are linked to tumor growth, invasion, or metastatic potential. Low LDL levels in progressing cancer stages could result from increased lipid uptake by tumor cells. LDL levels could serve as a potential biomarker for assessing tumor stage and progression in oral cancer patients. There is no significant result associated with HDL and tumour progression, stating there is no direct association of HDL and growth potential of oral cancer p value 0.07. The elevated levels of triglyceride, VLDL, total cholesterol have not significant value in the association with cancer staging, these levels however effects tumor biology indirectly, also associated with metabolic disfunction and systemic inflammation.[8]The dysregulation of these values may not be associated with staging of oral cancer but indirectly impacts tumour growth and inflammation.[7-15]

CONCLUSION

The findings suggest that lipid profile alterations may serve as early indicators of oral cancer risk. Total cholesterol, HDL, VLDL and Triglyceride may not contribute to predispose direct association with cancer development but low level of low density lipids are significantly related with tumour staging as there is uptake of lipids by tumor cells for rapid cell growth. Thus significant p value 0.019 shows the correlation between LDL and Tumour staging, as the staging advances there is reduction in level of LDL, depending on the size of tumour thus indicating the rapid demand of low density lipids by tumor cells for growth.

Keywords: Oral cancer, lipid profile, tobacco, dyslipidemia, biomarkers, Madhya Pradesh

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