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STUDY OF LIPID PROFILE LEVELS IN PATIENTS WITH ASTHMA

Biochemistry

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ABSTRACT

Asthma is primarily a disease of childhood and its increasing prevalence, beginning in the 1980s, has been referred to as an asthma epidemic. Studies have found that lipids have many important biological functions such as energy conversion, substance transport, signal transduction, cell development and differentiation, and regulation of cell death. Lipids also play an important role in the development of asthma through inflammatory responses and oxidative stress. However, there are limited studies on the lipid phenotype of asthma using lipidomics. **Materials And Methods:** This study was conducted in ACPM Medical College, Dhule. It is hospital based case-control study. For this study we are selected 165 controls and 165 patients with Asthma. The lipid profile samples were collected from patients in fasting state. Parameters like Total cholesterol, TGL, HDL & LDL were analyzed through enzymatic method by using Chem Ultra (ASPEN). Estimation of Total Cholesterol by Glycerol phosphate oxidase-peroxidase method (Enzymatic end point method), Estimation of TGL by Polyethylene glycerol/cholesterol oxidase-peroxidase method (Enzymatic end point method), HDL cholesterol by Direct Enzymatic colorimetric method, LDL-cholesterol = total-cholesterol – HDL-cholesterol – [TG/5], where [TG/5] is an estimate of very-low-density lipoprotein (VLDL) cholesterol; all values are in mg/dL. **Result:** In our study, the mean LDL and TC/HDL were significantly greater in control as compared to case group of asthma patients. **Conclusion:** From this study, we conclude that plasma lipid and lipoprotein abnormalities associated with alterations in LDL metabolism, which contribute to the risk for CAD in majorty of patients.

KEYWORDS

CAD – Coronary Artery Disease, HDL – High Density Lipoprotein, TC – Total Cholesterol, LDL – Low Density Lipoprotein, VLDL – Very Low Density Lipoprotein.

INTRODUCTION:

Asthma is primarily a disease of childhood and its increasing prevalence, beginning in the 1980s, has been referred to as an asthma epidemic.[1] It has been estimated that the prevalence of asthma in 1980 was 3.6%, increased to 7.5% in 1995 and further increased to 9.3% in 2010. Since 2010, the overall prevalence of childhood asthma has remained unchanged or has decreased slightly.[2]

Asthmatic patients can be managed well control owing to promotion of the Global Initiative for Asthma (GINA). However, a large proportion of asthmatic patients show poor control, including refractory status, indicating that the underlying pathogenetic mechanisms are unclear.[3]

While a number of risk factors are associated with the development of childhood asthma, the condition has been linked especially to obesity and metabolic syndrome.[4] Being overweight in childhood has also been associated with an increased risk of the development of allergic disease.[5] In addition, increasing attention has been given to the association between hypercholesterolemia and obesity, as well as that between hypercholesterolemia and obesity with airway hyper-responsiveness, suggesting a potential role of cholesterol and lipid homeostasis in lung physiology and asthma.[6,7]

Lipids are widely distributed in the body, represent the majority of the metabolites in the blood, and account for 50% of the weight of the cell membrane.[8] Studies have found that lipids have many important biological functions such as energy conversion, substance transport, signal transduction, cell development and differentiation, and regulation of cell death. Lipids also play an important role in the development of asthma through inflammatory responses and oxidative stress.[9] However, there are limited studies on the lipid phenotype of asthma using lipidomics.

The primary aim of this study was to identify signature lipid biomarkers in asthma patients and controls.

MATERIALS AND METHODS:

This study was conducted in ACPM Medical College, Dhule. It is hospital based case-control study. For this study we are selected 165 controls and 165patients. Both the sexes were included in this study. The Inclusion criteria for this study is Diagnosed patients with Asthma. Patients with chronic respiratory (COPD), Osteomalacia, Rickets, Smokers, Alcoholics, Pregnant women's and Gestational diabetes patients were excluded from this study.

The lipid profile samples were collected from patients in fasting state. Parameters like Total cholesterol, TGL, HDL & LDL were analyzed through enzymatic method by using Chem Ultra (ASPEN). Estimation of Total Cholesterol by Glycerol phosphate oxidase-peroxidase method (Enzymatic end point method), Estimation of TGL by Polyethylene glycerol/cholesterol oxidase-peroxidase method (Enzymatic end point method), HDL cholesterol by Direct Enzymatic colorimetric method. LDL-cholesterol = total-cholesterol – HDL-cholesterol – [TG/5], where [TG/5] is an estimate of very-low-density lipoprotein (VLDL) cholesterol; all values are in mg/dL.[10]

RESULT:

Table – 1 Shows The Comparison Of Mean And SD Between Controls And Cases

P<0.05 considered to be significant, p<0.0001 - highly significant

DISCUSSION:

Accumulation of immune cells, activation of mast cells and smooth muscle cells, and elevated immunoglobulin E (Ig E) levels are characteristics of asthma and atherosclerosis. When the immune system is active, cytokines are released, which influence fatty acid oxidation and activate hepatic and lipoprotein lipases, leading to dyslipoproteinemia.[11]

In our study, the mean LDL and TC/HDL were significantly greater in control as compared to case group of asthma patients.

In another research done by Scichilone *et al.*,[12] they looked for relationship between different types of LDL and level of asthma control. They found that adults with moderate asthma had lower levels of LDL-1 and LDL-2 than healthy participants. While on the other hand, it was found that asthmatic adults had greater levels of LDL-3 and LDL-4 with the highest pro-inflammatory activity compared to non-asthmatic subjects. Additionally, they also found that level of LDL-3 was inversely correlated with lung function, pointing to LDL-3's potential role in the inflammatory changes to the airways.

Expert Consensus Statement on Management of Dyslipidemia in Indians [13] stated that Indians develop atherosclerotic cardiovascular disease at a younger age, have malignant disease and high case fatality rates. From this perspective, our finding that HDL is significantly higher among females of controlled asthma group highlights an important aspect, that controlling asthma could also contribute to

cardio-protection.

The association between hypercholesterolemia and obesity with airway hyper responsiveness has drawn increasing attention due to the potential role of cholesterol and lipid homeostasis in lung physiology and asthma.[14] However, the mechanism responsible for this obesity-asthma association is unknown. A high-fat meal can lead to significant increases in nitric oxide (FeNO), total cholesterol, and especially triglycerides. This suggests that a high-fat diet may contribute to chronic inflammatory diseases of the airway and lungs.[15] The disease burden of asthma appeared normal in normal weight and slightly overweight women rather than obese and markedly obese women suggests that the development of asthma may be a point on the trajectory of chronic obesity or that asthma and obesity are concurrent disorders.[16]

Therefore, it seems that all risk factors for obesity are related to asthma and even asthma exacerbation.

CONCLUSION:

From this study, we conclude that plasma lipid and lipoprotein abnormalities associated with alterations in LDL metabolism, which contribute to the risk for CAD in majority of patients. Further study may require for this dyslipidemia can be improved by a variety of therapeutic composition with premature coronary artery disease in control.

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Conflicts Of Interest: None.

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