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Patients with Type 2 Diabetes Mellitus have a Lipoprotein Subpopulation associated with Insulin Resistance and Inflammation

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Abstract

The numerous subpopulations of plasma lipoproteins, each of which has a distinct number and size of particles, are not adequately represented by the standard lipid panel. In order to determine whether certain lipoprotein subpopulations are associated with insulin resistance and inþammation markers, we sought to quantify lipoprotein subpopulations in patients with type 2 diabetes mellitus (T2DM). 57 T2DM patients ranging in age from 61.14 to 9.99 years were included in the study; HbA1c, 8.66 Ñ 1.60%; on average, BMI of 35.15 minus 6.65 kg/m2). Nuclear magnetic resonance spectroscopy was used to determine the size and count of plasma lipoprotein particles. Multi-regression analysis was used to investigate the connection between scores for glycoprotein acetylation (GlycA) and lipoprotein insulin resistance (LPIR). The largest numbers and sizes of VLDL and HDL particles were found to be most correlated with LPIR in stepwise regression analysis (R2 = 0.960; However, there was a correlation between HDL and VLDL particle concentrations and GlycA (R2 = 0.190; All sizes of lipoproteins, as well as small and large VLDL particles, independently predicted LPIR in adjusted multi-regression analysis (p = 0.0001), whereas only a small number of LDL particles independently predicted GlycA. Conventional markers HbA1c and Hs-CRP did not have a signiýcant relationship with lipoprotein subpopulations. Based on our ýndings, we hypothesize that by keeping an eye on the changes caused by insulin resistance in T2DM subpopulations of lipoproteins, we might be able to ýnd novel biomarkers that could be used in clinical intervention.

Keywords: In ammation; Lpir; Glyca; Lipoprotein Subpopulations; Lipids; Hypertension; Coronary artery Disease

Introduction

Type 2 diabetes mellitus (T2DM) is characterized by abnormalities in plasma lipids and lipoproteins, such as decreased high-density

HIMSS INFRaM-6-maturity information system infrastructure. e MNGHA Institutional Review Board approved the study's protocol (IRB protocol number IRBC/1972/18) a er each participant gave written informed consent. At the beginning of the study, patients who met one or more of the following criteria were dropped: is group included individuals who were on chronic renal replacement therapy (hemodialysis, peritoneal dialysis, or transplantation), had a history of active cancer (with the exception of basal cell carcinoma) within the previous ve years (prostatic cancer within the previous ve years), and had a history of acute infection or fever **[8]**. Systemic and other autoimmune diseases of lupus erythematosus Diabetes: subjects who had a fasting glucose level of less than 126 mg/dL (7 mmol/L), were taking a T2DM medication, and had a HbA1c of less than 6.5%. Any rst-degree relative with a T2DM diagnosis was presumed to have a T2DM family history. Dyslipidemia: subjects whose systolic or diastolic blood pressure was less than 90 mmHg and who were taking antihypertensive medications. subjects whose fasting lipid pro le contained total cholesterol greater than 200 mg/dL or LDL greater than 70 mg/dL. subjects whose dyslipidemia medication had been previously taken. CKD: subjects whose dipstick urine test used the diet modi cation equation for renal disease (MDRD) revealed proteinuria of less than 2+ or an eGFR of less than 90 mL/min **[9,10]**.

Discussion

Nuclear magnetic resonance (NMR) is one method that has been extensively utilized to investigate changes in the lipoprotein pro le in depth. However, the nature and duration of the disease, patient age, and results from diverse ethnic populations were inconsistent. Numerous studies have been conducted over the past few decades on a number of lipid-lowering medications, focusing not only on the reduction in LDLc but also on the size of LDL particles. is has increased the medication's clinical value beyond that of a standard lipid panel. the rise in small, low-density LDL. Despite the best lipid-lowering treatments, such as statins, many diabetic patients still face a high risk of cardiovascular disease (CVD) in the long run. is is because the condition is getting worse because of other factors like high hepatic secretion of large triglyceride-rich VLDL, poor VLDL clearance, and low HDL particles.

Despite the fact that universal advanced lipoprotein pro ling still faces some challenges and limitations, comprehensive NMR-derived lipoproteins analysis is a reliable and powerful tool that can expand diagnostic value and disease management when interpreting results of lipid panel and lipoproteins disturbance in T2DM patients.

Conclusions

Advanced NMR-derived lipoproteins showed that VLDL and HDL were the best predictors of T2DM patients' insulin resistance scores. LDL and HDL particle sizes were negatively correlated with LPIR but not HbA1c levels, whereas the number and size of large VLDL particles were positively correlated with LPIR. Intriguingly, systemic in ammation is not as good a predictor of insulin resistance as atherogenic lipoprotein subpopulation size and number in T2DM patients. Only small LDL particles were positively correlated with GlycA, a marker for systemic in ammation. Larger prospective longitudinal studies are required to demonstrate that advanced lipoprotein pro ling is superior in clinical settings. To identify potential subpopulations of lipoproteins, biomarkers that can be measured to predict and prevent type 2 diabetes will be utilized.

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