Abstract

Background: Glycation and oxidative modification of lipoproteins enhance the uptake of these lipids by macrophages in the early stages of atherosclerosis. Measurement of blood levels of modified LDL particles could thus constitute another useful modality in identifying subjects at high risk of coronary atherosclerosis (CHD).

Objective: To measure the Glycated LDL level and assess its associations with other metabolic parameters in diabetic and non diabetic subjects attending a University diabetic center in Riyadh.

This study was the first in Saudi & Jordan to measure the concentration of Glycated LDL in the serum of diabetic & non diabetic subjects.

Subjects and methods: Thirty one (31) type-2 diabetic patients (DM) and thirty one (31) non-diabetic (hyperlipidemic) subjects had their fasting serum samples analyzed for Fasting blood sugar (FBS), HbA1c, total cholesterol (TC), triglycerides (TG), high density lipoprotein (HDL), low density lipoprotein (LDL) (by routine auto-analyzer methods) and Glycated LDL(Gly-LDL) by ELISA.

- Most of diabetic and non-diabetic (hyperlipidemic) groups taking Atorvastatin (Lipitor) as anti-hyperlipidemic drug.
- Most of diabetic group taking Metformin for hyperglycemia.

Results: The serum Gly-LDL level was significantly higher in non-diabetic hyperlipidemic than in diabetic patients (p=0.037). The Gly-LDL level correlated significantly with LDL in diabetic patients (p = 0.035) and insignificant with other parameters, and also significantly correlated with HDL (p = 0.049), TG (p = 0.025) and VLDL (p = 0.03) in non-diabetic group and insignificant with other parameters.

Diabetic group showed significantly higher FBS (177 ± 69.9 mg/dl) in comparison to the non-diabetic group (95 ± 20.2 mg/dl) (p=0.000). Moreover, all of the diabetic patients showed Hba1c >6% which indicate uncontrolled hyperglycemia (mean ± SD = 9.9 ± 0.018) while the non-diabetic subjects showed Hba1c <6% which indicate controlled glucose level (5% ± 0.099) this difference was significantly (p=0.000).

Assessment of lipid profile in the two groups showed there are significantly lower LDL, TC and Gly-LDL ([111.7 ± 31.6 mg/dl] (p = 0.018), [160.6 ± 29.1 mg/dl] (p = 0.044), [4.09 ± 1.7 µmol/ml] (p = 0.37) respectively) in diabetic group than in non-diabetic ([131.5 ± 32.5 mg/dl], [185.3 ± 30.7 mg/dl], [5.05 ± 1.6 µmol/ml]).

The levels of HDL and TG/HDL ratio although they are lower in diabetic patient in comparison to the non-diabetic subjects but the differences were insignificant ([42.5 ± 8.2 mg/dl] (p = 0.21), [3.1 ± 1.7] (3.3 ± 2.3) (p=0.48)).

On the other hand TG and VLDL values were insignificantly higher in diabetic patients ([141.1 ± 77.8 mg/dl] (p = 0.414), [26.43 ± 15.7 mg/dl] (p = 0.468) than in non-diabetic (129.3 ± 61.9 mg/dl), [25.8 ± 12.3 mg/dl]).

In regard to the C-reactive protein (CRP) level in diabetic patients (0.39 ± 0.47 mg/ml) was insignificantly lower than in non-diabetic (hyperlipidemic) (0.59 ± 0.62 mg/ml) (p=0.32).

Conclusions:
- Serum Gly-LDL levels are increased in hyperlipidemic patients and are further decreased with diabetes taking statin, suggesting that the significant Glycation of LDL occurs in all hyperlipidemic patients irrespective of their glycemic status.
- The significant correlation of Gly-LDL with LDL in diabetic patients would suggest its potential utility as another index of medium term glycemic control.
- Gly-LDL is easily measurable and its values could provide additional information in ascertaining an individual’s aggregate CHD risk.

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Title: The effect of Glycated low density lipoprotein as Atherogenic Motivator for type-2 Diabetic Patients

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