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CROSS SECTIONAL STUDY TO KNOW THE CORRELATION OF NEPHROPATHY WITH LDL DYSLIPIDEMIA IN DIABETIC PATIENTS

[1]Talal Latif Khan,[2]Umaima faizi,[3]Saba Iqbal

[1]Lahore General Hospital
[2]THQ Hospital Sabzazar
[3]Lahore General Hospital

Abstract:

Objective: *The aim of this study was to determine the correlation and cause-and-effect relationship between LDL cholesterol and nephropathy in the diabetic population.*

Design: *cross-sectional analytical study.*

Place and Duration: *The study was performed in the Nephrology Department of Bahawal Victoria Hospital, Bahawalpur for the period of two years from June 2015 to June 2017.*

Patients and Methods: *A total of 500 adult diabetic patients were selected for this study. Serum LDL creatinine, cholesterol, microalbumin and urine macroalbumin were measured using the standard laboratory method. LDL was labeled as 100mg / dL dyslipidemia and defined as microalbuminuria or macroalbuminuria as nephropathy.*

Findings: *Of the 500 patients, 320 (71.3%) were dyslipidemia and 180 (28.7%) were nephropathy. Dyslipidemic patients (LDL> 100) showed slightly higher levels of serum creatinine with a mean creatinine level of 1.022 ± 0.74 mg / dl compared to those with a mean creatinine level of 1.004 ± 0.63 mg / dl. However, subjects with nephropathy showed a significant serum LDL cholesterol level of 125.7 ± 44.8 mg / dL compared to those without nephropathy, with an average LDL of 114 ± 39 mg / dL. The Spearman correlation was highly significant for the causal relationship between serum LDL and nephropathy (p <0.001).*

Conclusion: *The observed data indicate that the highest levels of LDL are associated with higher creatinine levels, nephropathy development and progression. Control of LDL dyslipidemia is one of the effective strategies for controlling diabetes to prevent diabetic nephropathy.*

Key words: *Diabetes, dyslipidemia, LDL cholesterol, microalbuminuria, nephropathy.*

Corresponding author:
Talal Latif Khan,
Lahore General Hospital

QR code

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INTRODUCTION:

Diabetic nephropathy remains the leading cause of end-stage renal disease (ESRD) worldwide, requiring renal replacement therapy. For this reason, it is important to prevent or delay the progression of nephropathy. Baseline breakthrough albumin ratio (ARE) is present in current medical literature and chronic hyperglycemia is a separate risk factor for hyperlipidemia, renal disease, and diabetic kidney disease and contributes to progression in 60% of patients with chronic renal disease (CRD) shows dyslipidemia. Interestingly, investigations have shown that atherosclerosis is associated with pathobiological renal damage, as well as associated etiological factors and mechanisms. Therefore, it can be said that the risk factors are similar for two different diseases. The progression of nephropathy also increases the risk of other diabetic complications. Typically, the risk of cardiovascular disease (CVD) increases dramatically with the progression of kidney disease. In other words, the opposite aims to control or treat the progression of kidney disease, which may limit or limit cardiovascular complications. In addition, microalbuminuria and macroalbuminuria are predictors of progressive atherosclerosis and eventually premature death (CAD) of future proteinuria, coronary artery disease, renal function and diabetic renal disease from SDBY requiring dialysis or renal transplantation. Compared with non-diabetic subjects in Type 2 diabetes mellitus patients, it is increasing for the development of cardiovascular morbidity and mortality. This risk increases even more when proteinuria is independent of the amount of diabetic subjects. For this reason, detection of nephropathy in maicroalbuminina stage is crucial to prevent further progression of nephropathy. However, low glycemic index, smoking and hypertension continue to be risk factors for the development of nephropathy and other diabetic complications.

It is also known that the present literature is related to cardiovascular disease in which the small dense LDL particles (low density lipoproteins) are highly atherogenic, caused by insulin resistance and atherosclerosis. Oxidized LDL (LDLox) is caused by endothelial damage, atherosclerosis, and plays an important role in tissue ischemia. In addition, in vitro studies in rats have shown that oxidized LDL particles cause ischemia and stress and damage to cultured renal tubular cells. Diabetic Control and Complications / Epidemiology Intervention and diabetic complications (DCCT / EDIC) also showed a significant association of LDL with albumin excretion (AER) and nephropathy. Therefore, LDL hypercholesterolemia and dyslipidemia trigger nephropathy development and progression in diabetic subjects. LDL dyslipidemia directly affects the kidney by increasing albumin excretion and further advancing advanced nephropathy. The natural course of diabetic nephropathy initially shows only the microalbuminuria, which can not be determined by analyzing the urine routine laboratory, which can eventually progress the macroalbuminuria and eventually a dense proteinuria. After proteinuria develops, the glomerular filtration rate (GFR) decreases, eventually leading to end-stage renal disease for several years. This emphasizes the importance of detecting microalbumin in urine specimens with special laboratory methodology.

At its most intense clinical setting, hyperglycemia is the only treatment initially focused on leaving behind determinants for dyslipidemia and nephropathy development. Early diagnosis of LDL, high levels of macroalbuminuria and microalbuminuria and specific therapies is very important in diabetes management. Taking these precautions into consideration, the effect of this study on the relationship and effect between LDL cholesterol and nephropathy in the target diabetic population has not been investigated to date.

PATIENTS AND METHODS:

This is a cross-sectional analytical study. The study was performed in the Nephrology Department of Bahawal Victoria Hospital, Bahawalpur for the period of two years from June 2015 to June 2017. Patients with proteinuria or chronic renal disease due to infection, nephrotic syndrome, or thick / albuminuria have shown problems prior to work with the diagnosis of diabetes proteinuria. All laboratory measurements were made on an empty stomach, not less than 12 hours. LDL (mg / dl) system and Dimension® were measured in direct plasma (Siemens Health Diagnostics Inc. Newark, DE 19714., USA) according to the method of automated low density lipoprotein (ALDL) for clinical chemistry analysis, Low density lipoprotein cholesterol (LDL- C) Quantitative determination of in vitro diagnostic test. Similarly, serum creatinine (mg / dl) was quantitated by the method CREA by Dimension® clinical chemistry (Siemens Healthcare Diagnostics Inc. Newark, DE 19714, USA). LDL> 100 mg / dL was marked as dyslipidaemia. Nephropathy criteria were identified in the urine specimens with microalbuminuria, macroalbuminuria or proteinuria. For this, Quik Check ™ urine analysis reagent strips (ACON Biotechnology, Co., Ltd.) were used on urine specimens from the first morning on an empty stomach. Patients exhibiting

macroalbuminuria or proteinuria due to deterioration were labeled as nephropathy. proteinuria and albuminuria negative dipstick are again freshly sampled for microalbuminuria (mg / L) in the morning MALB early method used in the Dimension® clinical chemistry system and diagnostic test is quantitative measurement of human urine albumin using turbidimetric inhibition immunological test with improved particles (PETINIA) (Siemens Health Diagnostics Inc. Newark, DE 19714. USA) for microalbuminuria. In the event, microalbuminemia was re-labeled as nephropathy. All data for categorical and continuous variables were entered and analyzed using the SPSS version 12 statistical software package Windows (SPSS Inc., USA).

RESULTS:

Of the 500 patients, 280 (63.6%) were male and 180 (36.4%) were female. 76 cases were type 1 (8.6%) and 807 (91.4%) were type-2. The mean age was 56.5 ± 14.8 years and mean duration of diabetes was 13.8 ± 9 years. Six hundred thirty patients (71.3%) showed dyslipidemia (LDL> 100 mg / dl) while 253 patients (28.7%) had nephropathy. The demographic characteristics and nephropathy status of the patient with dyslipidemia are shown in Table-1.

Table-1: Demographic Characteristics of Diabetic Patients

Parameters	Description with n(%)	
Gender	Male 562 (63.6%)	Female 321 (36.4%)
Type of Diabetes	Type-1 76 (8.6%)	Type-2 807 (91.4%)
Dyslipidemia status	LDL <100mg/dl 253 (28.7%)	LDL > 100mg/dl 630 (71.3%)
Nephropathy status	No Nephropathy 630 (71.3%)	Nephropathy 253 (28.7%)

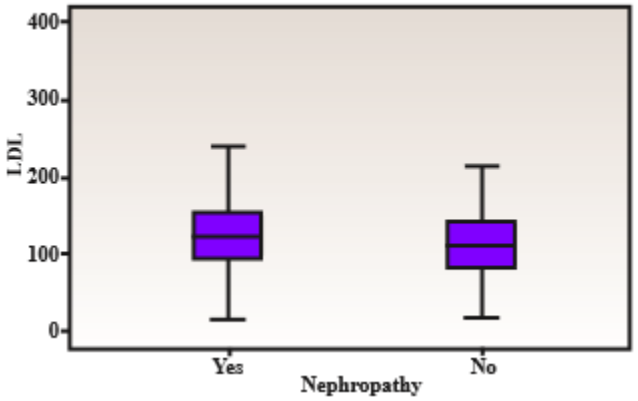
Dyslipidemic patients (LDL> 100 mg / dl) showed serum creatinine levels at 1.04 mg / dl with a mean creatinine of 1.004 mg / dL compared to those without dyslipidemia. However, subjects with nephropathy exhibited a significant serum LDL cholesterol level of 125.7 mg / dL compared to those without nephropathy, where the mean LDL was 114 mg / dL. In addition, cases with nephropathy were found to be 1,347 mg / dl with a higher level of creatinine and those without nephropathy averaged 0.897 mg / dl. These results are presented in Table 2.

Table-2: Variables of interest with standard deviations and confidence intervals

Variable	Mean ± SD (95%CI)
Age	56.5±14.8 years
Duration of Diabetes	13.8±9 years
Serum Creatinine (mg/dl) for LDL > 100	1.02±0.74 (0.963 to 1.080)
Serum Creatinine (mg/dl) for LDL < 100	1.00±0.63 (0.926 to 1.082)
LDL cholesterol (mg/dl) with Nephropathy	125.7±44.8 (120.2 to 131.19)
LDL cholesterol (mg/dl) without Nephropathy	114±39 (110.95 to 117.10)
Serum Creatinine (mg/dl) with Nephropathy	1.34±1.13 (1.208 to 1.486)
Serum Creatinine (mg/dl) without Nephropathy	0.89±0.35 (95% CI 0.851 to 0.907)
Spearman correlation for cause effect relationship between LDL and Nephropathy	p value < 0.001

The relationship between the progression and progression of LDL and nephropathy is shown graphically with the box drawing in Figure-1.

Figure 1: Box Plot: LDL levels in mg/dl versus nephropathy development with microalbuminuria or macroalbuminuria



The Spearman correlation for the causative effect relationship between serum LDL and nephropathy was very significant at the level of p <0.001.

DISCUSSION:

Statistical results of this study suggest that LDL dyslipidemia is one of the major risk factors for the development of nephropathy. Creatinine is a well-defined indicator of renal function. In this study, creatinine levels were measured for diabetic patients with LDL> 100 mg / dL and the results were slightly higher than the mean of 1.022 mg / dL for those with LDL <100 mg / dL. dL and literally 1,004 mg / dL. Because of this, creatine levels begin to increase as LDL dyslipidemia develops. In addition, creatinine levels were higher in patients with established nephropathy with an average of 0.897 mg / dl serum

creatinine, which was 1.347 mg / dl compared to those without nephropathy. More importantly, in nephropathic patients, LDL cholesterol levels were found to be 125.7 mg / dL higher than those without nephropathy, with higher mean LDL values. mg / dl. These findings suggest that LDL cholesterol is an important factor and that serum creatinine levels are increased frequently and that the detected nephropathy and urine specimens are positive in the presence of microalbumin or macroalbumin. The main purpose of this study was to determine the causal relationship between LDL cholesterol and nephropathy. This relationship was found to be highly significant at the level of <0.001 p-value. In this study, the majorities of patients were referred to the diabetes center for annual follow-up from peripheral health centers and did not receive treatment to reduce lipids or LDL cholesterol. This suggests that diabetic patients should begin anti-lipid therapy at primary care levels if the lipid or LDL cholesterol levels are higher than the target. According to current research studies, patients progressing to microalbuminuria macroalbuminuria usually progress to ESRD. However, progress can be reduced if therapy is initiated by early ACE or ARB inhibitors. The aggressive control of blood pressure <130/80 mmHg is one of the strategies that limit the elimination of albumin in idiopathic and limit nephropathy. Like other risk factors, LDL cholesterol also has a direct effect on the development and progression of nephropathy in the diabetic population. He's involved in increasing the kidneys' albumin excretion rate. Thus, the cause-and-effect relationship between LDL and nephropathy in this study showed a strong association between LDL dyslipidemia and nephropathy between these two pathologies. LDL is one of the major risk factors for diabetic nephropathy, and is associated with mean creatinine at high levels. There is currently evidence of intensive oxidative stress due to lipids in diabetes and the metabolic syndrome. This and also the starvation lipid profile should be requested at a distance diabetes clinic when managing diabetes. LDL cholesterol is now defined as the main target of lipid-lowering therapy. For this reason, early diagnosis of LDL dyslipidemia in newly diagnosed diabetic patients and treatment with lipid-lowering drugs or statins should be considered additionally to hyperglycemia. Close monitoring of creatinine levels with microalbumin in the urine is one of the standard methodologies used to control renal function in the diabetic population. The tertiary care diabetes center should be equipped with facilities such as urine and LDL dyslipidemic microalbumin detection.

CONCLUSION:

According to the findings of the present study, LDL dyslipidemia is one of the major risk factors for the development and progression of nephropathy. For this reason, early diagnosis and treatment with statins is recommended for high LDL levels to prevent the development and progression of diabetic nephropathy.

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