ORIGINAL ARTICLE

Dyslipidaemia in Newly Diagnosed Diabetic Patients with and without Microalbuminuria

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ABSTRACT

Objective: To determine the association of dyslipidemia in newly diagnosed diabetic patients with and without microalbuminuria.

Study Design: Cross sectional study.

Place and Duration of Study: The study was conducted from December 2009 to July 2011 at Medical Unit 1, Pakistan Railway Hospital, Islamic International Medical College (IIMC) Rawalpindi.

Materials and Methods: A cross sectional study was carried out in Medical Unit 1 Pakistan Railway Hospital Rawalpindi. The newly diagnosed diabetic patients i.e. the patients who have not yet been given any treatment, of both genders, without overt-proteinuria were included in the study. A proforma was filled indicating their bio-data, history and clinical examination and laboratory investigations which included fasting blood glucose, urinary albumin and lipid profile. If albumin was negative with dipstick, a sample of urine was sent for microalbuminuria. Frequency of dyslipidaemia in patients with and without microalbuminuria was determined.

Results: Out of the 317 newly diagnosed diabetic patients screened for microalbuminuria, 43 patients (13.5%) had microalbuminuria while 274 patients (86.6%) did not have microalbuminuria. Out of these patients with microalbuminuria, 58.8% (i.e 24) of patients had dyslipidaemia. Among microalbuminuria negative patients only 36% (i.e101) of patients had dyslipidaemia.

Conclusion: The dyslipidemia, occurs more frequently in newly diagnosed diabetics who have micro-albuminuria than those without micro-albuminuria.

Keywords: *Type 2 Diabetes Mellitus, Microalbuminuria, Dyslipidaemia.*

Introduction

Diabetes mellitus is a chronic disease resulting in different long term complications.[1] Poor glycaemic control is considered as a strong risk factor for the development of complications like nephropathy.[2,3] While recent data suggest that tight glycaemic control by itself is not sufficient to prevent complications as many of the diabetic patients do not develop complications like diabetic nephropathy even when their glycaemic control is not optimal.[4] This indicates that some other risk factor is also involved resulting in nephropathy. Microalbuminuria is an early marker of diabetic nephropathy and is independent risk factor for cardiovascular disease.[5] Clinical and experimental studies have highlighted that dyslipidemia has potential role in the development of microalbuminuria and diabetic nephropathy by causing Mesangial, tubulo-interstitial, and glomerular changes in the kidney.[6,7] In a study, subjects who developed microalbuminuria had higher cholesterol levels than subjects who have microalbuminuria.[8] In addition, lower cholesterol levels predicted regression of microalbuminuria to normoalbuminuria.[9] HDL is considered as a good cholesterol and its low levels are found to be present in patients with microalbuminuria.[10] In this regard, there is some evidence that lipid reduction by antilipidaemic agents might decrease proteinuria in diabetic patients.[11]

Based on these data, it appears that measurement of plasma lipids can add to the prognostic value of albumin excretion in the prediction of subjects at risk of diabetic nephropathy. This interesting correlation between microalbuminuria and dyslipidaemia is the focus of the present day research.

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Materials and Methods

The study was carried out from 1st December 2009 to 31st July 2011 on the newly diagnosed diabetic patients registered in Diabetic Clinic of Pakistan Railway Hospital Rawalpindi (Teaching hospital of Islamic International Medical College and Trust). Sample size of 326 was calculated with 95% confidence interval, using WHO sample size calculator. Type II diabetics of both genders were included in study. Patients with gestational diabetes, type I diabetics, type II diabetics with overt-

proteinuria and patients already taking statins, ACE inhibitors or ARBs were excluded from study. Complete history and clinical examination was carried out and 3 ml venous blood samples were collected in yellow-top gel tubes for laboratory analyses. Blood samples for Fasting Plasma Glucose (FPG) and fasting lipid profile i.e. serum cholesterol, triglycerides, HDL-Cholesterol were estimated in the laboratory using colorimetric methods on an auto analyser. If albumin was negative with dipstick, spot urine sample was sent for microalbumin. Albumin was estimated using immunoturbimetric method on an auto analyser. Frequency of dyslipidaemia in patients with and without microalbuminuria was calculated. Data was analysed by using SPSS 16.0. Descriptive statistics were calculated like frequency and 95% confidence interval for various parameters. For inferential statistics chi-square test was used. Level of significance was kept at 0.05.

Results

Of the total 326 patients included initially in the study, 9 patients were lost to follow up. Study thus comprised 317 patients. Out of the 317 patients screened for albuminuria 131 were males (41.33%) and 186 were females (58.8%). Overall the mean age of patients included was 47.20 years. The average age in case of males was 48.68 years and that of females was 46.12 years. The maximum numbers of patients in this study were from the age group 41-50 years (i.e. 110 patients). Forty three out of 317 patients i.e. 13.5% had microalbuminuria, 19 were males with mean age of 51years and 24 were females with a mean age of 50 years. Among these patients with microalbuminuria, 24 i.e. 55.8% of patients had dyslipidaemia as well,while 19(44.1%) patients with microalbuminuria did not have dyslipidaemia. In contrast out of 317 patients 274 patients i.e. 86.6% did not have albuminuria. Among these microalbuminuria negative patients, only 36 % (101) of patients had dyslipidaemia. So the frequency of dyslipidaemia was more in patients with microalbuminuria than patients without microalbuminuria in diabetic patients and was statistically significant ($p< 0.01$).

Table I: Frequency of Dyslipidaemia in Diabetics with or without Microalbuminuria

Patients' Categories	No of Patients	Dyslipidaemia Positive Patients	P value
Diabetics with microalbuminuria	43	24 (8.8%)	P < 0.01
Diabetics without microalbuminuria	274	101(36%)	
Total	317	125 (39%)	

Discussion

Diabetes mellitus owes its mortality and morbidity mostly to its complications. Two of the risk factors most putatively responsible for diabetic complications are microalbuminuria and dyslipidemias.[12]The main objective of our study was to find the association between albuminuria and dyslipidemias in newly diagnosed diabetic patients. The results were very convincing in favour of increased frequency of dyslipidemias in patients with albuminuria. Our findings are consistent with a study conducted in Lahore, in which the prevalence of diabetic nephroathy and hyperlipidaemia in newly diagnosed type 2 patients was found to be 56.2%.[13] It is important to note that diabetic nephroathy is associated with high mortality rate and improvement in microalbuminuria results in decrease in all cause mortality.[14] Not only the hyperglycaemia, hypertension, abdominal obesity and smoking, result in diabetic nephropathy but hyperlipidaemia is also a risk factor for microalbuminuria with diabetes.[15]In our study diabetic patients with albuminuria, 55.8% of the patients had dyslipidemia. Most of the patients i.e. 37% had both TG and LDL-C were elevated. Similar relationship between serum cholesterol level and the progression of renal dysfunction in type 2 diabetic patients has been found in other studies.[15,16] So Kim et al (2006) reported triglycerides (Tg) to be a factor in the progression of diabetic nephropathy.[17] Similarly fasting plasma Tg levels are reported to be a strong independent risk factor of microalbuminuria and macroalbuminuria in the UK Prospective Diabetes Study (UKPDS).[18] In prospective studies of patients with type 2 diabetes, an elevated TG-to-HDL-C ratio has been independently associated with the progression of microalbuminuria.[19]An important question is whether dyslipidaemia results in

microalbuminuria or its other way out. This clinical relevance needs to be assessed in a long-term outcome study of renal function. However it has been observed that lipid lowering drugs can reduce diabetic nephropathy progression as pitavastatin and rosuvastatin reduced the urinary excretion of albumin by 60 and 40% respectively, in animal studies.[20] Similarly The FIELD study also provided promising data that adding fenofibrate to primary statin therapy might be a useful strategy to decrease microalbuminuria progression in type 2 diabetics.[21]These observations suggest a causative relationship between dyslipidaemia and diabetic nehropathy.

Conclusion

The dyslipidemias occur more frequently in those newly diagnosed diabetics who tend to excrete albumin in their urine even in amounts small enough to be detected by routine dipstick used for urinalysis. A diabetic patient who is found to have dyslipidemia should be screened for microalbuminuria because a timely intervention at an early stage can prevent or delay so many complications of diabetes.

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