ORIGINAL ARTICLE

Moderately Increased Albuminuria (Microalbuminuria) and Hypertriglyceridemia in Type 2 Diabetic Patients at Sugra Shafi Teaching Medical Complex, Narowal

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ABSTRACT

Aim: To see the occurrence of moderately increased albuminuria (microalbuminuria MA) and elevated fasting serum triglyceride levels in Type 2 diabetic patients.

Study design: Observational study

Place and duration of study: Indoor, Department of Medicine, Sughra Shafi Teaching Hospital, Narowal, from 30th December2016 to 28th February 2017.

Methods: Analysis included data of 100 patients, both males and females, admitted in the department of medicine. All patients included in the study were diagnosed cases of Type 2 diabetes mellitus. Patients with Type 1 diabetes were excluded from the study. All patients were checked for microalbuminuria and fasting serum triglyceride levels. Patients fasting blood glucose was also checked. Chi-square test was applied and p Value of < 0.05 was accepted as significant.

Results: A total of 100 patients were included in the study. Mean age of the patients ranged from 53.95±12.2 and mean duration of diabetes mellitus was 10.91±7.06. MA was found in 32% of the whole sample and the rate was higher, 56.3% among females than 43.8% males. It was seen in patients with mean fasting blood glucose of 223.88±60.68 and mean fasting serum triglyceride of 293.25±91.91. It was also seen significant with duration of diabetes.

Conclusion: The prevalence of moderately increased albuminuria in Type 2 diabetic patients was high and significantly associated with fasting serum triglyceride levels.

Keywords: Moderately increased albuminuria. Hypertriglyceridemia. Type 2 diabetes mellitus

INTRODUCTION

Diabetes mellitus remains a tremendous challenge to public health worldwide. Diabetic nephropathy is the leading cause of end stage renal disease. (ESRD)[1] Moderately increased albuminuria.formerly known as microalbuminuria is the first clinical sign of involvement of kidneys in patients with Type 2 diabetes. It is also responsible for about third of all patients requiring renal replacement therapy that is expensive and not widely available in our country. The development of diabetic nephropathy is characterized by progressive increase in the excretion of protein particularly albumin. The American Diabetic Association recommends that patients with Type 2 diabetes be tested for albuminuria at the time of initial diabetes diagnosis and yearly thereafter[2]. Routine screening for microalbuminuria is recommended for all patients

with diabetes but not necessarily in other high risk groups such as those with hypertension[3]. The estimation of the burden of microalbuminuria and its strength of association with cardiovascular disease would guide the management of public health programs for prevention and management of chronic disease. Such targeted strategies could be particularly useful in population shown to be at high risk of cardiovascular disease, diabetes or microalbuminuria. We therefore conducted study to determine the prevalence of MA and its association with triglyceride levels in Type 2 diabetic patients. MA was defined as the urine albumin concentration between 30-300mg/g in a 24 hours urinary sample. Diabetes was defined as fasting blood glucose of 126mg/dL or greater. Hypertriglyceridemia was defined as fasting serum triglyceride levels of greater than 150mg/dL.

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MATERIAL AND METHODS

This observational study was carried out in the Inpatient Department of Medicine at Sughra Shafi Teaching Medical Complex Narowal that is the only teaching hospital in this remote area of Punjab, Province. This is a 350 beds hospital. A total of 100

patients both male and female were enrolled after taking consent. In our study, complete clinical workup was done. A fasting sample of blood was drawn after an overnight fast of ten hours and plasma glucose and serum triglyceride were checked. Urine samples were collected in the early morning after an overnight fast. Urine microalbumin concentration was measured using commercially available immunoturbidometric assay kits. This method besides being easy to perform and cost effective was sensitive enough to detect an even slightly increased albumin excretion. Immunoturbidimetry is an important tool in the broad diagnostic field of clinical chemistry. Turbidimetry is an analytical technique that uses light scattering, a physical phenomena resulting from the interaction of light with particles in solution to measure the concentration of particles. The photometric signal is generated by a decrease in light intensity as a direct consequence of increasing turbidity in the reaction.

Data was entered and analyzed using the SPSS version 22. Frequencies and percentages were computed for all categorical variables. Mean and standard deviations were computed for all numerical variables. Two-tailed independent samples t-test was applied to check the difference in all continuous variables. Chi-square test was applied to check the association between gender and Microalbuminuria. Binary logistic regression was conducted to determine the factors with a significant associated Microalbuminuria. P-value <0.05 was considered as significant.

RESULTS

A total of 100 patients diagnosed with Type 2 Diabetes and fulfilling the inclusion criteria were enrolled in the study. There were 39% males and 61% females with mean age 53.95±12.12. Moderately increased albuminuria was found in 32% of the sample and the rate was higher, 56.3% among females as compared to males having 43.8%. The mean age of present microalbuminuria 58.50±10.53 was significantly higher as compared to absent microalbuminuria 51.81±12.31 (p=0.009). Furthermore, duration of positive for MA, diabetes mellitus 15.41±7.12 was also significantly higher as compared to absent 8.79±5.99, (p <0.001). We also observed positive for MA with significant mean difference of fasting blood glucose of 223.88± 60.68 and absent with fasting plasma glucose of 135.59±51.76 (p < 0.001). Similarly the fasting serum triglyceride were also significantly associated with moderately increased albuminuria as shown present

in mean fasting triglyceride of 293.25±91.91 and absent among those with level of 150.56 ± 62.17. The association of microalbuminuria between male and female (n=14, 43.8% v/s n=18, 56.3%), was highly significant (p < 0.001). Similarly, fasting blood glucose was significantly less in those who had absent microalbuminuria (OR: 0.97, 95% CI: 0.96 – 0.98). The analysis also shown that the chances of fasting serum (TG 264mg/dl) in positive for MA was 1.97 time higher as compared to those patients who had absent microalbuminuria (OR: 1.97, 95% CI: 1.06 – 2.58).

Table 1: Demographic characteristics of patient

Characteristics	n
Age in years	53.95 ± 12.12
Gender	
Male	39 (39%)
Female	61 (61%)
Duration of Diabetes Mellitus	10.91±7.06
BSF (164mg/dl)	163.84±68.41
Fasting Serum (TG 264mg/dl)	196.22±98.67
Microalbuminuria	
Positive	32 (32%)
Absent	68 (68%)

Values are presented as Frequency (%) or Mean and Standard deviation

Table 2

Parameters	Microalbuminuria		
	+ve	**Absent**	**P value**
Age in years	58.50±10.53	51.81±12.31	0.009*
Duration of DM	15.41±7.12	8.79±5.99	<0.001*
BSF(164mg/dl)	223.88±60.68	135.59±51.76	<0.001*
Fasting serum (TG264mg/dl)	293.25±91.91	150.56±62.17	<0.001*
Male	14(43.8%)	25(36.8%)	0.504**
Female	18(43.8%)	43(63.2%)	

*Continuous variables are presented as Mean and Standards deviation and t-test applied
**Categorical variables are presented as Frequencies and Percentages and Chi square test is applied

Table 3: Factors affecting microalbuminuria in multivariate analysis

Factors	Microalbuminuria		
	Odds ratio	**95%C.I.**	**P value**
Age in years	1.25	0.91-1.58	0.013*
Duration of diabetes mellitus	0.86	0.78-0.93	<0.001*
BSF (164mg/dl)	0.97	0.96-0.98	<0.001*
Fasting serum (TG264mg/dl)	1,97	1.06-2.58	<0.001*

*Significant p value, C.I.: Confidence Interval

DISCUSSION

The presence of MA in the urine of persons with Type 2 diabetes is perhaps the most important early sign heralding the onset of systemic vasculopathy and associated with target organ damage, the brain, heart and the kidneys. MA also identifies patients who need more rigorous cardiovascular risk management especially more intensive blood pressure control, strict attention to glycemic control and lipid levels.

This study based on the data collected from 100 patients in the Department of Medicine at a tertiary care Hospital at Narowal, showed significant moderately increased albuminuria with 32% in Type 2 diabetic patients. Bruno et al followed 1253 Type 2 diabetic patients over seven years and showed the progression of 3.7% of Type 2 diabetic patients to overt nephropathy every year and MA provided a risk increased by 42% as compared to normoalbuminuria[6]. Dyslipidemia is common among Type 2 diabetic patients. Raised serum triglyceride levels often precede the onset of Type 2 diabetes for many years.[7].In our study, fasting serum triglyceride were also significantly associated with moderately increased albuminuria as shown present in mean fasting serum triglyceride level of 293±91.91 and absent among those with 150.50±62.17. A study published in Pakistan Journal of Pharmacy January 2012 edition by Shahid Sm et al described diabetes, hypertension and nephropathy with reference to glycemic control, dyslipidemia and endothelial dysfunction indicating the foremost basis of morbididty and mortality world wide and rapidly progressing in Pakistan.[8] In addition time of exposure to elevated triglyceride levels >150mg/dL predicts incident moderately increased albuminuria[9]. In a study carried out by Gomes MB, published in Arq Bras Cardiol in 1997, a total of fifty patients were enrolled. Moderately increased albuminuria was present in 10% of the patients. No difference concerning serum lipids were found in comparison between normo and moderately increased albuminuria patients. A total of 4% of all patients had elevated triglyceride levels[10]. Out of total 184 cases, seventy six subjects, 41.3% had moderately increased albuminuria. These subjects had higher fasting plasma glucose concentration (p=0.002) then subjects with normal albumin excretion rate (<30mg/24hrs). There was no significant difference between subjects with and without moderately increased albuminuria with regards to triglyceride concentrations[11]. This was in contradiction to our study. Similarly duration of diabetes mellitus was also significantly associated, as MA was present among those patients with mean duration of diabetes of 15.4±7.12 and absent in those with mean of 8.79±5.96. Univariate analysis demonstrated significant association between moderately increased albuminuria and longer duration of diabetes, high glycated haemoglobin and triglycerides[12]. According to Waleed P et al, the parameters of lipid profile including triglyceride, total cholesterol and LDL-cholesterol were significantly (p<0.001) higher in diabetics and showed progressive increase with worsening albuminuria[13] In a study by Ali et al, the results showed poor glycemic control as a contributory factor for moderately increased albuminuria. [14] In our study more females 56.3% had MA as compared to males 43.8%.It was contradictory to study done by Hussain S that showed male dominance. Another study done by Hussain S showed diabetic retinopathy was found in 23.9% of Type 2 diabetic patients and associated with duration of disease, age at presentation, male gender, high triglycerides and moderately increased albuminuria[15]. Smulder et al reported that diabetic dyslipidemia i.e., high triglyceride and low HDL is a predictor of rapid progression of moderately increased albuminuria[16]. Mather et al also reported a statistically significant correlation between the prevalence of moderately increased albuminuria and serum triglyceride levels.[17] Univariate analysis demonstrated significant association between moderately increased albuminuria and high triglyceride levels in Type 2 diabetic subjects[18]. Hypertriglyceridemia and hyperglycemia are associated with an increased risk of future moderately increased albuminuria[19]. Experimental and clinical studies have shown a strong association between hypertriglyceridemia and diabetic nephropathy[20]. Overall 518 patients out of total 1425 cases studied, had MA. Fasting plasma glucose was significantly higher in the MA group. Serum triglyceride was not statistically significant in these patients[21].

The results of our study justify that all Type 2 diabetic patients must be checked for the presence of MA at least once a year with measuring of fasting serum triglyceride levels. As MA may be reversible if diabetes is well controlled and elevated serum triglyceride can be corrected by medication and life style changes, the early detection of both these may be very beneficial in treatment programs of diabetes.

CONCLUSION

All Type 2 diabetic patients must be screened regularly for the presence or absence of moderately increased albuminuria along with fasting serum triglyceride levels as their early detection can improve the morbidity and mortality associated with diabetes mellitus.

Limitations: Our study has limitations. We tested only a single urine sample, while confirmed diagnosis of MA requires persistence on at least two out of three consecutive tests. However a single urine test is considered appropriate for epidemiological studies.

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