ORIGINAL RESEARCH

To study the correlationship of proteinuria with blood pressure in patients with diabetic nephropathy

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ABSTRACT
Background: Diabetic nephropathy develops in one third of the patients with diabetes. The incidence is increasing worldwide and the Asia pacific region being the most affected . According to statistical prediction, in India diabetic nephropathy is expected to develop in 6.6million people out of 30million people with diabetes. Studies in south India have shown that the prevalence of microalbuminuria is 26.9% and overt proteinuria is 2.2%.Prevalence of diabetic nephropathy in Asia in Vellore (India) was 8.9%, and Asians in Leicester, United Kingdom was 22.3% and Caucasians in Leicester, in United Kingdom was 12.6%. **Method:** The aim of the study is to study the correlationship of proteinuria with blood pressure in patients with diabetic nephropathy. Patients with diabetes mellitus and eGFR <90 ml/min/1.73 m^2 were included in the study. Clinical profile of each patient was noted and 24hrs urine protein was estimated. Blood samples were sent to estimate blood sugar, lipid profile, HbA1c and serum creatinine. **Result:** The mean duration of diabetes in our study is 9 years 4 months and mean SBP is 146 mm Hg and DBP is 92 mm Hg. As the duration of diabetes increases, hypertension prevalence also increases and is maximum in diabetes of >10 years duration (45.45%). The present study showed that 15.9% of diabetics of duration >10 years were found to have eGFR <15 ml/min/1.73 m^2 as compared to nil patients in those with diabetes duration of upto 5 years. Among the 40diabetics who had hypertension, 26(65%) patients had proteinuria >1 gm/day. 82.3% patients patients with SBP ≥180 and/or DBP ≥110 mm Hg showed urinary protein >1 gm/day as compared to 40% patients with SBP 140-159 and/or DBP 90-99 mm Hg. The present study also shows, proteinuria increases as the duration of diabetes increases. **Conclusion:** Our study has shown a positive correlation between raised blood pressure levels and proteinuria in patients of diabetic nephropathy. 24 Hr urinary protein were high in patients with higher blood pressure and duration of diabetes >10 years.
Keywords: Proteinuria, Hypertension, Nephropathy.
Study Designed: Observational Study.

INTRODUCTION

Diabetic nephropathy develops in one third of the patients with diabetes. The incidence is increasing worldwide and the Asia pacific region being the most affected[1]. According to statistical prediction, in India diabetic nephropathy is expected to develop in 6.6million people out of 30million people with diabetes[2]. Studies in south India have shown that the prevalence of microalbuminuria is 26.9% and overt proteinuria is 2.2%.Prevalence of diabetic nephropathy in Asia in Vellore (India) was 8.9%, and Asians in Leicester, United Kingdom was 22.3% and Caucasians in Leicester, in United Kingdom was 12.6%. [3].

India is having the world's largest number of diabetic patients [4]. Type 2 diabetes accounts for more than 90% of cases and Type 1 diabetes is on the increasing trend. International Diabetes Federation (IDF) said that total number of diabetics in India was around 40.9 million in the year 2006, and it projected that it will become 69.9million by the year 2025.Study done in1998 in Chennai population showed a prevalence of 8.2% in urban and 2.4% in rural areas. A study done after 5 years in the same urban area showed a prevalence of 11.6%[5].
The common risk factors shared by kidney damage and cardiovascular diseases support the focus on diabetes and hypertension as an adequate strategy to

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deal with kidney damage also in the developing countries.[6] Proteinuria is a recognized early marker of kidney damage and a risk factor to develop chronic kidney disease, and eventually end-stage renal disease (ESRD).[7] In a meta-analysis of more than 1.1 million individuals aged 42–81 years,[8] dipstick proteinuria of 1 þ or greater conferred also an increased risk for all-cause mortality, independently of age and estimated glomerular fifiltration rate. The evaluation of the different meanings of proteinuria in urban and rural settings is however rarely addressed in scientifific literature.[9]

MATERIAL & METHOD

This is an observational study, done at Jayarogya Group of Hospitals, Gwalior for 06months duration in the Department of Medicine. The patients recruited in the study were patients admitted in the general medical ward for control of diabetes and patients attending Medicne & Endocrinology department as outpatients.

Patients who had FBS >126 mg/dl or post prandial blood sugar >200 mg/dl or HbA1c >6.5 with eGFR <90 ml/min/1.73 m^2 were selected for the study after a valid consent. Detailed clinical profile of each patient was noted, physical examination was done and 24hrs urine protein was estimated.Blood was drawn to estimate blood sugar, lipid profile, HbA1c, serum proteins (including albumin), serum urea and serum creatinine.

INCLUSION CRITERIA
• Patients of Diabetes mellitus, and
• eGFR <90 ml/min/1.73 m^2

EXCLUSION CRITERIA
• Primary Hypertention
• Congestive cardiac failure
• Urinary tract infection

RESULTS
Table No. 1: Gender Distribution

Gender	No.	Percentage
Male	59	59
Female	41	41

In the present study males were 59% and 41% of diabetic population were females.

Table No. 2: Duration of Diabetes and its correlation with hypertension

Duration of Diabetes	Diabetics	Hypertensives	Hypertensive Percentage in DM
Upto 2 Years	09	02	22.2%
03 to 05 Years	18	06	33.3%
06 to 10 Years	29	12	41.3%
Above 10 Years	44	20	45.45%
Total	100	40	40%

Among the 100 study population, duration of documented diabetes in56% patients was less than 10 yrs and in 44% was above 10 yrs. As the duration of diabetes increased, hypertension prevalence also increased and was maximum in diabetes of >10 years duration (45.45%).

Table No. 3: Duration of Diabetes and its correlation with eGFR

Duration of Diabetes	Diabetics	eGFR 60-90 ml/min/1.73 m^2	eGFR 30-59 ml/min/1.73 m^2	eGFR 15-29 ml/min/1.73 m^2	eGFR <15 ml/min/1.73 m^2
Upto 2 Years	09	6	3	0	0
03 to 05 Years	18	10	7	1	0
06 to 10 Years	29	11	8	7	3
Above 10 Years	44	18	9	10	7
Total	100	45	27	18	10

Among the 100 study population, we can see that as the duration of diabetes increases, eGFR also follows a proportional decline in patients with diabetic nephropathy. 15.9% of diabetics of duration >10 years were found to have eGFR <15 as compared to nil patients in those with diabetes duration of upto 5 years.

Table No. 4: Correlation of Blood Pressure with proteinuria

Blood Pressure range	24 Hr Urinary Protein <1 gm/24 hour	24 Hr Urinary Protein 1-3.5 gm/24 hour	24 Hr Urinary Protein >3.5 gm/24 hr	Percentage patients with proteinuria >1 gm/day
SBP 140-159 and/or DBP 90-99	6	3	1	40%
SBP 160-179 and/or DBP 100-109	5	7	1	61.5%
SBP≥180 and/or DBP	3	8	6	82.3%

≥110			
Total	14	18	8	65%

Among the 40diabetics with hypertension, 26(65%) patients had proteinuria >1 gm/day. Linear correlation was found between blood pressure and proteinuria. 82.3% patients patients with SBP ≥180 and/or DBP ≥110 mm Hg showed urinary protein >1 gm/day as compared to 40% patients with SBP 140-159 and/or DBP 90-99 mm Hg.

DISCUSSION

This study conducted in tertiary care medical college hospital in Gwalior enrolled 100 diabetic patients with eGFR <90 ml/min/1.73 m^{2}patients, out of which 8 were type 1 diabetics and 92 were type 2 diabetics. The mean duration of diabetes in our study is 9 years 4 months and mean SBP is 146 mm Hg and DBP is 92 mm Hg. In our study, as the duration of diabetes increases, hypertension prevalence also increases and is maximum in diabetes of >10 years duration (45.45%). The present study showed that 15.9% of diabetics of duration >10 years were found to have eGFR <15 as compared to nil patients in those with diabetes duration of upto 5 years.

Among the 40diabetics with hypertension, 26(65%) patients had proteinuria >1 gm/day. 82.3% patients patients with SBP ≥180 and/or DBP ≥110 mm Hg showed urinary protein >1 gm/day as compared to 40% patients with SBP 140-159 and/or DBP 90-99 mm Hg. The present study also shows, proteinuria increases as the duration of diabetes increases.

CONCLUSION

Our study has shown a positive correlation between raised blood pressure levels and proteinuria in patients of diabetic nephropathy. There was a significant direct correlation between eGFR and duration of diabetes. 24 Hr urinary protein were high in patients with higher blood pressure and increased duration of diabetes.

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