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Original Research

Study of Association between duration of Diabetes from onset and Development of Nephropathy in Type II Diabetes Mellitus

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ABSTRACT
Numerous factors, such as the length of diabetes, proteinuria, hyperglycemia, genetic susceptibility, ethnicity, excessive protein intake, massive obesity, hypertension and a family history of renal disease, have a role in the development and progression of diabetic nephropathy. Also, systolic blood pressure, hyperangiotensinemia and hyperaldosteronism showed to be independent predictors of more vigorous decline in renal function. **Background** – End-stage renal disease (ESRD), which affects both Type 1 and Type II diabetics, is most frequently caused by diabetes. In both Type 1 and Type II diabetes, 20 to 30% of patients show signs of nephropathy, but a much smaller percentage of Type II diabetes patients go on to develop end-stage renal disease (ESRD). **Aim and objective –** Persistent proteinuria, hypertension, and a progressive loss in renal function are the hallmarks of diabetic kidney disease (DKD), a potentially fatal and irreversible micro-vascular consequence. Microalbuminuria, often known as early DN[1-4], or a slight rise in urine albumin excretion (UAE) are characteristics of the early stage. As it is known that diabetes mellitus causes major macro vascular and micro-vascular consequences, a significant portion of the related morbidity and mortality are caused by micro-vascular consequences of diabetes mellitus Therefore, the purpose of the current study was to ascertain the relationship between nephropathy development in type II diabetics and its duration. **Methodology –**This study was conducted in Department of General Medicine, Government General Hospital, Ananthapuram, over a period . All patients presenting to General medicine OPD and patients admitted in the medical wards were included in the study. Type II diabetes is considered in case of Patients who developed diabetes after the age of 30 years . Albuminuria in diabetic people is regarded as nephropathy. **Results** - Duration of diabetes- Most patients with type II diabetes will have end organ dysfunction with micro macro-vascular complications staring at even the time of diagnosis of disease rather than type I diabetes where it takes years to develop complications .Therefore, it is important to screen for organ dysfunction at an increasing frequency as the disease progresses through years. **Conclusions – E**arly screening for urine albumin excretion predicts early development of renal dysfunction thereby providing us a chance for intervening in between and thereby preventing further progression to end stage renal dysfunction , which is life threateningand may require renal replacement therapy .

Keywords – Diabetic kidney disease, Proteinuria, Angiotensin converting enzyme

INTRODUCTION

Today, diabetes is the most frequent single cause of end-stage renal disease, and nephropathy affects roughly 40% of diabetic people. Because the onset of diabetes is typically not well established, diabetic nephropathy in type II diabetes can be harder to predict. Without treatment, 20–40% of type II diabetic patients with Microalbuminuria will progress to macroalbuminuria.

Diabetes mellitus prevalence among people has increased to epidemic levels on a global scale. Ten years from now, it's predicted that one in five diabetics will be Indian[5]. Particularly in patients with significant urine albumin excretion[6], type II diabetics rapidly develop serious renal and cardiovascular problems.

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MARKERS OTHER THAN MICROALBUMINURIA[7]

There is intensive research to identify earlier biochemical/clinical or genotypic marker that will be predicting diabetes related nephropathy with high specificity and sensitivity before the actual development of disease. Of these genes which are encoding for rennin angiotensin system, very notably the genes that for Angiotensin Converting Enzyme (ACE) is a field of interest .3 genotypes such as II /ID/DD have been found in population. In Japanese population there is higher incidence of DD genotype in Type II DM patients with declining renal functions

METHODOLOGY

Study design: Cross –sectional
Study duration: 1year 8 months
Sample size: 100

Source of data: This study was conducted in Department of General Medicine, Government General Hospital, Ananthapuram. All patients presenting to General medicine OPD and patients admitted in the medical wards were included in the study. Type II diabetes is considered in case of Patients who developed diabetes after the age of 30 years. Albuminuria in diabetic people is regarded as nephropathy.

Inclusion criteria

- Already diagnosed type II diabetic adults aged 35-75 years.
- Type II diabetic adults on either diet therapy or oral hypoglycemic drugs or insulin therapy.

Exclusion criteria

- Patients not willing for study
- Newly diagnosed patients of type II diabetes mellitus (< 6 months)
- Type I diabetes mellitus patients
- Patients with known renal disease
- Patients with acute febrile illness,
- sepsis, urinary tract infections, Pregnants,
- Patients on dialysis

As per the proforma, detailed history is taken. Relevant history regarding age of onset of diabetes & duration since diagnosis will be collected. Based on the history regarding age of onset ,all diabetic people are categorized into anyone of the three groups such as <5 years, between 5-10 years and > 10 years of diabetes duration.

Patients will undergo thorough clinical examination in the form of General Examination, Vital signs like Pulse rate, Respiratory Rate, B.P, Temperature. Conscious levels using GCS scale and systemic examination done. BP is measured in the subject,s right arm being positioned in sitting posture.

All required blood investigations including serum creatinine and blood urea are done by sampling of blood of all subjects and these investigations are done in the clinical laboratory of biochemistry within the Hospital of Medical college. Random morning urine samples are collected to estimate urine albumin excretion .

RESULTS

Table 1- Laboratory profile and Albuminuria

	<30	**30 – 300**	**>300**	**P value**
Blood urea (Mean ± SD)	30.01 ± 9.36	28.82± 7.06	33.47± 3.12	0.09
Serum creatinine	1.05± 0.16	1.16 ±0.13	1.21± 0.19	0.08
Serum cholesterol	189.92± 33.71	184.45 ±35.53	195.40± 46.47	0.12
FBS	178.35± 45.01	176.84± 31.57	199.90± 48.47	0.02
PPBS	263±.59 5	289.85 ±78.73	411.57 ±302.86	0.11

Table 2: Association between DM duration in years & Albuminuria

Diabetes Duration in years	**Albuminuria (Mean ± SD)**
<5 years	186.92 ±85.01
5 –10	163.05 ± 96.72
>10	349.54 ±89.77
F test= 48.02, p= 0.0001*, Statistically significant	

Table 3: Association between Duration of diabetes and Albuminuria

DURATION OF DIABETES IN YEARS	**ALBUMINURIA**		
	<30	**30-300**	**>300**
<5	1	12	1
5-10	12	26	2
>300	1	6	39
TOTAL	14	44	42

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Chi square test= 69.07, p=<0.0001* Statistically significant

DISCUSSION

Duration of diabetes- Most patients with type II diabetes will have end organ dysfunction with micro macro-vascular complications staring at even the time of diagnosis of disease rather than type I diabetes where it takes years to develop complications .Therefore, it is important to screen for organ dysfunction at an increasing frequency as the disease progresses through years.

Based on the duration, 14% of participants have diabetes duration <5years , 40% have duration between 5-10years and 46% have >10years of diabetes duration. Mean Albuminuria is found to be 349.54±89.77 in >10years duration which is much more compared to 163 ±96.72 in 5-10 years duration and 186±85 in < 5years diabetes duration .There is statistically significant association between duration of diabetes and urine albumin excretion amount.

84% of participants in >10years diabetes duration have macroalbuminuria whereas 5% and 7% in 5-10years and <5 years duration have macroalbuminuria and thus there is statistically significant association between albuminuria and diabetes duration both in males and females. There is moderately positive correlation obtained between duration of diabetes and albuminuria.

A trail on diabetes control & complications found a link between having diabetes for a long time and developing diabetic nephropathy. An important association between the diabetes progression through time and the emergence of proteinuria evidenced by Kathryn and colleagues[8] & Knowler WC et al[9]

The present study confirmed and increased the association between the incidence of proteinuria and the diabetes duration. Researchers Dasmahapatra A et al[10], Klein R et al[11] and Nelson R G et al found similar results in their studies.

Ardekani et al[12] conducted a cross-sectional study to determine the prevalence of microalbuminuria and its risk factors among type II diabetic patients. Two hundred and eighty-eight type II diabetic patients (141 males and 147 females) in the tertiary care hospital were randomly recruited for the research. Microalbuminuria was observed by calculation of albumin to creatinine ratio in early morning urine. Chi-square analysis identified that microalbuminuria correlated with diastolic blood pressure (P = 0.003) and period of diabetes (P = 0.000). Logistic regression was used for research of 240 patients for whom the duration of diabetes was known from the answers in their questionnaires. Results showed that two variables like period of diabetes and Diastolic Blood Pressure (DBP) play a function in this model and the following logical relation was obtained: g^(x) =-9,233 ± 0,079 DBP ± 0,114 duration, both DBP and duration of diabetes were directly associated with microalbuminuria. Determination of urine albumin-creatinine ratio is a simple method of microalbuminuria screening that is suggested for all diabetic patients, particularly diabetic patients with hypertension and long-term diabetes.

364 Pima Indians older than 35 with type II diabetes & proteinuria were chosen by Nelson et al[13] 95 of the 364 individuals showed ESRD . After the commencement of proteinuria, the overall incidence was 40% at ten years & 61% at fifteen years. They discovered that the ESRD incidence attributable to diabetes-related nephropathy rose from 0 cases /1000 person-years for diabetes durations of 0 to 5 years to 40.8 cases/1000 person-years for diabetes durations of higher than or close to 20 years. The frequency of diabetes-related nephropathy increases with the length of diabetes.

SUMMARY AND CONCLUSIONS

Thus, early screening for urine albumin excretion predicts early development of renal dysfunction thereby providing us a chance for intervening in between and thereby preventing further progression to end stage renal dysfunction , which is life threatening and may require renal replacement therapy .

This early screening of albuminuria also predicts development of other associated micro and macro vascular consequences particularly cardiovascular morbidity and mortality and hence we should consider early interventions such as risk factor control, strict glycemic control, associated blood pressure monitoring with target lowered BP, lifestyle management with physical activity and strict balanced diet approach to overcome morbidity and mortality.

Many combination medical interventions rose and strict adherence to prescribed drugs and regular screening for complications provide a definitive way for improving qualitylife of diabetics

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