Journal of Cardiovascular Disease Research

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 07, 2024

Original research article

Assessment of prevalence of diabetic nephropathy in type 2 DM patients: A tertiary care centre

[1]Dr. V.K. Chawdhary
Assistant Professor, Department of Medicine, Amar Shaheed Jodha Singh Attaiya Thakur Dariyao Singh Medical College, Fatehpur, Uttar Pradesh, India

Corresponding Author: Dr. V.K. Chawdhary

Abstract

Background: Diabetic nephropathy is the leading cause of end-stage renal disease (ESRD) worldwide, and it is estimated that ~20% of type 2 diabetic patients reach ESRD during their lifetime. Diabetic nephropathy is the leading cause of chronic kidney disease in patients starting renal replacement therapy and is associated with increased cardiovascular mortality. Diabetic nephropathy has been classically defined by the presence of proteinuria >0.5 g/24 h. This stage has been referred to as overt nephropathy, clinical nephropathy, proteinuria, or macroalbuminuria.
Aims and Objectives: To Assess the prevalence of diabetic nephropathy in type 2 DM patients.
Materials and Methods: In this prospective study, 52 patients diagnosed diabetics were studied. Group A had 26 patients with at least one risk factor are hypertension, hypercholesterolemia and obesity. Group B had 26 patients without any of the risk factors. Patients who were selected for presence of Diabetic nephropathy with abnormal serum Creatinine, creatinine clearance and urinary albumin levels.
Results and Observations: As many as 8 out of 52 patients were found to have Diabetic nephropathy. The number was significantly higher in group A compared to group B. Incidence of nephropathy was higher with higher number of associated risk factors. Urinary microalbuminuria was the commonest abnormality, Serum creatinine was found in only 25.84% of total positive cases.
Conclusion: The large differences observed in the prevalence of nephropathy among different studies could be attributed to the differences in study design and methodologies adopted for defining the disease. Hypertension, obesity and hypercholesterolemia can contribute to development of nephropathy, and also, urinary microalbuminuria appears to be much more sensitive than serum creatinine.
Keywords: Nephropathy, type II DM, hypertension, obesity, serum creatinine, macroalbuminuria

Introduction

Diabetic nephropathy is the leading cause of end-stage renal disease (ESRD) worldwide, and it is estimated that ~20% of type 2 diabetic patients reach ESRD during their lifetime [1]. Kidney disease in diabetic patients is clinically characterized by increasing rates of urinary albumin excretion, starting from normoalbuminuria, which progresses to microalbuminuria, macroalbuminuria, and eventually to ESRD. Microalbuminuria is the earliest clinically detectable stage of diabetic kidney disease at which appropriate interventions can retard, or reverse, the progress of the disease. Diabetes Mellitus (DM) is one of the commonest diseases in the world, especially the industrialized world. But recently, the "Silent epidemic" of diabetes has been spreading like a wild fire through the developing world. India has earned the dubious distinction of being termed the "Diabetes capital of the world" with number of patients expected to cross 79.4 million by year 2030 [2]. The dangerous fact about diabetes is that it is a "Silent killer". By the time patient is diagnosed to have diabetes, he/she is already affected with complications like diabetic nephropathy, retinopathy and neuropathy. Diabetic nephropathy has been didactically categorized into stages based on the values of urinary albumin excretion (UAE): microalbuminuria and macroalbuminuria. The cutoff values adopted by the American Diabetes Association (timed, 24-h, and spot urine collection) for the diagnosis of micro- and macroalbuminuria, as well as the main clinical features of each stage, are depicted in. There is accumulating evidence suggesting that the risk for developing diabetic nephropathy [3-6] and cardiovascular disease [7, 8] starts when UAE values are still within the normoalbuminuric range. Progression to micro- or macroalbuminuria was more frequent in patients with type 2 diabetes with baseline UAE above the median (2.5 mg/24 h)2. After 10 years of follow-up, the risk of diabetic nephropathy was 29 times greater in patients with type 2 diabetes with UAE values >10 μg/min[3]. The same was true for patients with type 1 diabetes. This favors the concept

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 07, 2024

that the risk associated with UAE is a continuum, as is the case with blood pressure levels [9]. Possibly, values of UAE lower than those currently used for microalbuminuria diagnosis should be established.

Materials and Methods: This was cross-sectional study carried out in A.S.J.S.A.T.D.S Medical College, Fatehpur, UP, India. A total 32 patients were male and 20 were female. The mean age was 47.2. Informed and written consent was obtained from patient or a responsible attendant before including the patient in the study.

1. Fasting Blood glucose- ≥126mg/dl (12 Hours fasting).
2. Postprandial Blood glucose- ≥200 mg/dl. (2 hours after taking meal).
3. Microalbuminuria can be diagnosed from a 24-hour urine collection (between 30-299mg/24 hours) or, more commonly, from elevated concentrations in a spot sample (30 to 299mg/L).

We have divided the patients in 2 groups of 26 patients each-
Group A: Diabetic patients with hypertension or obesity or hypercholesterolemia.
Group B: Diabetic patients without any of co-morbidities.

Inclusion criteria

1. Age more than 20 years.
2. Detection of diabetes within 6 months at the time of enrolment in study.

Exclusion criteria

1. Type 1 diabetes mellitus.
2. Diabetes for more than 6 months.

History of Hypertension, blood pressure was recorded more than 140/90mmHg Complete lipid profile was done for hypercholesterolemia. both the groups for prevalence of diabetic nephropathy and analyzed if there was a statistical difference in between these groups.

Results and Observations

Table 1: Age, sex distribution of the cases

Group A(n=26)					Group B(n=26)			
Age group	**Male**	**%**	**Female**	**%**	**Male**	**%**	**Female**	**%**
20-30	2	7	1	4	0	0	0	0
31-40	3	12	3	12	4	15	2	8
41-50	7	27	5	19	10	38	5	19
>50	3	12	2	7	3	12	2	8
	15	58	11	42	17	65	9	35

A total 32 patients were male and 20 were female. The mean age was 47.2. as in **Table 1.**

Table 2: Cases detected with nephropathy in both groups

Group A(n=26)			Group B(n=26)	
	Present	**Absent**	**Present**	**Absent**
Diabetic Nephropathy	6(23%)	20(77%)	2(8%)	24(92%)

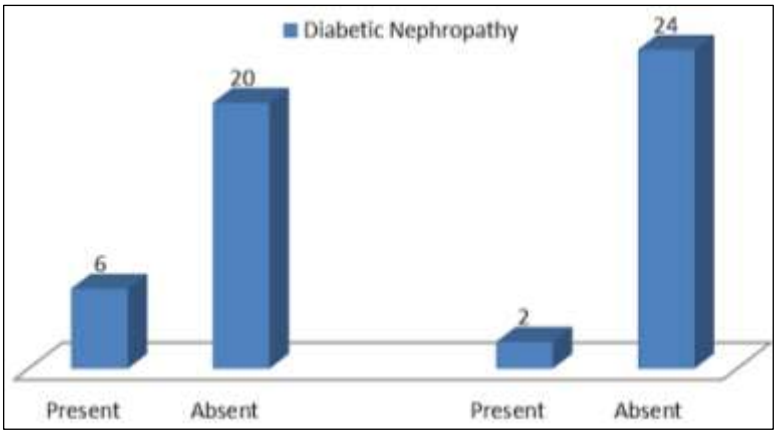

Fig 1: Diabetic nephropathy present in both the group

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 07, 2024

In this study, out of 52 total patients, 8 patients were detected to have Diabetic Nephropathy. In group A, out of 26 patients 6 (23%) patients had diabetic nephropathy, while in group B, out of 26 patients 2 (8%) patients had diabetic nephropathy as in **Table 2 and Figure 1.**

Table 3: Co-morbidities

	With Nephropathy (n=8)		Without nephropathy(n=44)	
	Present	**Absent**	**Present**	**Absent**
Hypertension	7(87.5%)	1(12.5%)	9(20%)	35(80%)
Hypercholesterolemia	6(75.0%)	2(25%)	8(18%)	36(82%)
Hypertension + Hypercholesterolemia	6(75.0%)	2(25%)	7(16%)	37(84%)
Obesity	7(87.5%)	1(12.5%)	5(11%)	39(89%)
Hypercholesterolemia +Obesity	6(75.0%)	2(25%)	5(11%)	39(89%)
Hypertension + Obesity	6(75.0%)	2(25%)	5(11%)	39(89%)

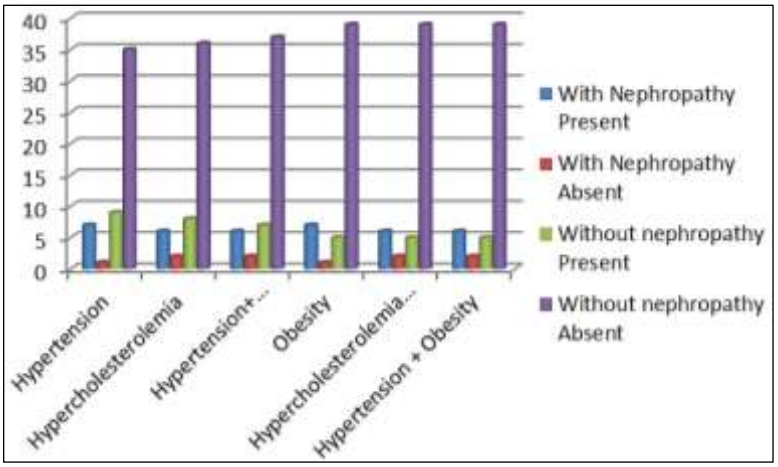

Fig 2: Comorbidities in subjects

A subgroup analysis was done with regards to multiple co-morbidities, showing increasing number of patients affected with increasing comorbidities of with diabetic nephropathy patients as in **Table 3 and Figure 2.**

Discussion

Type 2 diabetes in Asian Indians differs from that in Europeans in several aspects: the onset is at a younger age, obesity is less common, and genetic factors appear to be more common [10]. Diabetic nephropathy is a dreaded complication of DM and early detection is of paramount importance. Earlier, it has been shown that Nephropathy is present in about 15-18% of patients with newly diagnosed type 2 Diabetes [11]. In this study, out of 50 total patients, total 08 patients were detected to have Diabetic Nephropathy. In group A, out of 26 patients 6 (23%) patients had diabetic nephropathy, while in group B, out of 26 patients 2 (8%) patients had diabetic nephropathy. Study of development and progression of nephropathy in type 2 Diabetes by Amanda I. [12] Adler, Stevens RJ in United Kingdom showed the prevalence of nephropathy in recently detected type 2 DM to be 7.3%. Study by Ghai *et al*. on microalbuminuria showed the prevalence of Nephropathy in type 2 DM at onset to be 25% [13]. Chowta NK and Pant's P study on relation of microalbuminuria in type 2 DM with relation to age, sex weight and creatinine clearance showed prevalence of nephropathy at onset to be 37% [14]. Study by Agarwal N, Sengar NS has shown that there is 17.34% prevalence of diabetic nephropathy in recently detected type 2 DM, but with hypertension this prevalence was shown to be as high as 60% [15]. The higher prevalence of diabetic nephropathy found in this study could be attributed to a variety of factors. The overall prevalence of microalbuminuria and macroalbuminuria in both types of diabetes is approximately 30-35%. Microalbuminuria independently predicts cardiovascular morbidity, and microalbuminuria and macroalbuminuria increase mortality from any cause in diabetes mellitus. Microalbuminuria is also associated with increased risk of coronary and peripheral vascular disease and death from cardiovascular disease in the general nondiabetic population. Patients in whom proteinuria has not developed have a low and stable relative mortality rate, whereas patients with proteinuria have a 40-fold higher relative mortality rate. Patients with type 1 DM and proteinuria have the characteristic bellshaped relationship between diabetes duration/age and relative mortality, with maximal relative mortality in the age interval of 34-38 years (as reported in 110 females and 80 males). In this study, author detected 6 out of 26 patients in Group A (those having hypertension and/or hypercholesterolemia and/or obesity) to have diabetic nephropathy. While in Group B (without any of the 3 factors), only 2 out of 26 patients were

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 07, 2024

detected to have diabetic nephropathy. Author analyzed this data using Chi2 method and found that association of nephropathy in group A was highly significant at P value < 0.0001. Some studies [16, 17] conducted in migrant Asian Indians in the U.K. and Europe have reported increased prevalence of diabetic nephropathy compared with white Caucasians.

Conclusion

The large differences observed in the prevalence of nephropathy among different studies could be attributed to the differences in study design and methodologies adopted for defining the disease. Many of the studies were clinic based, and this could have introduced a referral bias. In addition, most of these studies have not included retinopathy in the definition for diagnosis of diabetic nephropathy. The strength of our study is that it is population based and has included diabetic retinopathy in the definition with the latter diagnosed using retinal color photography. Urinary Albumin is much more sensitive test to detect Nephropathy, and measurement for urine microalbuminuria on two separate occasions (especially in presence of another cause for albuminuria) or measuring the creatinine clearance for the earlier diagnosis of nephropathy. We conclude that S. Creatinine is a very poor marker of Nephropathy and may be medical fraternity needs to stop depending on it as screening tool for Diabetic Nephropathy. Hypertension, obesity and hypercholesterolemia can contribute to development of nephropathy, and also, urinary microalbuminuria appears to be much more sensitive than serum creatinine.

Source of funding: None.

Conflict of interest: None.

References

1. Ayodele OE, Alebiosu CO, Salako BL. Diabetic nephropathy: a review of the natural history, burden, risk factors and treatment. J Natl Med Assoc. 2004;96:1445-1454.
2. American Diabetes Association: Nephropathy in diabetes (Position Statement). Diabetes Care. 2004;27(1):S79-S83.
3. Forsblom CM, Groop PH, Ekstrand A, Totterman KJ, Sane T, Saloranta C, *et al*. Predictors of progression from normoalbuminuria to microalbuminuria in NIDDM. Diabetes Care. 1998;21:1932-1938.
4. Murussi M, Baglio P, Gross JL, Silveiro SP. Risk factors for microalbuminuria and macroalbuminuria in type 2 diabetic patients: a 9-year follow-up study. Diabetes Care. 2002;25:1101-1103.
5. The Microalbuminuria Collaborative Study Group. Predictors of the development of microalbuminuria in patients with type 1 diabetes mellitus: a seven-year prospective study. Diabet Med. 1999;16:918-925.
6. Gall MA, Hougaard P, Borch-Johnsen K, Parving HH. Risk factors for development of incipient and overt diabetic nephropathy in patients with non-insulin dependent diabetes mellitus: prospective, observational study. BMJ. 1997;314:783-788.
7. Yusuf S, Sleight P, Pogue J, Bosch J, Davies R, Dagenais G, *et al*. Effects of an angiotensin-converting-enzyme inhibitor, ramipril, on cardiovascular events in high-risk patients: the Heart Outcomes Prevention Evaluation Study Investigators. N Engl J Med. 2000;342:145-153.
8. Gerstein H, Mann J, Yi Q, Zinman B, Dinneen S, Hoogwerf B, *et al*. Albuminuria and risk of cardiovascular events, death, and heart failure in diabetic and nondiabetic individuals. JAMA. 2001;286:421-426.
9. Deepa M, Pradeepa R, Rema M, Mohan A, Deepa R, Shanthirani S, *et al*. The Chennai Urban Rural Epidemiology Study (CURES): study design and methodology (urban component) (CURES-I). J Assoc Physicians India. 2003;51:863-870.
10. Vasan R, Larson M, Leip E, Evans J, O'Donnell C, Kannel W, *et al*. Impact of high-normal blood pressure on the risk of cardiovascular disease. N Engl J Med. 2001;345:1291-1297.
11. Mohan EA, Monagham B. Nephropathy in newly diagnosed type 2 Diabetes. Diabetes cone. 1994;17:1545-6.
12. Adler AI, Stevens RJ, Manley SE, Bilous RW, Cull CA, Holman RR. Development and progression of nephropathy in type 2 Diabetes: The United Kingdom Prospective Diabetes Study (UKPDS 64). Kidney Int. 2003;63:225-232.
13. Ghai R, Verma ND, Goel A, Bhatnagar MK, Kapoor P, Vashishta A. Microalbuminuria in non-insulin dependent Diabetes and essential hypertension: A marker of severe disease. J Assoc Physicians India. 1994;42:771-774.
14. Chowta NK, Pant P, Chowta MN. Microalbuminuria in Diabetes mellitus: Association with age, sex, weight, and creatinine clearance. Indian J Nephrol. 2009;19:53-56.
15. Agarwal N, Sengar NS, Jain PK. Nephropathy in newly diagnosed type 2 Diabetics with special stress on the role of Hypertension. JAPI. 2011;59:145-147.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 07, 2024

16. Samanta A, Burden AC, Feehally J, Walls J. Diabetic renal disease: differences between Asian and white patients. Br Med J (Clin Res Ed). 1986;293:366-367.
17. Mather HM, Chaturvedi N, Fuller JH. Mortality and morbidity from diabetes in South Asians and Europeans: 11-year follow-up of the Southall Diabetes Survey, London, UK. Diabet Med. 1998;15:53-59.