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A Clinical Study of Microvascular Complications in Newly Diagnosed Diabetes Mellitus Patients

KEYWORDS: Microvascular complications; Diabetic retinopathy; Diabetic neuropathy; Diabetic nephropathy; newly diagnosed Diabetes Mellitus,

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ABSTRACT *BACKGROUND*

DM is characterized by asymptomatic phase between actual onset of hyperglycemia and clinical diagnosis, which has been estimated to last at least 4-7 years. Although microvascular complications do not occur at onset of disease, due to delay in diagnosis they are commonly present at the time of diagnosis. Aim of the study was to detect microvascular complications at the time of diagnosis of DM.

METHODS

A total of 50 newly diagnosed Diabetic patients were enrolled over a period of 1 year. Detailed clinical examination and relevant investigations for DM and microvascular complications were carried out.

RESULTS

Classical symptoms of DM were present in 56% patients, 32% had symptoms due to microvascular complications and 12% were asymptomatic. Thirty six percent of the patients presented with neuropathy at the time of diagnosis of DM of which 30% had neuropathy symptoms at presentation, 6% had only signs and 28% had both. Retinopathy was present in 24% and most common form was BDR(12%). 28% of the patients had diabetic nephropathy, with 22% of them having incipient nephropathy.

CONCLUSION

Microvascular complications were present in 52% at the time of diagnosis of DM this signals physicians to have serious awareness about these unusual presentations and helps in concentrating on further evaluation and appropriate intensive control of diabetes to prevent further complications.

INTRODUCTION

India already faces a grave problem with the largest number of subjects with diabetes (approx 33 million in 2003) and it will escalate further with the number increasing to 57.2 million in the year 2025 and by the year 2030 it may be 80.9 million.[1]

Diabetes mellitus is characterized by asymptomatic phase between actual onset of hyperglycemia and clinical diagnosis which has been estimated to last at least 4-7 years.[2]

Although various microvascular complications do not occur at onset of disease, due to delay in diagnosis they are commonly present at the time of diagnosis. Various microvascular complications in diabetes mellitus includes: 1) Diabetic Retinopathy, 2) Diabetic Nephropathy, 3) Diabetic Neuropathy

OBJECTIVE

To study the prevalence of various microvascular complications in patients with newly detected Diabetes Mellitus.

MATERIALS AND METHODS:

A Prospective Observational Study was conducted on 50 Consecutive newly diagnosed Diabetes Mellitus patients (detected by chance for first time) in Department of Medicine, MGM Hospital from February 2012 to February 2013. Approval from the institute ethical committee was obtained. Patients were enrolled on basis of inclusion criteria (newly diagnosed DM on basis of FPG ≥126mg/dl (7.0mmol/dl) and PPPG ≥200mg/dl). Exclusion criteria were pts with UTI, known cases of Hypertension and/or on ARB/ACE inhibitor, S creatinine >2, Pregnancy, other causes of neuropathy or not willing to participate).

Patients' clinical history i.e. symptoms of diabetes and microvascular complications of peripheral &/or autonomic neuropathy, Diabetic retinopathy and diabetic nephropathy were taken. Examination for diabetic peripheral neuropathy was done by foot sensitivity testing with Semmes Weinstein monofilament, deep tendon reflex testing by percussion hammer and vibration perception testing by 128Hz tuning fork; for diabetic autonomic neuropathy, parasympathetic tests i.e. heart rate response to Valsalva maneuver and to deep breathing and sympathetic test i.e. BP response to standing up, gustatory sweating, erectile dysfunction, diabetic diarrhea, urinary incontinence, pupillary abnormalities were conducted. Examination for diabetic retinopathy was done by direct ophthalmoscopic examination of fundus by an ophthalmologist.

Investigations (FPG, PPPG, CBC, blood urea & serum creatinine, urine for proteinuria, urine culture and sensitivity, ESR, microalbuminuria detection by Albumin Creatinine Ratio estimation) were carried out. Urinary albumin was measured by rate Nephelometry and Urinary Creatinine was measured by modified Jaffe's method. The albumin to creatinine ratio was calculated to determine presence of microalbuminuria (macroalbuminuria > 300 µg/mg, microalbuminuria 30-300 µg/mg, Normal <30 µg/mg).

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RESULTS AND OBSERVATIONS

Out of total 50 patients with newly diagnosed diabetes, 60% were males (n=30) and 40% were females (n=20). 44% of the patients were within age of 45-54yrs. Mean age of the patients was 55.26±20.24.

Table 1: Cases Distribution on bases of symptoms and diabetes induced microvascular complications

	Male, n	Female, n	Total, n (%)
Asymptomatic	4	2	6(12%)
Classical symptoms	18	10	28(56%)
Symptoms due to microvascular complications	8	8	16(32%)
Neuropathy	Male	Female	Total
Symptoms on presentation	9	6	15 (30%)
Signs with symptoms	8	6	14 (28%)
Only signs	2	1	3 (6%)
Retinopathy	Male	Female	Total
BDR	4	2	6(12%)
PPDR	2	2	4(8%)
PDR	2	-	2(4%)
Proteinuria	Male	Female	Total
Microalbuminuria	6	5	11 (22%)
Macroalbuminuria	1	2	3 (6%)

In our study 56% patients (18 males and 10 females) presented with classical symptoms of diabetes mellitus. About 32% patients with newly diagnosed diabetes mellitus presented with symptoms due to microvascular complications and 12% patients were totally asymptomatic and accidentally detected as having diabetes.

Symptomatic neuropathy was more common than asymptomatic. 36% patients presented with neuropathy at the time of diagnosis of diabetes. 30% patients (9 males and 6 females) were having symptoms of neuropathy at time of presentation, 6% presented with only signs of neuropathy, 28% (8 males and 6 females) were having both signs and symptoms.

In our study BDR was more common than PDR at the time of diagnosis. Total 24% (8 males and 4 females) of the patients had retinopathy at the time of diagnosis. 4% of the patients had maculopathy at the time of diagnosis. None of these patients presented with loss of vision at the time of diagnosis.

In the study significant numbers of patients (22%) presented with incipient nephropathy (microalbuminuria) at the time of diagnosis. 6% patients had macroalbuminuria. 28% patients presented with diabetic nephropathy at the time of diagnosis of diabetes mellitus.

DISCUSSION

Table 2: Comparison of results of present study with other studies

NEUROPATHY	Peripheral Neuropathy	Autonomic neuropathy	Overall	
Present study	28%	18%	36%	
Ratzmann K P et al[4]	6.30%	7.30%		
Parker A L et al[5]		9.70%		
Nambuya A P et al[6]			46.40%	
NEUROPATHY	Peripheral Neuropathy	Autonomic neuropathy	Overall	
A Ramachandran et al[7]			14%	
Thompson T J et al[8]			9%	
RATINOPATHY	BDR	PPDR	PDR	Overall
Present study	12%	8%	4%	24%
Wang Y et al[10]	12.85%	6.20%	2.3%	19.6%
Cathelineau G et al[12]	10.20%			10.2%
Verinoca R Collins et al[11]	15.40%			15.4%
Thomson T J et al[8]				20.0%
NEPHROPATHY	Microalbuminuria	Macroalbuminuria	Overall	
Present study	22%	6%	28%	
A Ramachandran et al[7]	14%	2.20%	16.20%	
Verinoca R Collins et al[11]			26%	
Paulsen P L et al[13]	25%		25%	
Thompson P J et al[8]			8%	
Cathelineau G et al[12]	30%		30%	

Symptoms

In the present study 56% of patients presented with classical symptoms of Diabetes Mellitus and 36% with weight loss. In a study conducted by V. Sekar et al[3] classical symptoms were present in 21% and weight loss was in 47%.

Neuropathy

The incidence of peripheral neuropathy and Autonomic neuropathy was high in our study compared to Ratzmann KP et al[4] and Parker AL t al[5]. Over all percentage of neuropathy was almost equal when compared to Nambuya AP et al[6] and high when compared to Thompson TJ et al[8] and Ramachandran A et al study[7].

Symptomatic neuropathy was present in 36% of patients in present study, 7% in Sekar V et al[3] and 30% in Tripathi BB et al[9]. It was little higher when compared to study by Tripathi BB et al[9] and very high compared to V Sekar et al[3]

Retinopathy

The incidence of retinopathy in our study was nearly equal when compared to Thompson T J et al[8] and Wang Y et al.[10] It was more when compared to Verinoca R Collins et al[11] and Cathelineau G et al.[12]

BDR was the main presenting feature in all the studies including our study and PPDR in our study was almost equal when compared to Wang Y et al[10]. In our study Maculopathy was present in 4% of patients, in Wang Y et al[10] it was 2.3%. It was little higher in our study.

Nephropathy

The incidence of nephropathy in present study was almost equal to Verinoca R. Collins et al[11], Paulsen P et al[13] and Cathelineau G et al[12]. But it was higher than A Ramachandran et al[7] and Thompson T J et al[8].

The percentage of microalbuminuria in present study was nearly equal to Paulsen PJ et al[13], it was little lower

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than Cathelineau G et al[12] but was higher than Ramachandra A et al[7].

The presence of microalbuminuria is also believed to be a biomarker of widespread vascular injury and atherosclerotic burden. It does not measure a kidney disease but only a secondary and indirect effect of a distant disease process on kidney physiology.[14] Thus microalbuminuria is a marker of endothelial dysfunction instead of marker of renal impairement.[15, 16]

The presence of neuropathy as well as nephropathy is common in newly diagnosed cases of type 2 diabetes mellitus. Both these complications have been significantly associated with increasing age indicating the possibility of a longer duration of undetected diabetes among them. Concurrence of neuropathy and nephropathy found in this study suggests that microvascular complications go hand in hand.[17]

Limitation of our study includes small study population size. Pregnant and gestational DM females were not enrolled in the study.

CONCLUSION

26 out of 50 newly diagnosed diabetes mellitus presented with microvascular complications. In them Neuropathy was found to be the commonest microvascular complication followed by diabetic nephropathy and diabetic retinopathy.

Early diagnosis and management of DM and its complications can prevent further progression of the disease process and reversal of initial phase of complications. Targeted screening for previously undiagnosed type 2 diabetics may help in prevention of emergence or delay the onset of microvascular complications.

REFERENCE

1. King H, Aubert RE, Herman WH. Global burden of diabetes 1995-2025; Prevalence, numerical estimates, and projection, Diabetes Care 1998;21:1414-31. | 2. Harris MI, Klein R, Welborn TA, onset of NIDDM occurs atleast 4-7 years before clinical diagnosis. Diabetes care 1992; 15: 815-819. | 3. Sekar V. Screening for complications at diagnosis in NIDDM.RSSDI; 1997; Dec:15. | 4. Ratzmann KP. Prevalence of peripheral and autonomic neuropathy in newly diagnosed Type-2 diabetics. Journal Diabet Complications, 1991 Jan-Mar; 5(1): 1-5. | 5. Parker AL. Peripheral autonomic impairment in patients newly diagnosed with Type-2 DM. Diabetes care, 1994 Dec; 17(12): 1422-7. | 6. Nambuya AP. The presentation of newly diagnosed diabetic patients in Uganda QJM, 1996 Sept; 89(9): 705-11. | 7. Ramachandran A, Vishwanathan V. Prevalence of complications at diagnosis of NIDDM. RSSDI, 1997; Dec 14. | 8. Thompson TJ. Screening of NIDDM in non-pregnant adults. Diabetes Care, 1995; 18:1606-1618. | 9. Tripathy BB et al. Diabetic neuropathy. JAPI 1993; (Suppl 1): p:47 | 10. Wang Y.Chung-Hauu-IHseuch-Tsu-Chih. Chronic diabetic complications and treatment in Chinese diabetic patients, 1997 Feb; 77(2):119-122 | 11. Verinoca RC. High prevalence of Diabetes Retinopathy and Nephropathy in Polynesians of Western Samoa. Diabetes Care, Aug 1995; vol18:8. | 12. Cathelineau G. Management of newly diagnosed NIDDM in the primary setting effect of 2 years of gliclazide treatment. The Diadem study, Metabolism, 1997 Dec; 46(12):31-4 | 13. Paulsen PL. Epidemiology of microalbuminuria in diabetes and in background Population. Current opinion-Nephrology Hypertension, 1994; May; 3(3):248-256. | 14. Glassock RJ : Is the presence of microalbuminuria a relevant marker of renal disease Curr Hypertens Rep 2010 12:364-368 | 15. Solbu MD,Jenssen TJ, et al. Changes in insulin sensitivity , renal function and markers of endothelial dysfunction in hypertension Metabolism 2009 58:408-415. | 16. Silva AM, Schaan BD et al. Microalbuminuria is associated with impaired arterial and venous endothelium dependent vasodilatation in patients with type 2 diabetes. J Endocrinol Invest 2010. 33:696-700. | 17. Karmakar RN, Khandakar MR, Gangopadhyay PK, Ghosh K, Babu AS. Albuminuria and neuropathy in newly detected diabetics: profile and correlation. J Indian Med Assoc. 2011 Jun; 109(6):396-9. |