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Original Research Paper

Pathology

EVALUATION OF MICROALBUMINURIA IN TYPE II DIABETIC MELLITIS PATIENTS BY AUTOMATED URINE ANALYSIS

Vennela D — Assistant Professor, Department of Biochemistry ,Government Medical College and General Hospital, Suryapet, Telangana State.

Madhukar Reddy Kadaru* — Assistant Professor, Department of Pathology, Government Medical College and General Hospital, Suryapet, Telangana State. *Corresponding Author.

ABSTRACT

AIMS AND OBJECTIVES: The prevalence of Diabetes Mellitus is growing rapidly worldwide and iNephropathy is an important complication which is the leading cause of End Stage Renal Disease. The earliest manifestation of Diabetic Nephropathy being microalbuminuria can be present in NIDDM patients at the time of diagnosis.But prompt recognition helps in intervention.This study is to document and analyse the findings of automated complete urinogram among proven type 2 diabetes mellitus patients while studying the levels of albuminuria and correlate cases of microalbuminuria with age, sex, duration since diagnosis of diabetes.

MATERIALS AND METHODS: Data for the current study was collected from outpatients attending the attached hospitals of GMC&GH, Suryapet during the period from JULY 2018 to June 2019. Based on levels of albuminuria the patients were categorized into normoalbuminuria with <30 mg/gm of creatinine, microalbuminuria with 30- 300mg/gm of creatinine, and macroalbuminuria with >300mg/gm of creatinine. Hypertension, Ischemic heart disease,myocardial infarction, Diabetic neuropathy defined by signs and symptoms of neuropathy and Diabetic retinopathy defined by signs of retinopathy on slit lamp biomicroscopy. Detail history, examination followed by investigations-Fasting Blood Sugar, Postprandial Blood Sugar, Glycosylated Haemoglobin, Lipid Profile, Urine analysis by dipsticks, estimation of albumin creatinine ratio and urine microscopy wasdone.

RESULTS: In the present study it was noted that among 500 patients studied, microalbuminuria was common in males, prevalence of microalbuminuria was 20% and correlated with duration. Most of the cases were accumulated in the first five years since diagnosis of diabetes, showing positive correlation with HbA1c values more than 7%, serum total cholesterol >200 mg/dl, serum triglycerides >150 mg/dl, HDL < 35 mg/dl and withhypertension.

CONCLUSION: Testing for microalbuminuria should be standardized in type 2 diabetes mellitus patients from time of first diagnosis of diabetes because early intervention helps in delaying the progression of diabetic nephropathy. Microalbuminuria independently is significantly associated with male gender, cardiovascular risk factors like hypertension and dyslipidemia.

KEYWORDS : Albuminuria, Body Mass Index, Dyslipidemia

INTRODUCTION

Diabetes mellitus is not a single disease entity but rather a group of metabolic disorders sharing the common underlying feature of hyperglycemia.[1]

Diabetes is perhaps as old as mankind. By 400 BC, Sushruta an astute clinician and a deft surgeon supplemented the earliest information and presented a comprehensive picture of diabetes, its possible predisposing factors, clinical features, course and complications along with principles of medical care and surgical intervention wherever necessary[2]. The disorder was named Madhumeha (rain of honey) because of the sweet taste of urine attracting ants andinsects.[3]

The term 'Diabetes" coined by Celsus in 1st century AD means "as if passing through a siphon" was used to describe polydypsia and polyyuria.[4] Cullen (1710-90) added mellitus (mel-honey) to diabetes to constitute the full name of the disorder.[5]Diabetes is one of the first diseases described in an Egyptianmanuscript mentioning "too great emptying of the urine".[6] Description of important symptoms of diabetes have been ascribed to the Chinese physician Neizling and in greater detail by Celsis ofGreece(30-50BC)[7]. The prevalence of Diabetes mellitus is growing rapidly worldwide and is reaching epidemic proportions. It is estimated that there are 285 million people with diabetes worldwide and this number is set to increase to 438 million by the year 2030.[8] Type 2 Diabetes known as Non Insulin Dependent Diabetes (NIDDM) accounts for 85 to 95% of patients with Diabetes in various populations of the world.

Diabetic nephropathy is the leading cause of End Stage Renal Disease[9]. The earliest manifestation of diabetic nephropathy is the appearance of microalbuminuria[10]. The progression of the disease culminates in renal changes with microal buminuria (incipient nephropathy) and macroal buminuria (overt nephropathy). Albumin excretion rate is elevated years before reduction in Glomerular Filtration Rate[11]. Prompt recognition and intervention can delay the progression of the disease. Thus the study was taken up in NIDDM patients to utilise the findings of automated complete urinogram in studying the levels of albuminuria and thus to correlate cases of microalbuminuria with age, sex, duration since diagnosis of diabetes and associated complications among the patients.

Methodology: Patients attending Government medical college and General Hospital, Suryapet during the period from July 2018 to June 2019, 500 out patients of type 2 diabetes mellitus were selected at random.

Inclusion Criteria:

- Already diagnosed adult type 2 diabetes mellitus(NIDDM)patients.

Exclusion Criteria:

- Gestational diabetes mellitus and Type 1 diabetes mellitus(IDDM)patients.
- Cases of urinary tract infection, haematuria ,intake of Vit. B-complex, Jaundice, urinary antiseptic which interfere with urine strip analysis were excluded from the study.

RESULTS

Of the 500 patients studied the following observations were made based on the Albumin creatinine ratio :

328patients were grouped under Normalbuminuria having Albumin creatinine ratio <30mg/gm of creatinine (ACR

<0.03). This group included 64.4% of the total cases. 100 patients were grouped under Microalbuminuria having Albumin creatinine ratio 30-300 mg/gm of creatinine (ACR 0.03 – 0.3). This group included 20% of the total cases. 72 patients were grouped under Macroalbuminuria having Albumin creatinine ratio >300 mg/gm of creatinine (ACR >0.3). This group included 14.4% of the total cases.

Table:1, Albumin and Creatine Ratio:
CREATININE RATIO (ACR)

GROUP	ACR	NUMBER	PERCENTAGE
Normalbuminuria	<0.03	328	64.4
Microalbuminuria	0.03-0.3	100	20
Macroalbuminuria	>0.3	72	14.4

Table no;2: Age Groups AND Albuminuria Groups

Age group	Albuminuria Groups						Total	
	Macroal buminuria		Microal buminuria		Normal buminuria			
	No.	%	No	%	No	%	No	%
30-40	8	11.10	12	12.00	38	11.60	58	11.60
41-50	16	22.20	30	30.00	88	26.80	134	26.80
51-60	24	38.90	24	24.00	130	39.60	182	36.40
61-70	8	11.10	24	24.00	54	16.50	86	17.20
71-85	12	16.70	10	10.00	18	5.50	40	8.00
Total	72	100	100	100	328	100	500	100

$X^2 = 10.227$,
df : 8
p=0.249 (not significant)

Total 500 NIDDM subjects involving 336 male patients (67.2%) and 164 female patients (32.8%) .Males being the highest even among Microalbuminurics (54%)age group from 41-50years showed maximum number of microalbuminics.51-60 showed maximum number of macroalbuminics.

DISCUSSION:

A Total number of 500 patients were involved in this study involving 336 male patients (67.2%) and 164 female patients (32.8%). Males being the highest even among Microalbuminurics(54%)

They were further grouped into three broad categories based on the albuminuria levels as Normoalbuminurics, Microalbuminurics and Macroalbuminurics..

The largest group was that of the Normoalbuminurics comprising of 336 cases making the maximum of 65.6% of the total case followed by Microalbuminurics 100 in number with a 20% of the total cases and Macroalbuminurics were 72 with a 14.4 % of the totalcases.

In the Present study 67.2(male%) 32.8(female %) ,Mohammed Yakoob et al[12] 57(male%) 43(female%) Microalbumiurics in present study 54% 46% Microalbumiurics in Mohammed Yakoob et al[12] 37.1%29.9%.

Summary

A Total number of 500 patients were involved in this study. Following were the observations made in the present study.

1. There were 336 male patients (67.2%) and 164 female patients (32.8%). Males being the highest even among Microalbuminurics(54%).
2. The largest group was that of the Normoal buminurics comprised of 336 cases making the maximum of 65.6% of the total case followed by Microal buminurics were 100 in number with a 20% of the total cases and Macroal buminurics were 72 with a 14.4 % of the total cases.
3. Prevalence rates for microalbuminuria in the present study was20%.
4. Most of the patients were detected with microalbuminuria and in the first few years of the disease i.e, 1-5 year period.52% of microalbuminurics were seen in this duration.
5. No significant association was found with respect to the type of food ingested and microal buminuria

CONCLUSION

Microalbuminuria is an early predictor of diabetic nephropathy in diabetic patients. Urine analysis by dipstick method serves as a screening tool for the detection of microalbuminuria. It has to be combined with estimation of microalbumin by turbidometric assay and albumin creatinine ratio to eliminate false values caused by over hydration and dehydration in a spot sample.

Microalbuminuria is associated with various microvascular and macrovascular co-morbidities of diabetes. Microalbuminuria in itself being a predictor of diabetic nephropathy showed positive association with diabetic neuropathy and diabetic retinopathy (microvascular complications) . Microalbuminuria also showed positive association with Ischemic Heart Disease(macrovascular complication) cases in the present study.

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