Original Research Paper

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Pathology

URINARY FINDINGS IN DIABETIC NEPHROPATHY PATIENTS

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ABSTRACT

INTRODUCTION: Diabetic nephropathy (DN) is a serious complication of type 1 diabetes and type 2 diabetes. Early detection is critical in improving clinical management. Although microalbuminuria is regarded as the gold standard for diagnosing onset of DN, here, we review various other urinary biomarkers also.

AIM AND OBJECTIVE: The aim was to study various urinary biomarkers for their utility in diagnosis of diabetic nephropathy.

MATERIALS AND METHOD S: The study was done in 50 enrolled cases of diabetic nephropathy. This article reviews the scope of diabetic proteinuria. Urine is collected from patients and sent for physical, pathological and biochemical analysis. This is a retrospective study.

CONCLUSION: There was a statistically significant rise in urinary protein levels in virtually all of the 50 samples collected for the purpose of this study. Hence, it is a simple bio marker along with serum urea and creatinine levels, as predictor and prognostic tests in diabetics despite some limitations.

KEYWORDS : Diabetic Nephropathy, Microalbuminuria, Urea, Creatinine

INTRODUCTION

The kidneys are major targets of diabetes. The leading cause of end stage renal disease in the United States is diabetic nephropathy. Approximately 30% to 40% of all diabetics develop clinical evidence of nephropathy and progress to end stage renal disease(1,2)

Three lesions are majorly implicated: (1) glomerular lesions (2) renal vascular lesions, principally arteriolosclerosis; and (3) pyelonephritis, necrotizing papillitis. The most important glomerular lesions are capillary basement membrane thickening, diffuse mesangial sclerosis and nodular glomerulosclerosis.

The earliest manifestation of diabetic nephropathy is the appearance of low amounts of albumin in the urine (>30 mg/day, but <300 mg/day), that is, microalbuminuria. Notably, microalbuminuria is also a marker for greatly increased cardiovascular mor- bidity and mortality for persons with either type 1 or type 2 diabetes. Therefore, all patients with microalbuminuria should be screened for macrovascular disease. Without specific interventions, approximately 80% of type 1 diabetics and 20% to 40% of type 2 diabetics will develop overt nephropathy with macroalbuminuria (>300 mg of urinary albumin per day) over 10 to 20 years, usually accompanied by the appearance of hypertension. Diabetics with overt nephropathy will develop end-stage renal disease, requiring dialysis or renal transplantation.

Here, we review various urinary biomarkers that are useful in diagnosis.

MATERIALS AND METHODS

This study was done in the patients admitted in the nephrology ward of Saveetha Medical College and Hospital, Thandalam, Chennai. It was a retrospective study, and the data was collected from patients already diagnosed with Diabetic nephropathy. Serum samples of 50 people with ages ranging from 40 to 70 were collected. Complete urine examination was done assessing various parameters like specific gravity, glucose, proteins, ketone, nitrite, leukocyte, bilirubin, urobilinogen.

Microscopic examination was done to detect the presence of red blood cells, white blood cells, epithelial cells, casts and crystals.

The biochemistry findings pertaining to urea, creatinine and electrolytes like sodium, potassium, chloride and bicarbonate were also tabulated.

Urine dipstick was used in our hospital. It is a highly specific method for detecting proteinuria. Spot (random) urine samples were collected, although early morning collection is preferable, as the sample will be more concentrated. Timed urine collection was not required as spot sampling accurately reflected 24-hour albuminuria and proteinuria. The possibility of transient proteinuria was eliminated. Transient proteinuria was confirmed by a repeat dipstick result which was negative, in the absence of any suspected transient cause.

This test depends on the protein-error of indicators principle. At a constant pH, if protein is present, green color develops. The resulting colors range from yellow for negative through yellow green and green to green-blue for positive reactions.

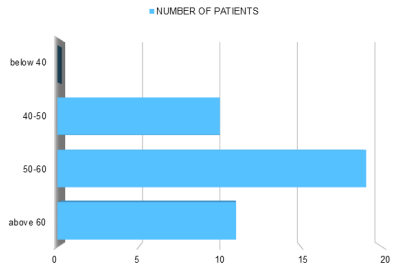
Persistent proteinuria was confirmed by two or more consecutive positive dipsticks over a one to two-week period.

DISCUSSION

50 samples were collected from a tertiary care hospital.

The age and gender do relation for all the cases were taken into consideration and the results showed a male predominance especially in the age group 50-60.

AGE OF THE PATIENTS INCLUDED IN THIS STUDY



COLOUR-

The urine of the patients ranged from pale yellow to straw yellow. Four samples were colorless.

CLARITY-

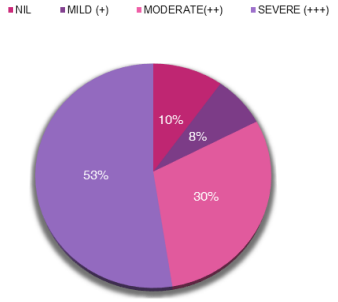
The samples were clear except for one which was turbid.

SPECIFIC GRAVITY-

Ranged from 1.010 to 1.025

PROTEIN/ALBUMIN

In my study, the most consistent finding was the presence of increased excretion of protein in the urine. Three patients had nil proteinuria. Fifty three percent of the patients had severe proteinuria. Thirty percent had moderate and eight percent had mild proteinuria. Similar findings are reported by various studies(3,4). Clinically, the presence of persistent proteinuria greater than 0.5g/day or macroalbuminuria greater than 300 mg per day seen in Diabetic nephropathy patients. Microalbuminuria precedes this stage.



GLUCOSE

The presence of glucose has no specific diagnostic value in diabetic nephropathy patients though the most characteristic finding in diabetics is the elevated blood sugar. Hyperglycemia is one of the causes of progressive renal damage and this corroborates with the findings of other studies (5,6)but glucosuria is not useful. There were traces or mild amount of glucose in the urine of fourteen patients. The rest had no glycosuria.

KETONES

All the patients except two had no ketonuria.

BLOOD

Hematuria and red cell casts are unusual findings in diabetic nephropathy. Twenty-one patients with otherwise typical diabetic nephropathy had blood in their urine sample. It could indicate the possibility of a second unrelated form of glomerulonephritis. The peroxidase test was carried out to detect hematuria.

LEUCOCYTE

Twelve of the fifty patients had leucocytes in the urine sediment. Further microbiological examination in these people showed the presence of bacteria in three patients. One patient had yeast and another had both bacterial and yeast infection.

UREA

According to the study by SA Bamanikar, the severity and duration of diabetes strongly correlated with urea levels but not so with creatinine levels. They are established markers of GFR. Eleven samples had elevated urea levels.

CREATININE

Creatinine is a more sensitive level is a more sensitive index of kidney function because it fulfills most requirements for a perfect filtration marker. Creatinine levels were more than the normal range in 22 of the collected samples.

The results of our study were consistent with other studies which showed that raised levels indicate a pre-renal problem.

Limitations of this study are that the sample size is small and most of the patients were from the same geographical locality. It does not include diverse group of people. Since this is a retrospective study, the patient follows up was not possible.

CONCLUSION

To prevent the progress of Diabetic nephropathy, vigilant monitoring of proteinuria. Serum urea and creatinine are simple bio markers available in patients with proteinuria in whom the above mentioned screening test can't be performed. Proteinuria is a reliable marker that identifies patients with renal damage. The patients are mostly older than 50.

CONFLICTS OF INTEREST

No competing interests declared.

FUNDING

No funding sources.

ETHICAL APPROVAL

Not required because this is a retrospective study.

REFERENCES

1. Shlomo M, Polonsky KS, Larsen PR, Kronenberg HM.Diabete Mellitus.Williams textbook of endocrinology, 12th Ed. Philadelphia:Elsevier/Saunders;2011,p.1371-1435
2. 2. Zimmer P, Alberti KG, Shaw J. global and societal implications of the diabetes. Nature 2001;414:782
3. Williams ME. Diabetic nephropathy: The proteinuria hypothesis. Vol. 25, American Journal of Nephrology. 2005. p. 77–94.
4. O'Neill WM, Wallin JD, Walker PD. Hematuria and red cell casts in typical diabetic nephropathy. Am J Med. 1983;74(3):389–95.
5. Anjaneyulu M, Chopra K. Quercetin, an anti-oxidant bioflavonoid, attenuates diabetic nephropathy in rats. Clin Exp Pharmacol Physiol. 2004 Apr;31(4):244–8.
6. Shrestha R, Sigdel M. Serum Urea and Creatinine in Diabetic and non-diabetic Subjects .