Available online at: http://www.iajps.com   *Research Article*

ANALYSIS OF SPOT URINE PROTEIN TO CREATININE RATIO AS AN INDICATOR OF 24HR URINARY PROTEIN EXCRETION IN NEPHROTIC SYNDROME

Dr Ammara Saeed[1], Dr Khadija Ashraf[1], Dr Nargis[2]
[1]Services Hospital Lahore
[2]Civil Hospital Chatorkhand Ghizer Gilgit Baltistan

Abstract:
Introduction: Analysis of urine protein plays an important role in the evaluation of patients with suffering from renal disease. Analysis of 24h urine gathering was for quite a while the strategy for decision for measuring proteinuria however is never again suggested on the grounds of burden and imprecision because of human blunder in accumulation. Aims and objectives: The basic aim of the study is to analyze spot urine protein vs creatinine ratio as a predictor of 24hr urinary protein excretion in nephrotic syndrome. Material and methods: This cross sectional study was conducted at Services hospital, Lahore During October 2019 till March 2020. TheThe data was collected from 150 patients of both genders. Early morning urine examples were gathered as spot urine and estimated for urinary protein, creatinine and protein to creatinine ratios. That day, 24-hour urines were gathered from 8 am to 8 am. Blood tests were drawn for serum creatinine (mg/dL). Results: The data were collected from 150 patients from which 90 were male and 60 were female. The mean age was 25.6 ± 11.7 years. The mean value of serum creatinine was 85.8 ± 19.6 (umol/L) and urine creatinine was 6.2 ± 1.6 (mmol/L) in selected patients. The Pakistani children and grown-up patients who were discharging in excess of 150 mg urinary protein for every day; uncovered protein: creatinine record and ratio 141 and 0.18 individually in irregular urine tests. The concentration of protein in the urine is influenced by urine volume just as protein discharge rate. Conclusion: It is concluded that Urine prot vs Urine creatinine ratios in random urine sample are best indicators of 24h urinary total protein excretion in patients with and without renal insufficiency.
Key words: Urinary, Protein, Creatinine, Ratio, Analysis

Corresponding author:
Dr. Ammara Saeed,
Services Hospital Lahore

QR code

*Please cite this article in press Ammara Saeed et al, **Analysis Of Spot Urine Protein To Creatinine Ratio As An Indicator Of 24hr Urinary Protein Excretion In Nephrotic Syndrome.**, Indo Am. J. P. Sci, 2020; 07(10).*

INTRODUCTION:

Analysis of urine protein plays an important role in the evaluation of patients with suffering from renal disease. The 24-hour urine gathering was for quite a while the strategy for decision for measuring proteinuria however is never again suggested on the grounds of burden and imprecision because of human blunder in accumulation[1]. In its place, UK and American rules prompt an early-morning urine test to survey the albumin vs creatinine ratio (ACR) or the protein vs creatinine ratio (PCR). Evaluated protein yield (EPO) might be a shockingly better strategy for measuring proteinuria as it thinks about fit body weight[2].

A little measure of protein is regularly discharged in urine. The sign of kidney sickness is expanded urinary protein discharge past the sum ordinarily discharged[3]. Observing proteinuria is profitable in assessing reaction to therapy and in anticipating the movement of renal harm. Subsequently, precise recognition of every day urinary protein discharge is a critical piece of nephrological assessment[4]. Planned urine accumulation is the most widely recognized strategy for surveying urinary protein. Gathering these examples precisely is troublesome and tedious, particularly in babies and in patients experiencing incontinency or enuresis[5]. Ratios of protein to creatinine in single-voided urine examples have been offered as fitting devices for evaluating urinary protein[6]. Urinary discharge of creatinine may shift in babies and spot urine might be impacted by the hydration vs dehydration state of patients[7].

Theoretical background

Proteinuria is one of the determinants of movement of renal diseases as nephrotic disorder and the measure of protein discharge is an impression of seriousness of the ailment. Evaluation of urinary protein discharge isn't just indicative yet additionally has prognostic incentive in checking of these patients[8]. Customarily urinary protein discharge appraisal has been done in 24 hours urine accumulation examples however this methodology is tedious, awkward and loose. An elective methodology has been upheld by a few scientists keeping away from 24 hours gathering. This is the estimation of protein/creatinine ratio in an irregular urine test[9]. This methodology depends on the way that in nearness of a stable glomerular filtration rate, urinary creatinine discharge has been accounted for to be genuinely steady in a given person[10].

Aims and objectives

The basic aim of the study is to analyze spot urine protein to creatinine ratio as an interpreter of 24hr urinary protein excretion in nephrotic syndrome.

MATERIAL AND METHODS:

This cross-sectional study was conducted at Services hospital, Lahore During October 2019 till March 2020. The data was collected from 150 patients of both genders.

Exclusion Criteria

All those patients who has any previous history of cardiac diseases were excluded from this study.

Data collection

Early morning urine examples were gathered as spot urine and estimated for urinary protein, creatinine and protein to creatinine ratios. That day, 24-hour urines were gathered from 8 am to 8 am. Protein discharge, creatinine discharge and volume of 24hour urinary examples were estimated. Blood tests were drawn for serum creatinine.

Biochemical analysis

Blood sample of 3ml was additionally gathered for estimation of serum creatinine for estimation of GFR. 24h protein discharge was determined by urine protein (mg/dl) X urine volume. The urine protein vs creatinine list and ratio were determined by isolating the urine protein concentration by urine creatinine concentration duplicated by 10 and mg/mg separately. The 24 hours protein discharge rate, urine protein creatinine ratio and list were thought about.

Statistical analysis

The data of the different baseline variable was analyzed on SPSS 19 packages. Data of 150 patients was expressed as mean and SD. Significance was set at 0.05.

RESULTS:

The data were collected from 150 patients from which 90 were male and 60 were female. The mean age was 25.6 ± 11.7 years. The mean value of serum creatinine was 85.8 ± 19.6 (umol/L) and urine creatinine was 6.2 ± 1.6 (mmol/L) in selected patients. The Pakistani children and grown-up patients who were discharging in excess of 150 mg urinary protein for every day; uncovered protein: creatinine record and ratio 141 and 0.18 individually in irregular urine tests. The concentration of protein in the urine is influenced by urine volume just as protein discharge rate. Anyway the appraisal of proteinuria was misclassified in correlation with 24 hours urinary protein discharge by dipsticks because of mistake in accumulation of urine volume and understanding of hued diagram. It

demonstrated moderate connection (r=0.52) with 24 hours urinary protein discharge.

Table 01: Comparison of protein: creatinine index and ratio with reference to 24 hours urinary protein excretion rate in patients (Percentile distribution) of renal disease

Percentiles	Urinary Protein excretion (mg/24h)	Protein: Creatinine Index	Protein: Creatinine Ratio
2.5	150	141	.18
5	226	187	.19
10	360	301	.26
15	420	315	.27
20	487	329	.28
25	590	412	.37
30	646	471	.41
35	720	549	.50
40	900	689	.65
45	1099	781	.75
50	1365	954	.85
55	1561	1088	.98
60	1791	1234	1.14
65	1995	1354	1.38
70	2182	1620	1.48
75	2403	1902	1.75
80	2910	2114	1.91
85	3520	2501	2.27
90	4553	3108	2.70
95	6696	6022	5.31
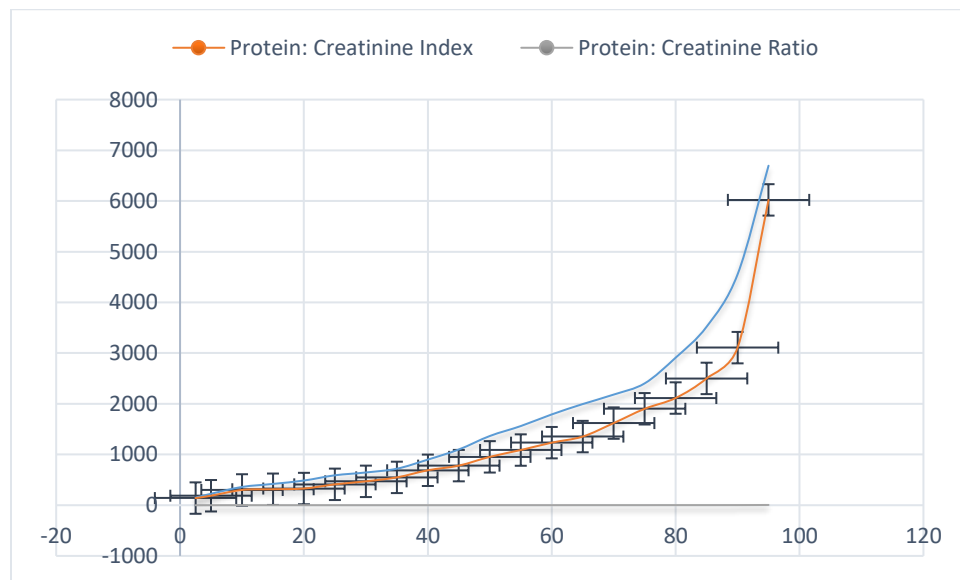
Comparison between Protein: Creatinine ratio and Protein: Creatinine Index in patients
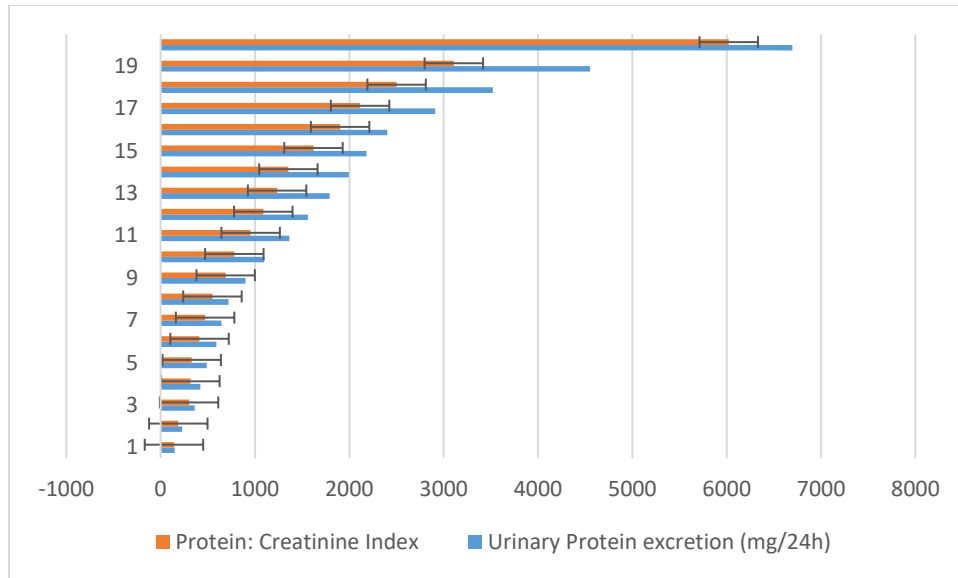
Comparison between Urinary Protein excretion (mg/24h) and Protein: Creatinine ratio in patients

DISCUSSION:

A random urinary protein-to-creatinine ratio has been recommended as the reasonable strategy to measure proteinuria in diabetes and renal deficiency[11]. In numerous focuses, sulfosalicylic corrosive turbidimetric appraisals are utilized to quantify proteinuria. This test is delicate to the concentration of urine[12]. Then again, every day creatinine discharge is steady in ordinary subjects, yet is variable amid the neonatal period. Creatinine is estimated by the Jaffe technique, which is affected by some non-creatinine chromogenes[13]. On the other hand, the estimation of urine osmolality is an important test for evaluating concentration capacity of the kidney. The test depends on the quantity of particles in arrangement[14]. At the point when glomerular filtration decays, the quantity of osmoles discharged per nephron builds, prompting osmotic diuresis[15].

Quantitative proteinuria predicts the rate of movement of nephropathy and 24 hours urinary protein discharge rate has been utilized to evaluate the seriousness and observing of renal pathology. However our patients having renal diseases are unconscious of the significance of the volume and timing of urine gathering which is essential for the appraisal of absolute urinary protein discharge[16]. The twenty-four hour urine gathering is normally connected with errors in urine volume because of ill-advised planning or missed examples of urine prompting over or under-24hours urine volume[17]. So it was chosen to compute protein: creatinine record/ratio on irregular urine tests to beat the deficiencies identified with 24 hours urine collection[18-19]. The protein: creatinine list on 130 arbitrary urine examples was discovered exceptionally

delicate and tantamount to 24 hour urine discharge. Patients discharging 150 mgs of urinary protein/day, had proteins: creatinine file and ratio 141 and 0.18 separately[20].

CONCLUSION:

It is concluded that urine protein vs urine creatinine ratios in random urine specimen are good indicator of 24hour urinary total protein excretion in patients with and without renal insufficiency.

REFERENCES:
1. Redon J. Measurement of microalbuminuria-- what the nephrologist should know. Nephrol Dial Transplant 2006; 21:573.
2. Fine DM, Ziegenbein M, Petri M, et al. A prospective study of protein excretion using short-interval timed urine collections in patients with lupus nephritis. Kidney Int 2009; 76:1284.
3. Hebert LA, Birmingham DJ, Shidham G, et al. Random spot urine protein/creatinine ratio is unreliable for estimating 24-hour proteinuria in individual systemic lupus erythematosus nephritis patients. Nephron Clin Pract 2009; 113:c177.
4. Birmingham DJ, Rovin BH, Shidham G, et al. Spot urine protein/creatinine ratios are unreliable estimates of 24 h proteinuria in most systemic lupus erythematosus nephritis flares. Kidney Int 2007; 72:865.
5. Medina-Rosas J, Yap KS, Anderson M, et al. Utility of Urinary Protein-Creatinine Ratio and Protein Content in a 24-Hour Urine Collection in Systemic Lupus Erythematosus: A Systematic Review and Meta-Analysis. Arthritis Care Res (Hoboken) 2016; 68:1310.

6. Hogan MC, Reich HN, Nelson PJ, et al. The relatively poor correlation between random and 24-hour urine protein excretion in patients with biopsy-proven glomerular diseases. Kidney Int 2016; 90:1080.
7. Price CP, Newall RG, Boyd JC. Use of protein:creatinine ratio measurements on random urine samples for prediction of significant proteinuria: a systematic review. Clin Chem 2005; 51:1577.
8. Nayak R, Annigeri RA, Vadamalai V, et al. Accuracy of spot urine protein creatinine ratio in measuring proteinuria in chronic kidney disease stage 3 and 4. Indian J Nephrol 2013; 23:428.
9. Rodby RA, Rohde RD, Sharon Z, et al. The urine protein to creatinine ratio as a predictor of 24-hour urine protein excretion in type 1 diabetic patients with nephropathy. The Collaborative Study Group. Am J Kidney Dis 1995; 26:904.
10. Abdelmalek JA, Gansevoort RT, Lambers Heerspink HJ, et al. Estimated albumin excretion rate versus urine albumin-creatinine ratio for the assessment of albuminuria: a diagnostic test study from the Prevention of Renal and Vascular Endstage Disease (PREVEND) Study. Am J Kidney Dis 2014; 63:415.
11. Fotheringham J, Campbell MJ, Fogarty DG, et al. Estimated albumin excretion rate versus urine albumin-creatinine ratio for the estimation of measured albumin excretion rate: derivation and validation of an estimated albumin excretion rate equation. Am J Kidney Dis 2014; 63:405.
12. Ginsberg JM, Chang BS, Matarese RA, Garella S. Use of single voided urine samples to estimate quantitative proteinuria. N Engl J Med. 1983;309:1543–46.
13. Serdaroglu E, Mir S, Kabasakal C. Urine protein—osmolality ratio for quantification of proteinuria in children. (Abstract) Nephrol Dialysis Transpl. 2002;17(suppl 1):S114.
14. Schawb SJ, Christensen RL, Dougherty K, Klahr S. Quantitation of proteinuria by the use of protein to creatinine ratios in single urine samples. Arch Intern Med. 1987;147:943–44.
15. Matos V, Drukker A, Guignard JP. Spot urine samples for evaluating solute excretion in the first week of life. Arch Dis Fetal Neonatal Ed. 1999;80:F240–42.
16. Morgenstern BZ, Butani L, Wollan P, et al. Validity of protein—osmolality versus protein—creatinine ratios in the estimation of quantitative proteinuria from random samples of urine in children. Am J Kidney Dis. 2003;41:760–66.
17. Schwab SJ, Christensen RL, Dougherty KK. Quantitation of proteinuria by the use of proteins to creatinine ratio in single urine sample. Arch Intern Med 1987;147:943-4.
18. Steinhauslin F, Wauters JP. Quantitation of proteinuria in kidney transplant patients: Accuracy of urinary proteins/creatinine ratio. Clin Nephrol 1995;43:110-5.
19. Parag KB, Seedat YK. The proteins creatinine index. A semiguantitative assessment of 24 hours proten excretion. S Afr Med J 1986;69:42-3.
20. National Kidney Foundation. K/DOQI Clinical Practice Guidelines for chronic kidney disease: evaluation, classification, and stratification. Am J Kidnet Dis. 2002;39(suppl 1):S93–102.