

# Analysis of Spot Urine Protein to Creatinine Ratio as an Indicator of 24 Hours Urinary Protein Excretion in Nephrotic Syndrome

SIBGHA BASHIR<sup>1</sup>, MUHAMMAD RIZWAN HAFEEZ<sup>2</sup>, JALIL IQBAL<sup>3</sup>, NUDRAT FAYYAZ<sup>4</sup>, SARA KHAN<sup>5</sup>, FAGHIA SHAHID<sup>6</sup>

<sup>1,6</sup>Assistant Professors, <sup>1</sup>Chemical Pathology,

<sup>2,3</sup>Department of Medicine, <sup>3</sup>Department of Pathology, Shahida Islam Medical College Lodhran,

<sup>4</sup>Assistant Professor, Chemical Pathology, Multan Medical and Dental College Multan,

<sup>5</sup>Assistant Professor of Pathology, CMH Institute of Medical Sciences, Bahawalpur

Correspondence to Dr. Muhammad Rizwan Hafeez Email: drrizwanhafeez@gmail.com

## ABSTRACT

**Aim:** To analyze spot urine protein versus creatinine ratio as a predictor of 24hr urinary protein excretion in nephrotic syndrome

**Method:** This cross sectional study was conducted at Shahida Islam Medical College, Lodhran during 1<sup>st</sup> January 2018 to 30<sup>th</sup> September 2018. The 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

**Results:** There were 90 males and 60 females with mean age 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:** Urine protein versus urine creatinine ratios in random urine sample are best indicators of 24 hours urinary total protein excretion in patients with and without renal insufficiency.

**Keywords:** Urinary, Protein, Creatinine, Ratio, Analysis

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## 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.<sup>1</sup> 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.<sup>2</sup>

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.<sup>3</sup> 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.<sup>4</sup> 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.<sup>5</sup> Ratios of protein to creatinine in single-voided urine examples have been offered as fitting devices for evaluating urinary protein.<sup>6</sup> Urinary discharge of creatinine may shift in babies and spot urine might be impacted by the hydration vs dehydration state of patients.<sup>7</sup>

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.<sup>8</sup> 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.<sup>9</sup> 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<sup>10</sup>.

## MATERIAL AND METHODS

This cross sectional study was conducted at Shahida Islam Medical College, Lodhran during 1<sup>st</sup> January 2018 to 30<sup>th</sup> September 2018. The 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. Protein discharge, creatinine discharge and volume of 24hour urinary examples were estimated. Blood tests were drawn for serum creatinine. 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. All those patients who has any previous history of cardiac diseases were excluded

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from this study. The data of the different baseline variable was analyzed on SPSS 20.

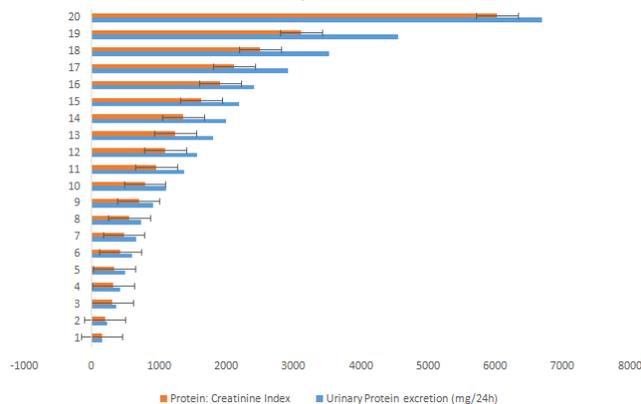
## RESULTS

There were 90 males and 60 females with mean age  $25.6 \pm 11.7$  years. The mean value of serum creatinine was  $85.8 \pm 9.6$  ( $\mu\text{mol/L}$ ) and urine creatinine was  $6.2 \pm 1.6$  ( $\text{mmol/L}$ ) 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 hue diagram. It demonstrated moderate connection ( $r=0.52$ ) with 24 hours urinary protein discharge.

**Table 1:** 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

**Fig. 1:** 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<sup>11</sup>. In numerous focuses, sulfosalicylic corrosive turbidimetric appraisals are utilized to quantify proteinuria. This test is delicate to the concentration of urine<sup>12</sup>. 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<sup>13</sup>. 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<sup>14</sup>. At the point when glomerular filtration decays, the quantity of osmoles discharged per nephron builds, prompting osmotic diuresis<sup>15</sup>.

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<sup>16</sup>. 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.<sup>17</sup> So it was chosen to compute protein: creatinine record/ratio on irregular urine tests to beat the deficiencies identified with 24 hours urine collection<sup>18,19</sup>. 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<sup>20</sup>.

## CONCLUSION

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.

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