Assessment of Proteinuria in Nephrotic Syndrome in Children by Using Spot Urinary Protein/Creatinine Ratio

Dr. Susanta Kumar Ghosh¹, Dr. Santosh Kumar Saha², Dr. Milia Islam³

¹Associate Professor, Department of Pediatrics, Medical College for Women and Hospital, Uttara, Dhaka, Bangladesh
²Assistant Professor (Pediatric Cardiology), National Institute of Cardiovascular Diseases, Dhaka, Bangladesh
³Assistant Registrar, Department of Pediatric, Medical College for Women and Hospital, Uttara, Dhaka, Bangladesh

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*Corresponding author: Dr. Susanta Kumar Ghosh

Abstract

Background: Proteinuria quantification is typically expected after 24-hour intake of urine. Several variables influence urinary collection and protein and creatinine excretion levels. Throughout the years, a spot urine protein-creatinine (P-C) ratio has proved to be a safe complement to the 24-hour proteinuria test for diagnosis and follow-up. Objective: To assess urinary protein consistency creatinine ratio (UP / UC) in a spot study in relation to the 24-hour urinary protein excretion in children with Glomerular regular filtration rate (GFR) in quantitative protein studies. Method: This potential analysis of sixty Nephrotic syndrome cases done via a systematic survey carried out at Tertiary medical college, Dhaka from March 2015-March 2017. The urine sample for 24 hours was recommended to all patients. They were requested to measure the overall protein release rate for a 24 hour urine sample beginning at 9 am. A spot urine examination and a protein / creatinine ratio of urine were obtained. The results were evaluated by linear analysis and the association of protein / creatinine urinary ratio to 24 hour urinary protein. The results were determined. Results: Total sample size was sixty. Urine total protein in a timed 24-hour sample of nephrotic syndrome patients was in the range of 300-3150 mg/m²/hour with the mean value of 2070 mg/m²/hour. While as U(Pr/Cr) ratio ranged from 3.1-27.5 with the mean value of 15.2. A significant correlation was found between timed 24-hour urinary protein and UP/UC ratio (r=0.622, p<.001.). Conclusion: Spot urinary protein-creatinine ratio for proteinuria in children with nephrotic syndrome is extremely accurate and quick testing.

Keywords: Proteinuria, Glomerular regular filtration rate, Creatinine urinary ratio.

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INTRODUCTION

Diagnosis of nephrotic syndrome requires the presence of edema, massive proteinuria (>40 mg/m²/hour) or a urine protein/creatinine ratio (P/C) >2.0 mg/mg) and hypoalbuminemia (<2.5 gm/dl) [1, 2]. The annual incidence in underdeveloped countries is 2-3 cases per 100 000 children per year and higher [3]. The assessment of the excretion of urinary protein not only identifies but also has predictive properties of nephrotic syndrome monitoring [4]. Traditionally, urinary protein tests have been performed in 24 hours, but this method requires time, is slow and is not reliable. Several scholars have called for an alternate method that stops collecting for 24 hours. This is calculated in a Random Urine Sample by the Protein / Creatinine ratio. Urinary protein tests have historically been carried out in 24 hours, however, this method has been time-consuming, inefficient and imprecise [5]. Several scholars have proposed an alternate method, which prohibits sampling for 24 hours. This is a spontaneous urine sample calculation of the protein-creatinine ratio [6]. This hypothesis is focused on the assumption that urinary creatinine excretion has been shown to be very reliable in a single person where there is a steady glomerular filtration rate [7]. This research was undertaken in order to determine the UP / UC ratio as a simple and accurate method for assessing specific areas of proteinuria and hence its utility in diagnosing children's nephrotic syndrome. In contrast to an urinary protein excretion in infants with nephrotic syndrome for 24 hours, the research aimed to determine the precision of the urine protein creatinine ratio (UP / UC) in a spot sample.

METHODS

This is a potential analysis done via a systematic survey carried out at Tertiary medical college, Dhaka from March 2015-March 2017. The number of samples was 60. Requirements for inclusion–patients with good renal function and satisfying nephrotic syndrome requirements. The age < 1year and
patients with an exceptionally low urinary production were exclusion requirements (less than100ml/24 hours). The age <1 year and patients with an exceptionally low urinary production were exclusion requirements (less than100ml/24 hours). Documented written consent to this trial was given to all participants. 60 patients were chosen on a conscious basis with varying degrees of proteinuria. Thorough physical measurements have been conducted with meticulous background. Every patient's overall urinary protein and spot urinary protein/creatinine ratio are measured at 24 hours.

**RESULTS**

The research involved 60 individuals, cases in which 60 samples were obtained in the proforma in terms in background, examination and analysis. The next vacuum position examination contained a 24-hour urine study. On the spot study, the proportion of protein/creatinine has been determined. For the 60 cases, nine were <3 years of age in each scenario, 45 were <3-9 years of age, and 6 were >9 years of age (Table-2). For the 60 cases, 41 were male and 19 were female (Figure-1).

![Fig-1: Distribution of patients in different Sexes (N=60)](image)

### Table-1: Distribution of patients in different clinical presentations (N=60)

| Clinical Parameters | Number of patients | Percentage |
|---------------------|--------------------|------------|
| Puffiness           | 60                 | 100.0      |
| Ascites             | 40                 | 66.7       |
| URTI                | 24                 | 40.0       |
| Hematuria           | 16                 | 26.7       |
| Oliguria            | 56                 | 93.3       |
| Hematuria           | 10                 | 16.7       |
| Pleural Effusion    | 9                  | 15.0       |
| Peritonitis         | 7                  | 11.7       |
| Hypertension        | 5                  | 8.3        |
| Diarrhea            | 5                  | 8.3        |
| CCF                 | 4                  | 6.7        |

Among the all cases, puffiness (100%) and oliguria (93.3%) is most common parameters among the patients. After that ascities and RTI, UTI’s are more frequent symptoms (Table-1). Throughout this analysis, a 24-hour urinary total protein level with a mean value of 1725 mg/m2/hour was 300-3150 mg/m2/hour. Although the range U(Pr/Cr) was 3.1-27.5, the average value was 15.2.

### Table-2: Biochemical profile of the study subjects (N=60)

| Investigation      | Mean(+SD)        |
|--------------------|------------------|
| Serum Albumin      | 17.65(+5.78) gm/L|
| Serum Globulin     | 32.29 (+6.2) gm/L|
| Serum Cholesterol  | 10.13 (+2.9) mmol/L|
| Serum creatinine   | 74 (+17.5) umol/L|
DISCUSSION

Throughout this analysis, a 24-hour urinary total protein level with a mean value of 1725 mg / m²/hour was 300-3150 mg / m²/hour. Although the range U(Pr / Cr) was 3.1-27.5, the average value was 15.2. There were 60 cases of nephrotic syndrome between 1 and 12 years of age. The average age was 6.5 years in this report. Chahar OP et al., [8] made identical findings. 20% of patients display hematuria in the present report. UTP is also commonly and popularly used for the treatment of nephrotic 24-hour syndrome and is a lengthy, complicated process. A contrast and analysis has been carried out with both cases observed 24 hours UTP and spot protein / creatinine ratio U(p / Cr). Study findings indicate a high UTP and spot urinary protein / creatinine ratio of 24 hours. So, as a diagnostic tool in nephrotic proteinuria of the urinary system, the spot protein / creatinine connection may be used for 24 hours. UTP: UTP.

CONCLUSION

We infer, thus, that the spot protein-creatinine ratio of the urine is extremely accurate and easy for nephrotic proteinuria to be quantified in kids. In a 24-hour array it represents the sum of protein. It thus removes all the inconveniences connected with the process of gathering energy. We therefore considered a extremely accurate and quick method for proteinuria quantification in children to be spontaneous protein-creatinine ratio. The amount of protein in a series lasting 24 hours. This avoids all the inconveniences involved with the time-collection process.

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