

**Research Article****Hidden Urinary Tract Infection in Children with Nephrotic Syndrome**

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Rakesh Ranjan KumarEmail: rakeshranjan2k@gmail.com**Abstract**

Background: Urinary Tract Infection (UTI) is a common infection in nephrotic Syndrome. Most of UTI infection are asymptomatic and remains undiagnosed. This may leads to poor steroid response, frequent relapse and long term renal damage.

Methods: 50 case of nephrotic syndrome was diagnosed by clinical history and laboratory tests. Urine for Routine microscopic examination and culture –sensitivity was done in all patients. Data regarding proteinuria, pyuria and etiological organisms were analyzed by statistical method.

Results: UTI was present in 30% of nephrotic children and most cases (66.6%) were asymptomatic. Mean serum albumin in nephrotic syndrome with UTI was lower than that of children without UTI (2.1 gm/dl vs. 3gm/dl, P value < 0.05) while mean serum cholesterol in nephrotic syndrome with UTI was higher than that of children without UTI (415 mg/dl Vs 350 mg/dl, p value < 0.05). Pyuria had poor association with definite UTI (p value > 0.05). E-coli were the commonest organism followed by klebsiella.

Conclusion: UTI is one of the most common infections in nephrotic syndrome and is mostly asymptomatic. It should be screened in every nephrotic child routinely to prevent long term renal damage.

Keywords: Nephrotic syndrome; UTI; microorganism.

INTRODUCTION

Nephrotic syndrome is a common renal problem in pediatric age group characterized by heavy proteinuria, hypoalbuminemia, edema and hyperlipidemia^[1] Incidence of idiopathic nephrotic syndrome (INS) varies between 2-7/100000 children^[2]. The nephrotic state and corticosteroid therapy render the children susceptible to infection which results in poor response to steroid and in relapse of disease^[3,4]. Infection in nephrotic syndrome may be vague or non-specific. Of all infections, urinary tract

infections are of special interest because most of the urinary tract infections in nephrotic syndrome are asymptomatic^[5]. In general, younger the child, the sign symptoms of urinary tract infection is less localizing^[6]. So it is often undiagnosed.

MATERIAL S AND METHODS

It was a hospital based study conducted in pediatric ward of indira Gandhi institute of Medical sciences Patna from March 2015 to December 2015. A total of 50 patient of nephrotic Syndrome were selected. Nephrotic syndrome was

diagnosed by heavy proteinuria (>40 mg/m²/hour), low serum albumin (<2.5 gm/dl), edema, high serum cholesterol and first morning urinary protein/creatinine ratio > 2; for 3 consecutive days.

OBJECTIVE

1. To observe the frequency of UTI in nephrotic syndrome children.
2. To identify etiological organisms causing UTI in nephrotic syndrome.

Inclusion criteria

- Nephrotic syndrome children aged 2-6 years presented with typical presentation.

Exclusion criteria

- Age < 2 years, > 6 years.
- Nephrotic syndrome with atypical presentation- hypertension, gross hematuria.
- Nephrotic syndrome with complications other than UTI.
- H/O of taking antibiotic during last 15 days prior to admission.
- Secondary nephrotic syndrome.

After taking informed written consent and physical examination of patients, midstream urine sample was collected in proper aseptic method and sent to laboratory for microscopic & culture sensitivity test. In case of collection failure, urine was collected by sterile catheterization. For diagnosis of UTI, pus cell > 5 per high power field was defined as pyuria considered suggestive of UTI [7]. A positive urine culture was defined as midstream clean voided specimen with isolation of >100000 colony forming unit/ml (cfu/ml) of single organism in asymptomatic patient and 10000 cfu/ml in symptomatic patient [8]. Data regarding pyuria, etiological organisms and other biochemical parameter were recorded in case record form and statistically analyzed.

RESULTS

The prevalence of UTI in our study was 30% (15 out of 50 cases).

Group (A)→Nephrotic syndrome with UTI n =15

Group (B)→Nephrotic syndrome without UTI n =35

Out of 15 nephrotic syndrome with UTI patients (Group A), 53.3% (n=8) was male. Out of 35 nephrotic syndrome without UTI (Group B), 61 % (n=21) were male. Out of 15 UTI patients, 66.6% (n=10) patients were asymptomatic, only 33.3% (n= 5) patients presented with symptoms (Table 1). So mostly UTI patients were asymptomatic (hidden).

Table 1: Distribution of clinical profile among the UTI patients (n = 15).

CLINICAL CONDITION	FREQUENCY	PERCENTAGE
SYMPTOMATIC	5	33.3%
ASYMPTOMATIC	10	66.6%
TOTAL	15	100%

Mean serum albumin was 2.1 gm/dl (±0.57) in nephrotic children with UTI (Group A) patients and 3.2 gm/dl (±0.47) in nephrotic children without UTI (Group B) patients and it was Statistically significant (p value was >0.05), while Mean serum cholesterol in nephrotic syndrome with UTI (Group A) patients was 415 mg/dl (±101) which is significantly higher than that of children without UTI (Group B) in whom it was 350 mg/dl (±23) so it was statistically significant (p<0.05) (Table 2).

Table 2-- Biochemical findings among the study groups

Serum biochemistry	No. of patient	mean	Standard deviation	P value
Serum albumin (gm/dl)	group (A) n=15	2.1	0.57	< 0.05
	group (B) n=35	3.2	0.47	
Serum cholesterol (gm/dl)	group (A) n= 15	415	101	<0.05
	group (B) n=35	350	23	

Microscopic examination of urine showed pyuria in 66.6% (n=10 out of 15) nephrotic syndrome with UTI patients (Group A) and in 57.14% (n=20 out of 35) nephrotic syndrome without UTI (Group B) (Table 3, p value >0.05, not significant)

Table 3: Distribution of pyuria among the study groups.

PYURIA	Group (A)	Group (B)
SIGNIFICANT	10 (66.6%)	20 (57.14%)
NOT SIGNIFICANT	5 (33.3%)	15 (42.8%)
TOTAL	15 (100%)	35 (100%)

Out of 15 patient of UTI, Culture report was showing E coli (46.6%, n=7) followed by Klebsiella (20%, n=3), Coliforms (13.3%, n=2) Proteus (13.3%, n=2), Pseudomonas (6.66 %, n=1).

DISCUSSION

The nephrotic syndrome represents an immune-compromised host and hence it is susceptible to a variety of infections. This could be due to decreased serum immunoglobulin, protein deficiency, decreased bactericidal activity of the leukocytes, immunosuppressive therapy, decreased perfusion of the spleen caused by hypovolemia and loss of a complement factor (Properdin factor 3) in urine that opsonizes bacteria. The pressure on the collecting system by edematous pyramids causes narrowing and functional obstruction to the flow of urine, further predisposing them to UTI. Of all the infections in children, Urinary Tract Infections (UTI) is significant because it can lead to long term renal damage.

The prevalence of UTI in our study was 30% (15 out of 50). This is consistent with previous studies 13.7% by Gulati S, Gupta A et al, 46% by Sengutthuvan P, Ravana K et al^[9, 10]. Incidence of UTI was equal in male & female. The important finding of this study was most of UTI patients (66.6%) were asymptomatic (Table 1) that is consisted with standard reference^[3, 11].

In our study, the incidence of UTI was more common in children with high serum cholesterol level, and low serum albumin. Mean serum cholesterol in nephrotic syndrome with UTI was 415 mg/dl which is significantly higher than that of children without UTI in whom it was 350 mg/dl ($p < 0.05$), also mean serum albumin in nephrotic syndrome with UTI was 2.1 gm/dl which is significantly lower than that of children without UTI in whom it was 3 gm/dl ($P < 0.05$)

(Table 2). Gulati S, Kher V et al and Gulati S, Arora P et al shown that UTI in nephrotic children is associated with lower serum albumin and higher serum cholesterol^[3,11].

This study shows poor association of pyuria with definite UTI. Microscopic examination of urine showed presence of pyuria in 66.6% culture positive cases and in 57.14% culture negative Cases (Table 3, p value > 0.05). This is consistent with observation of Rahman M, Rahman KM^[12]. In this study most common organism of UTI in nephrotic children was E coli followed by Klebsiella, Coliforms, Proteus and pseudomonas. According to Gulati S, Kher V et al Gulati S, Arora P et al and Emilia M, Dantas S et al, E coli is the commonest organism followed by Klebsiella^[3,9].

CONCLUSION

We conclude that urinary tract infections are an important, but often under diagnosed infection in children with nephrotic syndrome. E.coli is the commonest organism causing UTI followed by klebsiella. All children with nephrotic syndrome newly diagnosed or relapse should be screened for the presence of UTI routinely for proper management and thereby to prevent frequent relapse and long term renal damages.

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Conflict of Interest- None

REFERENCES

1. Nanjundaswamy HM, Phadke KD. Steroid sensitive Nephrotic syndrome. Indian J of Pediatr. 2002;69:1059-1063.
2. Consensus statement on management and audit potential for steroid responsive nephrotic syndrome : Report of a workshop by the British Association for Paediatric Nephrology and Research Unit, Royal College of Physicians. Arch Dis Child. 1994;70:151-157.
3. Gulati S, kher V, Arora A, et al. Urinary tract infection in nephrotic syndrome. Pediatr Infect Dis J. 1996;15:237-240.

4. Wolfish, P Melaine, P Philipps, et al. Role of respiratory viruses in exacerbations of primary nephrotic syndrome. *The J of Pediatr.* 1986;108: 378-382.
5. Alwadhi RK, Mathew JL, Rath B. Clinical profile of children with nephrotic syndrome not on glucocorticoid therapy but presenting with infection. *J Paediatr Child Health.* 2004;40:28-32.
6. George H and McCracken JR. Diagnosis and management of acute urinary tract infection in infants and children. *The Pediatr Infect Dis J.* 1987;6:107-112
7. Swash M. In : Hutchison's Clinical Methods. London: W B Saunders. 1995;20:129-132.
8. Elder JS. Urinary tract infection. In: Kliegman, Behrman, Jenson, Stanton, editors. *Nelson textbook of Pediatrics.* Philadelphia: Kliegman Saunders. 2007;18:2223-2225.
9. Gulati S, Gupta A, Kher V, Sharma RK. Steroid response pattern in Indian children with nephrotic syndrome. *Acta Paediatr.* 1995;83:530-533
10. Senguttuvan P, Ramanan K, Pravu N, et al. Infection encountered in childhood nephrotics in a paediatric renal unit. *Indian J Nephrol.* 2004;14:85-88.
11. Gulati S, Arora P, Sharma RK, Kher V, Gupta A, Rai PK. Spectrum of Infections in Indian Children with Nephrotic Syndrome. *Pediatr Nephrol* 1995;9:431-434.
12. Rahman M, Rahman KM. Urinary tract infection in school children. *BMRC Bulletin.* 1979;2:67-70.