

## Incidence And Clinicoetiological Study of Uti in Nephrotic Syndrome in Pediatric Age Group

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**Abstract:** Nephrotic Syndrome is one of the common kidney disease in children. This condition is seen mainly in children between 2-6 yrs of age. Infections are one of the major complication of Nephrotic Syndrome.

**AIM:** The aim was to study the incidence, etiology and clinical features of urinary tract infection in children with Nephrotic Syndrome.

**Method:** This was a prospective hospital based study was undertaken in the Department of Pediatrics, VSS, Medical college, Burla,Sambalpur. All the investigations were carried out in the Biochemistry,Pathology, Microbiology, Radiodiagnosis, Department of Pediatrics, VSS, Medical college, Sambalpur. Total cases included in this study are 50 ,all belonging to the age group between 1-14 yrs.Study period was 2 yrs and 6 months. Urine and blood investigation were done.

**Result :** In total 50 cases of Nephrotic Syndrome, out of which 38(76%) were male and 12 (24%) were female. Common infection associated with Nephrotic Syndrome was UTI 22% and E. Coli was the commonest organism isolated.

**Conclusion:** UTI is the commonest infection associated with Nephrotic Syndrome and early detection of UTI will help to reduce the morbidity and mortality in such cases.

**Keywords:** Nephrotic Syndrome, Urinary tract infection, Urine culture, E. Coli

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### I. Introduction

Nephrotic Syndrome is among the most common type of kidney disease in children.It is a clinical complex characterized by a number of renal and extra renal features , the most prominent of which are heavy proteinuria (3.5 gm /24 hrs in adults ,40mg/m<sup>2</sup> /hr in children) ,hypoalbuminemia (2.5g/dl) ,edema and hyperlipidemia.Children with this condition often present with sudden onset of periorbital swelling with or without generalized edeme.Although Nephrotic Syndrome most often occurs as a primary disorder in children ,it can occur secondary to a variety of systemic illnesses.

Nephrotic Syndrome is not an uncommon disease in pediatric age group.In a study done by Forman & Chan in the department of Pediatrics, Medical college Virginia ,Richmond, Nephrotic Syndrome constituted 6% of all the cases admitted with symptoms related to kidney and urinary tract.1.According to another study conducted in the department of Pediatrics ,Faculty of Medicine ,Kyushu University, Fukuoka ,Japan ,Nephrotic Syndrome accounts for 10% of all cases of all cases admitted with End stage renal disease.

70-80 % occurs in children between 2-6 yrs of age..Prolonged course with frequent relapse and remission of the disease leaves a ravaging effect on the physical and mental growth of the child and a psychological trauma as well as a financial burden on the parents.

Infections are one of the major complication of Nephrotic Syndrome.The increased incidence of infection in Nephrotic Syndrome may be due to decreased IgG levels ,the presence of edema fluid which act as a culture medium ,protein deficiency ,decreased activity of leucocytes ,and use of immunosuppressive therapy and loss of Properdin B in urine.In a study done in department of Nephrology, SGPGI ,Lucknow,one or more infectious complications were observed in 40% of cases of Nephrotic Syndrome with UTI being the commonest (13.7%) followed by Pulmonary Tuberculosis (10.4%) Peritonitis (9.1%),Skin infections (5.2%),URTI (5.3%),LRTI(3.9%) and pyomeningitis (0.6%).The frequency of infections was higher in children with frequent relapses ,steroid resistance and steroid dependence.

Although the treatment of Nephrotic Syndrome with steroid is easy and rewarding ,sometimes there is a delay in initiation of treatment due to the presence of UTI with positive urine culture .As a general principle ,the urinary tract has to be made free from any infection before starting immunosuppressive therapy .Therefore urine culture tests in all cases of Nephrotic Syndrome is mandatory to avoid under diagnosing UTI.

There are very few studies on UTI in Nephrotic Syndrome cases .In a view of the facts stated by the different author,it is highly desirable to study the urinary tract infection in case of Nephrotic Syndrome,to find out the incidence, etiology ,clinical spectrum & predisposing factors of UTI associated with Nephrotic Syndrome in pediatric age group.

## II. Aim

To study the incidence, clinical feature and etiological aspect of UTI in Nephrotic Syndrome.

## III. Materials And Methods:

This prospective study was undertaken in the Department of Pediatrics, VSS Medical college, Burla, Sambalpur. All the investigations were carried out in the Biochemistry, Pathology, Microbiology, Radiodiagnosis, Department of Pediatrics, VSS Medical college, Sambalpur. Total cases included in this study are 50, all belonging to the age group between 1-14 yrs, were studied in 2 1/2 yrs duration. Cases admitted to Dept. of pediatrics VSS Medical college, Burla, Sambalpur with symptoms of Nephrotic Syndrome such as generalized edema starting from the periorbital region and oliguria of insidious onset, and revealing laboratory findings suggestive of Nephrotic Syndrome like heavy proteinuria, hypoalbuminemia, hypercholesterolemia raised urine protein creatinine ratio have been taken for study.

The following children were excluded from this study. (1) Children <1yrs and >14 yrs. (2) Patient already on steroid, immunosuppressive drugs and antibiotics. The cases presenting with edema due to other causes like hepatic failure, CCF, PEM, protein losing enteropathy, Koch's abdomen, acute /chronic glomerulonephritis were also excluded from the study group.

Cases with massive proteinuria, hypoalbuminemia, hypercholesterolemia have been defined as follows.

Heavy proteinuria ie, urinary protein excretion more than 40 mg /m<sup>2</sup> /hr

Hypoalbuminemia ie, serum albumin level less than 2.5 mg /dl (Srivastava, et al 1975)

Hypercholesterolemia, serum cholesterol level more than 220 mg /dl (Drummond, 1975).

## Methods

**Clinical:** A detailed clinical examination was made in all cases, within 24 hrs of admission in pediatric department in a specified proforma meant for them. Blood pressure in the arm was measured by sphygmomanometer with the cuff of appropriate size as per the age of the patient. The patient were weighed daily and changes were recorded. Daily fluid intake versus output chart was maintained. Oliguria was defined when the urine output was less than 1ml/kg/hr.

**Laboratory investigation:** In all cases the following investigation were done.

Urine – routine and microscopic examination.

Culture and sensitivity

24 hrs urinary protein estimation.

Spot urinary protein creatinine ratio

Blood - CBC, ESR

CRP, Blood culture and sensitivity.

Urea and creatinine.

Na, K

Albumin, Cholesterol

USG - abdomen, MCU in selected cases.

## IV. Observations

The present study "Incidence And Clinicoetiological Study Of Uti In Nephrotic Syndrome In Pediatric Age Group" Was Conducted In The Department Of Pediatrics In Collaboration with the department of Microbiology and Pathology of VSS medical college Hospital Burla. 50 cases of Nephrotic Syndrome in pediatric age group admitted to the pediatric ward in a period of 2 yrs and 6 months. The observations are noted down as, In our study show that the overall hospital incidence of Nephrotic Syndrome during the period of study is 0.86. In total 50 cases of Nephrotic Syndrome, out of which 38(76%) were male and 12 (24%) were female. Most of the cases (31cases) occurred below the age of 5 yrs (62%).

**Table 1.** Distribution of Associated Infections In Nephrotic Syndrome

Sl No.	Associated infection	No of cases	%
1.	Skin infection	10	20
2.	Upper respiratory tract infection	6	12
3.	Urinary tract infections	11	22
4.	Peritonitis	2	4
5.	Lower respiratory tract infection	2	4
6.	Pyomeningitis	1	2
7.	Pulmonary TB	2	4
8.	Cellulitis	3	6
9.	Gastroenteritis	5	10
10.	Without any infection	8	16

Table 1 shows the different associated infection in 50 cases of Nephrotic Syndrome in the present series .The common infections were UTI (22%) ,Skin infection (20%), URTI (12%),Gastroenteritis, (12%) ,cellulitis (6%),Peritonitis (4%), LRTI (4%), Pulmonary TB (4%) and Pyogenic meningitis(2%). In 8(16%) cases there was no associated infections observed.

**Table 2.** Laboratory Profile Of Nephrotic Syndrome Patients With Uti

Sl. No	Urinary Pus cells/HPF	Urine culture
1.	>15	E. Coli
2.	10 – 15	E. Coli
3.	Normal	Proteus
4.	10 – 12	E. Coli
5.	20 – 30	Klebsiella
6.	12 – 14	E. Coli
7.	Pus cells in clumps	E. Coli
8.	10 – 15	Mixed growth
9.	20 – 30	E. Coli
10.	>15	Proteus
11.	12 - 14	E. coli

Table 2 shows that out of 11 cases of Nephrotic Syndrome with culture positive UTI ,urine examination revealed significant pyuria in 10 cases and normal in 1 case E.Coli was the commonest organism to be isolated

**Table 3.** Different Organism Isolated In Urine Culture

ORGANISM ISOLATED	NO OF CASES	%
E. Coli	7	63.3
Klebsiella	1	9.2
Proteus	2	18.3
Mixed growth	1	9.2
<b>TOTAL</b>	<b>11</b>	<b>100</b>

Table 3 shows that out of 11 cases of Nephrotic Syndrome cases with UTI, E.Coli (63.3%) was the commonest organism isolated by urine culture followed by Proteus (18.3%) and Kliebsiella (9.2%).1 case (9.2%) showed mixed bacterial growth.

## V. Discussion.

Although Nephrotic Syndrome disease is a common disease in pediatric age group,its exact incidence is not known.This disease prevalent throughout the world.Certain type of Nephrotic Syndrome have got geographical distribution ,congenital Nephrotic Syndrome is seen mostly in Finland, Nephrotic Syndrome secondary to malaria in Nigeria,Ibden and certain other parts of Africa.

In our study 31 cases (62 %) of Nephrotic Syndrome were encountered in the age group of 1-5 yrs with peak incidence of 20 cases in the 1-3 yrs age period (shown in table 1).This present observation is in agreement with the work of Heymann ,Marker et all ,Agarwal et al ,and Srinivasa et al (1975).<sup>1, 4, 12</sup>

Heymann et al (1972 ) said that the age period of 1.5 -5.5 yrs is the most vulnerable one and have also observed the peak incidence in the above age group.Agarwal et al (1975) reported maximum number of cases in the age group of 2-5 yrs and Srinivasa et al (1975 ) 64 % of cases occurring before the age of 5 yrs .In the present study ,there were only 19 cases after the age of 5 yrs showing a gradual lowering of incidence with increasing age.<sup>4, 8</sup>

Table 1 shows the different associated infection in 50 cases of Nephrotic Syndrome in the present series .The common infections were UTI (22%) ,Skin infection (20%),URT I (12%),Gastroenteritis ,(12%) ,cellulitis (6%),Peritonitis (4%),LRTI (4%),Pulmonary TB (4%) and Pyogenic meningitis(2%).

Gulathi S, Kher and Gupta A (1995) have made similar observations.They have observed that one or more infectious complication in 42.9% of Nephrotic Syndrome cases with UTI being the commonest (13.7%) followed by pulmonary tuberculosis (10.4%),Peritonitis (9.1%),skin infection (5.2%),LRTI (3.9%) and pyomeningitis (0.6%).<sup>2</sup>

In this study the distribution of UTI in different age and sex group of 50 Nephrotic Syndrome cases studied .Out of 50 Nephrotic Syndrome cases 11 cases had a positive urine culture of which 8 were male and 3 were female childrens.The M:F ratio been 2.6:1.The positivity of urine culture was more common in 1-5 yrs age group.David W,C Jacobs studied cases of UTI in Nephrotic Syndrome and found a male prepondance in 81% cases of his series .He was of the opinion that the incidence of UTI is more in uncircumcised boys because of colonization of periurethral and prepuccial area by organisms such as E.Coli is more common in these children

.In the present series ,the higher incidence of male UTI can be explained in the same light or this may be a statistical findings.Mukerjee (1973) while studying 116 adult Nephrotic Syndrome patients also reported a consider number cases associated with pyogenic organism in urinary tract .In the present series all these cases (22%) with positive urine culture did not present with classical symptomatology .The colony count for these organism could not be possible due to lack of laboratory facilities .Therefore the exact correlation between their existence and their pathogenicity could not be drawn with certainty.<sup>71</sup>.However Rubin 1975 and Drummond (1975) have already emphasized that urine culture may show the existence of pathogenic organism even without the association of fever .Also Gulati et al 1975 in their study of Nephrotic Syndrome cases with UTI found that 28.6 % of cases with UTI were asymptomatic .<sup>5,6</sup>

Table 2 shows out of 11 cases, presence of significant number of pus cells in urine was found in 10 cases and normal urine in 1 case. This observation also substantiated by the finding in the study conducted by Gulati S, Kher .V et al (1995). It is clearly visible from this study that even though UTI was established beyond doubt ,the urine examination was normal in one case .Therefore it is important to mention that urine routine and microscopic examination alone cannot be taken as confirmatory test for the establishment of UTI and should not be routinely used to exclude UTI.<sup>2</sup>

Table 3 shows the isolation of different organisms in 11 cases of UTI in Nephrotic Syndrome.The organism were E.Coli (63.3%),Proteus (18.3%),Kleibsiella (9.2%),mixed growth (9.2%).Similar observation have been made by Gulathi S, Kher, V et al (1995) were they found 61% of the culture isolates were E.coli and 39% were non E .Coli organisms.<sup>2</sup>

## VI. Conclusion

It is concluded from this study that UTI is the commonest infection associated with Nephrotic Syndrome and tends to remain hidden. Hence urine culture should be performed in all cases of Nephrotic Syndrome even in the absence of symptoms and signs of UTI and suitable treatment should be started immediately for the better outcome of these patients .

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