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INFECTION IN NEPHROTIC SYNDROME CASES PRESENTING IN TERTIARY CARE CENTRE

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ABSTRACT

Aim: The aim of the present study was to describe the accurate rate of infection and specific type of treatment in nephrotic syndrome cases admitted with activity to nephrology unit.

Methods: It was a retrospective case series study carried out in the department of Pediatrics, BRD Medical College Gorakhpur U.P. Children of 1-15 years of age who had developed nephrotic syndrome for the first time and fulfilled the International Study of Kidney Disease in Children (ISKDC) criteria for diagnosis of primary nephrotic syndrome (PNS) were enrolled in the study through OPD, nephrology ward and emergency room. The study was conducted over a period of 12 months. 120 patients were included in the study.

Results: A total of 120 children between the ages of 1 year to 15 years, diagnosed with NS were taken for the study. Majority of the subjects presented between 5-8 years of age (40%), followed by 9-12 years of age (30%). Among these, 66.66% of children were male and 33.34% were female. The most common presenting symptom was facial puffiness seen in 100% of patients, followed by abdominal distension (90%), pedal edema (80%), oliguria (50%), scrotal edema (40%), fever (33.34%), burning micturition (23.34%), abdominal pain (25%), hematuria (16.66%) and vomiting (13.34%). Most common was observed to be ascites comprising of 63.34% of cases, followed by hypertension (41.66%), respiratory complications like pleural effusion and pneumonia (25%), thromboembolism in 5% of cases and spontaneous bacterial peritonitis seen only in 2.5% of the cases. Of the 120 subjects included in the study, it was noted that 75% of the children presented with first episode of nephrotic syndrome, 20% with infrequent relapses and 5% with frequent relapses.

Conclusion: Major infections remain an important complication of nephrotic syndrome in children, especially during relapses. Drug resistant organisms should be considered while treating these infections in children with nephrotic syndrome. Counseling the parents is very important for the prompt management of these children.

Keywords: nephrotic syndrome, infection, treatment, primary nephrotic syndrome

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1. INTRODUCTION

Nephrotic syndrome (NS) is one of the commonest chronic renal diseases in children, characterized by selective proteinuria, hypoalbuminemia, hyperlipidemia, and edema. Majority of cases of nephrotic syndrome are without underlying secondary etiology and termed idiopathic nephrotic syndrome (INS). Based on response to therapy, these cases are further classified as steroid sensitive (SSNS) and steroid resistant nephrotic syndrome (SRNS). More than 50% cases of SSNS show frequent relapses or become steroid-dependent requiring repeated courses of steroid and other immunosuppressive drugs as steroid sparing agent.[1] SRNS cases, at the other end, are at additional risk of renal failure. Among the important risk factors for infection are urinary loss of immunoglobulins and alternative complement pathway factors B and I, presence of edema, and treatment with prednisolone and other cytotoxic agents.[2]

Almost 90-95% of the cases of NS in children are primary or idiopathic with no identified cause, the most common glomerular lesion being minimal change disease. The other 5-10% are associated with an underlying systemic illness.[3,4] Remission is defined as nil/trace urinary protein (Up/Uc <0.2) for 3 consecutive morning samples. Relapse is defined as urine protein >3+ (Up/Uc >2) for 3 consecutive morning samples.[3] Infrequent relapse is a responder with one relapse in 6 months.[4] Frequent relapse is 2 or more relapses in first 6 months after stopping initial therapy, >3 relapses in any 6 months, or >4 relapses in 1 year.[3] Children with NS show remission of proteinuria following 6 weeks of treatment with corticosteroids are classified as 'steroid-sensitive'.[5] Children with NS, especially if receiving immunosuppressants are susceptible to infections, especially with capsulated organisms like Pneumococcus, Meningococcus. Hence, vaccination becomes essential.[5] Complications such as anasarca with ascites and serious effusions, infections like peritonitis, cellulitis, bone and joint infections, acute kidney injury, severe hypovolemia and thrombosis of major vessels are seen.[4] NS is a disease that not only affects the obvious physical health, but also affects the family and psychology of the child and there is lack of understanding about the disease condition especially in a rural setup.[6]

Infections remain an important cause for morbidity and mortality in children with nephrotic syndrome.[7,8] Pneumococcal infections are the most common invasive bacterial infections in these children. Infections can lead to repeated relapses, poor response to steroid therapy and prolonged hospitalization.[9] Acute respiratory infections and urinary tract infections (UTI) are the most frequent infectious triggers of relapses.[10]

The aim of the present study was to describe the accurate rate of infection and specific type of treatment in nephrotic syndrome cases admitted with activity to nephrology unit.

2. MATERIALS AND METHODS

It was a retrospective case series study carried out in the department of Pediatrics, BRD MEDICAL COLLEGE GORAKHPUR U.P. Children of 1-15 years of age who had developed nephrotic syndrome for the first time and fulfilled the International Study of Kidney Disease in Children (ISKDC) criteria for diagnosis of primary nephrotic syndrome (PNS) were enrolled in the study through OPD, nephrology ward and emergency room. The study was conducted over a period of 12 months. 120 patients were included in the study.

Inclusion Criteria

All the consecutive children aged between 1 year to 16 year, presenting in OPD and IPD with symptoms of nephrotic syndrome will be included in study.

Exclusion Criteria- Following children will be excluded

- Age <1 year.

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- Acute nephritic syndrome
- Secondary nephrotic syndrome
- Patient admitted for diagnostic renal biopsy.
- Patient taking I.V. cyclophosphamide and I.V. rituximab.

The diagnosis of PNS was made on the basis of presence of generalized edema, heavy proteinuria >40 mg/m2 /hr, hypoalbuminemia 250 mg/dl. Children with known PNS presenting with relapse or already on steroid therapy and on antibiotic treatment were excluded and those having congenital and secondary nephrotic syndrome. All patients underwent history, physical examination and relevant laboratory investigations i.e. spot urine albumin, urinary protein/creatinine ratio or 24 hour urinary protein, complete blood count, urine analysis, serum protein, serum albumin and serum cholesterol. To establish the diagnosis of infections, all children were evaluated clinically and screened for evidence of infections using urine, blood, CSF, peritoneal fluid culture and sensitivity, chest X-rays PA view (in selected cases), stool detailed report and skin swab for C/S where necessary.

Data including age, gender, type of infection were computed and statistical analysis was performed by SPSS version 10. Descriptive statistics, frequency and percentages were calculated to present all categorical variables including sex, age groups, type of infections, clinical features and laboratory parameters. Age was presented as Mean+SD.

3. RESULTS

Table 1: Demographic details

Age groups	**N%**
1-4 years	12 (10)
5-8 years	48 (40)
9-12 years	36 (30)
12-15 years	24 (20)
Gender	
Male	80 (66.66)
Female	40(33.34)

A total of 120 children between the ages of 1 year to 15 years, diagnosed with NS were taken for the study. Majority of the subjects presented between 5-8 years of age (40%), followed by 9-12 years of age (30%). Among these, 66.66% of children were male and 33.34% were female.

Table 2: Presenting symptoms

Presenting symptoms	**N%**
Facial puffiness	120 (100)
Abdominal distention	108 (90)
Pedal edema	96 (80)
Scrotal edema	48 (40)
Oliguria	60 (50)
Burning micturition	28 (23.34)
Fever	36 (30)
Vomiting	16 (13.34)
Abdominal pain	30 (25)
Hematuria	20 (16.66)

The most common presenting symptom was facial puffiness seen in 100% of patients, followed by abdominal distension (90%), pedal edema (80%), oliguria (50%), scrotal edema

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(40%), fever (33.34%), burning micturition (23.34%), abdominal pain (25%), hematuria (16.66%) and vomiting (13.34%).

Table 3: Complications

Complications	**N%**
Hypertension	50 (41.66)
Ascites	76 (63.34)
Respiratory complications	30 (25)
Thromboembolism	6 (5)
Spontaneous bacterial peritonitis	3 (2.5)

All subjects were evaluated for complications. Most common was observed to be ascites comprising of 63.34% of cases, followed by hypertension (41.66%), respiratory complications like pleural effusion and pneumonia (25%), thromboembolism in 5% of cases and spontaneous bacterial peritonitis seen only in 2.5% of the cases.

Table 4: Relapse of NS and Time of response to steroids

Relapse	**N%**
First episode	90 (75)
Infrequent relapses	24 (20)
Frequent relapses	6 (5)
Time of response to steroids	
1	18 (15)
2	68 (56.66)
3	30 (25)
4	4 (3.34)

Of the 120 subjects included in the study, it was noted that 75% of the children presented with first episode of nephrotic syndrome, 20% with infrequent relapses and 5% with frequent relapses. After initiation of corticosteroid therapy, it was observed that remission was achieved after 2 weeks of treatment in 56.66% of cases, followed by 25% responding to treatment in the 3rd week, 15% in 1st week. A very low percentage of patients (3.34%) respond to treatment in the 4th week.

4. DISCUSSION

Nephrotic syndrome (NS) is a common renal disorder with an annual incidence of 1.2 to 16.9 per 100,000 children.[11] It is 15 times more common in children than adults.[12] The characteristic triad of NS is massive proteinuria, (>40 mg/m^2/hr, urine protein: creatinine ratio (Up/Uc) >2, nephrotic range proteinuria), hypoalbuminemia <3 g/dl and edema.[11] The underlying abnormality in NS is an increased permeability of the glomerular capillary wall, which leads to massive proteinuria and hypoalbuminemia.[13] Urinary tract infection (UTI) is a common infection in children with nephrotic syndrome (NS) and needs to be looked for and treated aggressively before starting steroid therapy.[14] Significant lower serum albumin level,[15] immunoglobulin loss in urine,[16] defective T$^-$ cell function, corticosteroids therapy, reduced perfusion of the spleen and loss of properdin (a complement factor that opsonizes certain bacteria) in the urine,[17] presence of ascites or relative malnutrition[18] associated with NS make the outcome worse in the presence of this infection.

A total of 120 children between the ages of 1 year to 15 years, diagnosed with NS were taken for the study. Majority of the subjects presented between 5-8 years of age (40%), followed by 9-12 years of age (30%). Among these, 66.66% of children were male and 33.34% were

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female. In similar studies done by Patil et al[12], Agarwal et al[19] and Sahana[20] observed that there was a male sex dominance in nephrotic syndrome. The most common presenting symptom was facial puffiness seen in 100% of patients, followed by abdominal distension (90%), pedal edema (80%), oliguria (50%), scrotal edema (40%), fever (33.34%), burning micturition (23.34%), abdominal pain (25%), hematuria (16.66%) and vomiting (13.34%). It was observed that the most common presenting symptom was edema in the present study as well as studies done by Patil et al[12], Agarwal et al[19] and Sahana[20] which occurs due to loss of proteins, decreasing the plasma oncotic pressure, causing an extravasation of plasma water into the interstitial space.

All subjects were evaluated for complications. Most common was observed to be ascites comprising of 63.34% of cases, followed by hypertension (41.66%), respiratory complications like pleural effusion and pneumonia (25%), thromboembolism in 5% of cases and spontaneous bacterial peritonitis seen only in 2.5% of the cases. The study done by Sreenivasa et al[21] shows fever in 18%, dysuria in 8%, abdominal pain in 10% but no one with gross hematuria. Another study by Gulati revealed fever in 38.8%, dysuria in 67.3% and gross haematuria in 4.1% patients.[18] Of the 120 subjects included in the study, it was noted that 75% of the children presented with first episode of nephrotic syndrome, 20% with infrequent relapses and 5% with frequent relapses. After initiation of corticosteroid therapy, it was observed that remission was achieved after 2 weeks of treatment in 56.66% of cases, followed by 25% responding to treatment in the 3rd week, 15% in 1st week. A very low percentage of patients (3.34%) respond to treatment in the 4th week.

5. CONCLUSION

Major infections remain an important complication of nephrotic syndrome in children, especially during relapses. Drug resistant organisms should be considered while treating these infections in children with nephrotic syndrome. Counseling the parents is very important for the prompt management of these children.

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ISSN: 0975-3583, 0976-2833 VOL14, ISSUE7, 2023

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