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Original Research Article

Clinico-Demographic Assessment of Nephrotic Syndrome in Children and Associated Complications: An Observational Study

Kumar Arpit[1], Rizwan Akhtar[2], Alka Singh[3]

[1]Senior Resident, Department of Pediatrics, N.M.C.H, Patna, Bihar, India
[2]Assistant Professor, Department of Pediatrics, N.M.C.H, Patna, Bihar, India
[3]Professor, Department of Pediatrics, N.M.C.H, Patna, Bihar, India

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Corresponding Author: Dr. Kumar Arpit
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Abstract:

Aim: The aim of the present study was to determine the demographic profile of children diagnosed with nephrotic syndrome, to analyze the clinical presentation of children with nephrotic syndrome and to study the associated complications.

Material & Methods: This hospital based observational study was conducted in the Department of Pediatrics for the duration of 12 months. The study included a total of 100 eligible children with nephrotic syndrome.

Results: A total of 100 children between the ages of 3 months to 12 years, diagnosed with NS were taken for the study. Majority of the subjects presented between 6-9 years of age (45%), followed by 3-6 years of age (30%). Among these, 70% of children were male and 30% were females. The most common presenting symptom was facial puffiness seen in 100% of patients, followed by abdominal distension (92%), pedal edema (84%), oliguria (55%), scrotal edema (45%), fever (32.5%), burning micturition (26%), abdominal pain (22%), hematuria (16%) and vomiting (12%). All subjects were evaluated for complications. Most common was observed to be ascites comprising of 64% of cases, followed by hypertension (45%), respiratory complications like pleural effusion and pneumonia (25%), thromboembolism in 5% of cases and spontaneous bacterial peritonitis seen only in 3% of the cases. Of the 100 subjects included in the study, it was noted that 76% of the children presented with first episode of nephrotic syndrome, 20% with infrequent relapses and 4% with frequent relapses. After initiation of corticosteroid therapy, it was observed that remission was achieved after 2 weeks of treatment in 58% of cases, followed by 28% responding to treatment in the 3rd week, 12% in 1st week. A very low percentage of patients (4%) respond to treatment in the 4th week.

Conclusion: In the present study, clinical and demographic profile of nephrotic syndrome was congruent with nephrotic syndrome in children in other studies. The response to treatment and associated complications did not differ significantly in a rural center when compared to other studies.

Keywords: Nephrotic syndrome, Clinical profile, Complications.

Introduction

Kidney disease in children constitutes an important cause of morbidity and mortality. There is increasing prevalence of chronic kidney disease (CKD) globally with an annual incidence rate of 8%. [1] The pattern of paediatric kidney diseases across different regions is influenced by genetic, racial and environmental differences. [2] Acute kidney injury (AKI) and nephrotic syndrome are the most reported paediatric kidney disease. Nephrotic syndrome (NS) is one of the commonest childhood kidney diseases. [3,4] Childhood nephrotic syndrome is also called nephrosis. Nephrotic syndrome happens when tiny structures in the kidneys called glomeruli stop functioning and let too much protein enter the kidneys.

It is a common renal disorder with an annual incidence of 1.2 to 16.9 per 100,000 children.[5] It is 15 times more common in children than adults. [6] The characteristic triad of NS is massive proteinuria, (>40 mg/m2 /hr, urine protein: creatinine ratio (Up/Uc) >2, nephrotic range proteinuria), hypoalbuminemia <3 g/dl and edema. [7] It results from the heavy proteinuria and a consequent reduction in plasma oncotic pressure with increased capillary ultrafiltration or as a consequence of an increased primary intra-renal renal avidity for sodium and water due to resistance to atrial natriuretic peptide and activation of epithelial sodium channels in the renal medullary collecting ducts. [8-11] While the cause remains unknown, the pathogenesis of idiopathic NS is thought to involve immune dysregulation, systemic

circulating factors or inherited structural abnormalities of the podocyte.

Oedema may be severe and require symptomatic treatment. Treatment of oedema is highly determined by the intravascular volume. Relapse is defined as urine protein >3+ (Up/Uc >2) for 3 consecutive morning samples. Infrequent relapse is a responder with one relapse in 6 months. [12] 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.[5] Children with NS show remission of proteinuria following 6 weeks of treatment with corticosteroids are classified as 'steroid-sensitive'. [13] 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. 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. [14]

Hence this study was taken up to assess the clinical presentation, therapeutic response, and complications in a child in with nephrotic syndrome in a rural area.

Material & Methods

This hospital based observational study was conducted in the Department of Pediatrics, in N.M.C.H, Patna, Bihar, India for the duration of 12 months J(an 2020 to December 2020). The study included a total of 100 eligible children with nephrotic syndrome.

Inclusion Criteria:

- Aged 3 months to 12 years, with newly diagnosed as well as previously diagnosed nephrotic syndrome.
- Children who responded to steroid treatment within 4 weeks of initiation of therapy.

Exclusion Criteria:

- Patients with congenital and adolescent nephrotic syndrome,
- Children with known cases of steroid resistant nephrotic syndrome and children with secondary causes of nephrotic syndrome.

Methodology

Detailed information regarding cases diagnosed with steroid sensitive NS was taken from the hospital's medical records. Diagnosis of nephrotic syndrome was based on the following criteria of massive proteinuria (>40 mg/m2 /hr), hypoalbuminemia (<3 g/dl) and presence of edema. A thorough history, complete clinical examination, and details of investigations of presenting illness, with response to treatment and complications of the disease were noted in a pre-structured proforma.

Statistical Analysis

The data from these filled proformas was analyzed in Microsoft Excel.

Results

Table 1: Distribution of cases based on age and gender

Age in years	Male	Female	Total (%)
3 months- 3 years	3	2	5 (5)
3- <6 years	20	10	30 (30)
6- <9 years	32	13	45 (45)
9-12 years	15	5	20 (20)
Total	70	30	100 (100)

A total of 100 children between the ages of 3 months to 12 years, diagnosed with NS were taken for the study. Majority of the subjects presented between 6-9 years of age (45%), followed by 3-6 years of age (30%). Among these, 70% of children were male and 30% were females.

Table 2: Presenting symptoms

Presenting symptoms	N%
Facial puffiness	100 (100)
Abdominal distention	92 (92)
Pedal edema	84 (84)
Scrotal edema	45 (45)
Oliguria	55 (55)
Burning Micturition	26 (26)
Fever	32 (32)
Vomiting	12 (12)
Abdominal pain	22 (22)
Hematuria	16 (16)

The most common presenting symptom was facial puffiness seen in 100% of patients, followed by abdominal distension (92%), pedal edema (84%), oliguria (55%), scrotal edema (45%), fever (32.5%), burning micturition (26%), abdominal pain (22%), hematuria (16%) and vomiting (12%).

Table 3: Complications

Complications	N%
Hypertension	45 (45)
Ascites	64 (64)
Respiratory complications	25 (25)
Thromboembolism	5 (5)
Spontaneous bacterial peritonitis	3 (3)

All subjects were evaluated for complications. Most common was observed to be ascites comprising of 64% of cases, followed by hypertension (45%), respiratory complications like pleural effusion and pneumonia (25%), thromboembolism in 5% of cases and spontaneous bacterial peritonitis seen only in 3% of the cases.

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

Episode	Number (N)	%
First episode	76	76
Infrequent relapses	20	20
Frequent relapses	4	4
Time of response (weeks)	**Number (N)**	**%**
1	12	12
2	58	58
3	28	28
4	2	2

Of the 100 subjects included in the study, it was noted that 76% of the children presented with first episode of nephrotic syndrome, 20% with infrequent relapses and 4% with frequent relapses. After initiation of corticosteroid therapy, it was observed that remission was achieved after 2 weeks of treatment in 58% of cases, followed by 28% responding to treatment in the 3rd week, 12% in 1st week. A very low percentage of patients (4%) respond to treatment in the 4th week.

Discussion

Nephrotic syndrome (NS) is a common renal disorder with an annual incidence of 1.2 to 16.9 per 100,000 children.[5] It is 15 times more common in children than adults. [15] The characteristic triad of NS is massive proteinuria, (>40 mg/m2/hr, urine protein: creatinine ratio (Up/Uc) >2, nephrotic range proteinuria), hypoalbuminemia <3 g/dl and edema. [5] The underlying abnormality in NS is an increased permeability of the glomerular capillary wall, which leads to massive proteinuria and hypoalbuminemia. [16] 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. [5,12]

A total of 100 children between the ages of 3 months to 12 years, diagnosed with NS were taken for the study. Majority of the subjects presented between 6-9 years of age (45%), followed by 3-6 years of age (30%). Among these, 70% of children were male and 30% were females. In similar studies done by Patil et al, Agarwal et al and Sahana it was also observed that there was a male sex dominance in nephrotic syndrome. [14,15,17] The most common presenting symptom was facial puffiness seen in 100% of patients, followed by abdominal distension (92%), pedal edema (84%), oliguria (55%), scrotal edema (45%), fever (32.5%), burning micturition (26%), abdominal pain (22%), hematuria (16%) and vomiting (12%) study as well as studies done by Patil et al [14], Agarwal et al [15] and Sahana [17] 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 64% of cases, followed by hypertension (45%), respiratory complications like pleural effusion and pneumonia (25%), thromboembolism in 5% of cases and spontaneous bacterial peritonitis seen only in 3% of the cases. In a similar study done by Patil et al[14] ascites was seen in 63% cases and hypertension in 53.13% of cases, in a study done by Agarwal et al[15] ascites was seen in 55.10% cases and hypertension in 275 cases and in a study done by Sahana [17] it was observed that ascites was seen in 63% of cases and HTN in 12% cases.

Of the 100 subjects included in the study, it was noted that 76% of the children presented with first episode of nephrotic syndrome, 20% with infrequent relapses and 4% with frequent relapses. After initiation of corticosteroid therapy, it was observed that remission was achieved after 2 weeks of treatment in 58% of cases, followed by 28%

responding to treatment in the 3rd week, 12% in 1st week. A very low percentage of patients (4%) respond to treatment in the 4th week.

Conclusion

In the present study, clinical and demographic profile of nephrotic syndrome was congruent with nephrotic syndrome in children in other studies. The response to treatment and associated complications did not differ significantly in a rural center when compared to other studies.

References

1. Makanda-Charambira PD, Mujuru HA, Ticklay I, Muchemwa L. Burden of Paediatric Kidney Diseases in a Tertiary Care Hospital in Harare, Zimbabwe. Clinical Medicine Insights: Pediatrics. 2023 Aug; 17:11795565231188940.
2. Anigilaje EA, Adesina TC. The pattern and outcomes of childhood renal diseases at University of Abuja Teaching Hospital, Abuja, Nigeria: A 4 year retrospective review. Nigerian Postgraduate Medical Journal. 2019 Jan 1; 26(1):53-60.
3. Shatat IF, Becton LJ, Woroniecki RP. Hypertension in childhood nephrotic syndrome. Frontiers in pediatrics. 2019 Jul 16; 7:287.
4. Tamura H. Trends in pediatric nephrotic syndrome. World journal of nephrology. 2021 Sep 9;10(5):88.
5. Sinha A, Bagga A, Banerjee S, Mishra K, Mehta A, Agarwal I, Uthup S, Saha A, Mishra OP, Expert Group of Indian Society of Pediatric Nephrology. Steroid sensitive nephrotic syndrome: revised guidelines. Indian pediatrics. 2021 May;58(5):461-81.
6. Patil RN, Bendale AG. A study of clinical profile and associated factors of nephrotic syndrome in children at tertiary health care center. Int J Pediatr. 2017;2(1):5-7.
7. Wang CS, Yan J, Palmer R, Bost J, Wolf MF, Greenbaum LA. Childhood nephrotic syndrome management and outcome: a single center retrospective analysis. International Journal of Nephrology. 2017 Feb 23;2017.
8. Anigilaje EA, Fashie AP, Ochi C. Childhood nephrotic syndrome at the University of Abuja Teaching Hospital, Abuja, Nigeria: a preliminary report supports high steroid responsiveness. Sudanese Journal of Paediatrics. 2019; 19(2):126.
9. Pasini A, Benneti E, Conti G, Ghio L, Lepore M and Masella L, et al. The Italian Society for paediatric nephrology consensus document on the management of nephrotic syndrome in children: Part 1-Diagnosis and Treatment of the First episode and the First relapse. Italian Journal of Paediatrics. 2017; 43:41
10. Deschênes G, Feraille E, Doucet A. Mechanisms of oedema in nephrotic syndrome: old theories and new ideas. Nephrology Dialysis Transplantation. 2003 Mar 1;18(3):454-6.
11. Rondon-Berrios H. New insights into the pathophysiology of oedema in nephrotic syndrome. Nefrologia. 2011 Jan 1;31(2):148-54.
12. Bagga A, Srivastava RN. Nephrotic syndrome. Pediatr Nephrol. 2016:195-234
13. Pandya NK, Mehta KG. Clinical profile of patients with steroid sensitive nephrotic syndrome at tertiary care centre in Gujarat, India. Int J Contemp Pediatr. 2018; 5:1172-5.
14. Agrawal A, Singh RP. Clinical profile and complication of nephrotic syndrome in a tertiary health care center in central India. Indian J Child Health. 2020;7(1):22-4.
15. Patil RN, Bendale AG. A study of clinical profile and associated factors of nephrotic syndrome in children at tertiary health care center. Int J Pediatr. 2017;2(1):5-7.
16. Kliegman R. Nelson textbook of pediatrics. 21st ed. Philadelphia, PA: Elsevier; 2020: 27 52-60.
17. Sahana KS. Clinical profile of nephrotic syndrome in children. J Evolut Med Dent Sci. 2014; 3:863-70.