Original Research Article

Clinical profile and predictors of steroid responsiveness of nephrotic syndrome in paediatric age group

Divya Dave[1*], Debangana Baruah[2]

[1]Associate Professor , [2]Resident, Department of Pediatrics, GMERS Medical College, Gotri, Vadodara, Gujrat, INDIA.
Email: drdivya99@yahoo.com,debangana.baruah@gmail.com

Abstract

Background: Along with the classical presentation a number of cases of nephrotic syndrome present with some atypical presentation **Study Type:** A hospital based Observational and Prospective study conducted at Department of Paediatrics of GMERS Medical College And General Hospital. **Aims and Objectives** This study was conducted with objective to study the clinical profile and presentation of Nephrotic Syndrome in children and to determine the possible underlying causes and the histopathological features of atypical Nephrotic Syndrome and document the immediate clinical response to the treatment. **Results:** In this study 61 (81.3%) showed typical clinical presentation of Nephrotic Syndrome, which is highly suggestive of minimal change disease while 14 (18.7%) had atypical clinical presentation of Nephrotic Syndrome which included >8 years at presentation or hypertension at presentation. Children between 1-3 years constitute (21.3%), 3-6 years constitute (48%), 6-8 years constitute (22.7%) and 8-16 years constitute (8%). All the children in the study group presented with edema 75(100%) and oliguria was present in 73(97.3%). 6(42.8%) of atypical Nephrotic Syndrome were frequent relapser whereas 13(21.3%) of typical cases were frequent relapse Most common cause of relapse is attributed to URTI 28(68.29%) followed by UTI, LRTI and non compliance. 20% of the typical presentation had FSGN and 60% with atypical presentation had histology suggestive of MCNS. The majority of the patients in the study group were steroid sensitive. **Conclusion:** Peak age of presentation of atypical Nephrotic Syndrome is >8 years(42.9%). Hypertension, pleural effusion, were present relatively more frequently in atypical Nephrotic Syndrome. Renal hyperechogenicity and nephromegaly was the major renal sonographic finding among the atypical cases of the studied group. The number of relapses is more with atypical cases. Patients less than 6 years old, not hypertensive, without gross haematuria and having normal biochemical renal functions predict steroid responsiveness.

Key Words: Nephrotic syndrome, atypical, steroid responsiveness

[*]**Address for Correspondence:**
Dr. Divya Dave, B-5 Vidyakunj Society, Opposite Bhathujhi temple, Manjalpur, Vadodara- 390011
Email: drdivya99@yahoo.com

Received Date: 16/08/2019 Revised Date: 10/09/2019 Accepted Date: 21/10/2019
DOI: https://doi.org/10.26611/10141222

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 02 November 2019

INTRODUCTION

Nephrotic syndrome is a common chronic renal disorder in children, characterized by heavy proteinuria, hypoalbuminemia, hyperlipidemia and edema.[1]It is more common in boys then in girls (2:1) and most commonly appears between the age of 2 and 6 years. [2] Minimal change Nephrotic Syndrome (MCNS) is historically responsible for approximately 80% of cases in children under 6 years old and is characterized by its benign nature and steroid responsiveness. Along with the classical presentation a number of cases present with some atypical presentation i.e. age of onset < 2 years or > 8 years, hematuria, hypertension, low C3 levels and impaired renal function.[2] Children with features atypical for MCNS require renal biopsy for diagnosis and treatment. Outcome of these patients are poor in comparison with classically presented Nephrotic Syndrome.

How to cite this article: Divya Dave, Debangana Baruah. Clinical profile and predictors of steroid responsiveness of nephrotic syndrome in paediatric age group. *MedPulse International Journal of Pediatrics.* November 2019; 12(2): 22-28.
http://medpulse.in/Pediatrics/index.php

AIMS AND OBJECTIVES

To study the clinical profile and presentation of Nephrotic Syndrome in children upto 18yrs of age and to determine the possible underlying causes and the histopathological features of atypical Nephrotic Syndrome and to document the predictors of steroid responsiveness.

MATERIALS and METHODS

Study Type: A hospital based Observational and Prospective study conducted at Department of Paediatrics of GMERS Medical College And General Hospital.

Study Population: The study included children presenting with Nephrotic Syndrome at our hospital below 18 years of age.

Study Duration: August 2017 to June 2018.

Inclusion Criteria: All children aged below 18 years who presented with symptoms and signs of Nephrotic Syndrome and in whom the diagnosis was documented by laboratory findings and included all children with signs and symptoms of Nephrotic Syndrome who are previously treated as well as newly diagnosed cases of Nephrotic Syndrome.

Exclusion Criteria: All children above 18 years of age presenting with nephrotic syndrome and refusal of the patients or parents to be included in the study

Study Methodology Approval of institutional ethical committee was taken before commencement of the study. Informed consent or assent in case of a minor was taken from the parents or the guardians of the children satisfying the inclusion criteria. Details such as age, sex, age at diagnosis, duration of steroid therapy and detailed history of clinical features including the type of onset of the Nephrotic Syndrome was recorded on pre- designed and pre – tested proforma. Anthropometric measurement like weight, height was recorded in all cases. Investigations like Complete blood count (CBC), urine examination, Blood urea, Serum creatinine, Serum cholesterol, Serum albumin, Chest x-ray, Mantoux test, Hepatitis B and C, Blood culture, Urine culture and Renal USG was done as per the standard diagnostic work up followed in our hospital. Renal biopsy was done in atypical cases where consent could be obtained for biopsy. All the children were subjected to International Study Of Kidney Diseases in Children (ISKDC) classification for diagnosis and case definition of Nephrotic Syndrome. (1) The patients were followed up in Nephrology OPD during the period of study every 15 days or monthly depending on the condition of the patient. Newly diagnosed cases were followed up only for 6 months. Treatment given as per ISKDC protocol. USG guided Renal biopsy was done under short acting general anaesthesia. Two core samples were obtained using a semi automatic kidney biopsy needle 16/18 gauge needle gun. Histopathological examination was done in the Pathology Department of GMERS Medical College And General Hospital.

Statistical Analysis

All the data were noted down in a pre-designed study proforma. Qualitative data were represented in the form of frequency and percentage. Association between qualitative variables were assessed by Chi-Square test with Continuity Correction for all 2 x 2 tables and Fisher's exact test for all 2 x 2 tables. Quantitative data were represented using Mean $\pm$ SD and Median and IQR (Interquartile range). Analysis of Quantitate data between the two groups were done using unpaired t-test if data passed ' Normality test' and by Mann-Whitney test if data failed 'normality test'. A p-value of <0.05 was taken as significant.

RESULTS AND DISCUSSION

75 children, who fulfilled the inclusion criteria of the study, were enrolled during the period from August 2017 to June 2018 at Department of Paediatrics GMERS Medical College and General Hospital ,Vadodara.

Table 1: Comparison between typical and atypical cases

	Frequency	Percent
Typical	61	81.3%
Atypical	14	18.7%
Total	**75**	**100.0%**

In this study 61 (81.3%) showed typical clinical presentation of Nephrotic Syndrome, which is highly suggestive of minimal change disease while 14 (18.7%) had atypical clinical presentation of Nephrotic Syndrome which included >8 years at presentation or hypertension at presentation.

Table 2: Comparison of Age with typical and atypical cases

Type	Age				Total
	1-3 yrs	3-6 yrs	6-8 yrs	8-16 yrs	
Typical	15	33	13	0	61
	24.6%	54.1%	21.3%	0%	100%
Atypical	1	3	4	6	14
	7.1%	21.4%	28.6%	42.9%	100%
Total	16	36	17	6	75
	21.3%	48.0%	22.7%	8.0%	100%

The age of children in this study ranged between 1 year to 16 years, with peak of 3-6 years. Children between 1-3 years constitute (21.3%), 3-6 years constitute (48%), 6-8 years constitute (22.7%) and 8-16 years constitute (8%). Therefore from this study we conclude that the peak age of presentation of typical Nephrotic Syndrome is 3-6 years (54.1%) and peak age of presentation of atypical Nephrotic Syndrome is >8 years(42.9%) ($p<0.001$) which is statistically significant. Spanish study of 100 children under 14 years were observed for a period of 4 years and 8 months, the peak age of presentation was between 2-5 years(3) Vijayalakshmi et.al(4) conducted a study on 44 cases of Nephrotic Syndrome, in which the most commonly affecting age group was between 3-5 years of age.

Table 3: Comparison of Gender with typical and atypical cases

	Male	Female	Total
Typical	32	29	61
	52.5%	47.5%	100%
Atypical	9	5	14
	64.3%	35.7%	100%
Total	**41**	**34**	**75**
	54.7%	**45.3%**	**100%**

There is a male predominance where males constituted 41(54.7%) of the study group ,while females were 34(45.3%). That gave a male to female ratio of 1.2:1. However males constitute 32(52.5%) and females constitute 29(47.5%) in typical, whereas of the atypical cases males constitute 9(64.3%) and females were 5(37.5%). P-value is 0.4 which is not significant and no data is available regarding male and female predominance in typical and atypical case of Nephrotic Syndrome.

Table 4: The Presenting Symptoms of the Study Group and Correlation of symptoms with typical and atypical cases

	Number of patients	Percent		
	Typical n=61	Atypical n=14	p-value	Total
Anasarca	61 (100%)	14 (100%)	0.001	75 (100%)
Oliguria	59 (96.7%)	14 (100%)	0.432	73(97.3%)
URTI	21 (34.4%)	1 (7.1%)	0.43	22(29.3%)
Abdominal pain	17 (27.9%)	9 (64.3%)	0.01	26(34.7%)

All the children in the study group presented with edema 75(100%) and oliguria was present in 73(97.3%). URTI was a presenting symptom in 22(29.3%) and abdominal pain in 26(34.7%). None of the children presented with hematuria. Upper respiratory tract infection (URTI), which immediately preceded the clinical signs of Nephrotic Syndrome was documented in a Russian study, which considered URTI as a triggering factor in the onset of Nephrotic Syndrome.[5]. Abdominal pain was the presenting complaint in 9(64.3%) of the children presenting with atypical features which was statistically significant ($p<0.01$).

Almost all patients had generalized body swelling (100%), hypertension occurring in 21(28%), pleural effusion in 3(4%), clinical evidence of pneumonia in 12 (16%) and 6(8%) showing hepatosplenomegaly. These are expected findings since Nephrotic Syndrome is a multisystem disease with adverse local and systemic effects.[6] Hypertension, pleural effusion, hepatomegaly and splenomegaly were present relatively more frequently in atypical Nephrotic Syndrome as compared to typical Nephrotic Syndrome and the difference was statistically significant.

Table 5: Correlation of signs with typical and atypical cases

Signs	Number of patients		Total	p-value
	Typical n=61	Atypical n=14	N=75	

Anasarca	61 (100%)	14 (100%)	75 (100%)	
Hypertension	10(16.4%)	11(78.6%)	21(28%)	<0.001
Pleural effusion	0(0%)	3(21.4%)	3 (4%)	<0.001
Bronchopnuemonia	11(18%)	1(7.1%)	12 (16%)	0.316
Hepatomegaly	3(4.9%)	3(21.4%)	6 (8%)	<0.04
Splenomegaly	3(4.9%)	3(21.4%)	6 (8%)	<0.04

Hypertension is a dominant clinical feature for those children above the age of eight years. This can be explained as Minimal Change Nephrotic Syndrome is unlikely to occur in this age group. The study documented that, in the subsequent age groups, the incidence of hypertension was higher corresponding to progressions in age. It was found that 10(16.4%) of the typical cases and 11(78.6%) of the atypical cases were hypertensive. This is in agreement with different world wide studies, which documented that hypertension is a stigma of Focal Segmental Glomerulonephritis.[5,6]. From the risk estimation table, it is estimated that atypical cases were at 9.429 times at higher risk of developing hypertension than typical cases. Since our patients are on long term steroids so the p-value is significant.

Table: RISK ESTIMATE

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for HTN (Persent / Absent)	056	013	227
For Cohort TYPICAL/ Atypical= Typical	504	320	793
For Cohort Typical/ Atypical= Atypical	9429	2918	30,466
N of Valid Cases	75		

Table 6: Investigations of the Study Group

	Typical/atypical	N	mean	Standard devaiation	t-value	p-value
Serum protein (gm/dl)	Typical	61	3.90	0,47	-0.036	0.972
	Atypical	14	3.91	0.73		
S.Albumin	Typical	61	2.46	0.38	1.502	0.137
(gm/dl)	Atypical	14	2.29	0.44		
S.Cholesterol	Typical	61	498.44	154.42	-1.295	0.199
Mg/dl	Atypical	14	556.50	135.81		
Urine protein/creatinine ration mg::mg	Typical	61	2616.2	2639.97	-1.385	0.170
	Atypical	14	3663.29	2092.76		
S. Creatinine	Typical	61	0.511	0.09	-1.350	0.181
Mg/dl	Atypical	14	0.550	0.10		

Hypoalbuminemia was a cardinal laboratory finding in this study, with mean of 2.46 gm/dl in typical and 2.29 gm/dl in atypical that was consistant with the international published data of ISKDC.[7]Like other, worldwide studies, our study demonstrated a significant hypercholesterolemia in patients with Nephrotic Syndrome with a mean of 498.44 mg/dl in typical and 556.50 mg/dl in atypical Nephrotic Syndrome. However the differences in the laboratory parameters in both the groups were not statistically significant. Renal function was normal in the study group at onset of Nephrotic Syndrome.

Table 7: Comparison of Renal sonography of the study Group

	Typical	Atypical	Total
Normal Sonogram	42 (68.9%)	5 (35.7%)	47 (62.7%)
Abnormal sonogram	19 (31.1%)	9 (64.3%)	28 (37.3%)

In this study it was confirmed that out of 75, 47(62.7%) patients had normal renal sonography, 28(37.3%) had abnormal sonography of which 26 patients had nephromegaly with increased renal echogenicity and 2 patients had congenital absent left kidney. Of the 28 patients with abnormal renal sonography, 19(31.1%) turned out to be typical cases and 9(64.3%) were atypical cases of Nephrotic Syndrome. Of the 47 patients with normal renal sonography 42(68.9%) were typical cases and 5 (35.7%) were atypical cases. Renal hyperechogenicity and nephromegaly was the major renal sonographic finding among the atypical cases of the studied group. p-value is 0.021 which suggest that nephromegaly with increased renal echogenicity is statistically significant.

Table 8: Comparison of Renal biopsy of the study group

	Typical	Atypical	Total
FSGN	1 (33.3%)	2 (66.7%)	3 (100%)
MCD	4 (57.2%)	3 (42.8%)	7 (100%)

Renal biopsy was carried out in 10(7.5%) patients of the study group and the histological findings were as follows; 7(70%) patients had histological features of Minimal Change and 3(30%) had Focal Segmental Glomerulosclerosis. Of the 7 patients with MCNS, 6(85.7%) patients were 3-6 years of age and 1(14.2%) was more than 8 years old. Out of 3 FSGS, 2(66.6%) patients belonged to age group of more than 8 years and 1(33.3%) was between 3-6 years of age. 20% of the typical presentation had FSGN and 60% with atypical presentation had histology suggestive of MCNS, hence from histology steroid responsiveness cannot be predicted. Renal biopsy was done in 5 cases with typical presentation with frequent relapse although they did not fit into atypical presentation. Out of 14 cases of atypical presentation biopsy was done in 5 cases as the parents did not give consent for biopsy in rest of the patients. It was found that, 4(57.2%) children with histopathologic type of Minimal Change Disease had typical presentation, while 3(42.8%) patients had atypical presentation. Renal biopsy was not done for the majority of the study group specially those children with typical presentation. Hence, this finding is strongly in agreement with the report of ISKDC, where, idiopathic minimal change disease accounts for approximately 90% of children under the age of 7 years and more than 50% in older children.[7]

Table 9: Comparison of Typical and Atypical Nephrotic syndrome and their relapses

Number of relapses	Typical	Atypical	Total
0	28 (45.9%)	6 (42.9%)	34 (45.3%)
1	7 (!!.5%)	1 (7.1%)	8 (10.7%)
2	13 (21.3%)	1 (7.1%)	14 (18.7%)
>/=3	13 (21.3%)	6 (42.8%)	19 (25.4%)
Total	**61 (100%)**	**14 (100%)**	**75 (100%)**

Of the total number of relapses, 8(10.7%) had only 1 relapse, 14(18.7%) patients had 2 relapses and 19(25.4%) patients had multiple relapses. The majority of study group were previously diagnosed patients of Nephrotic Syndrome were relapsing while 36% were newly diagnosed cases. This dominance of previously diagnosed cases is similar to the Nigerian study[6] but frequency was less. However, p-value was 0.556 which was not statistically significant. It was found that 6(42.8%) of atypical Nephrotic Syndrome were frequent relapser whereas 13(21.3%) of typical cases were frequent relapser. From the above findings we conclude that the number of relapses is more with atypical cases.

Table 9C: Comparison of Typical and Atypical Nephrotic Syndrome with Frequency of Relapse

	typical	atypical
Infrequent	48 (78.7%)	8 (57.2%)
Frequent	13 (21.3%)	6 (42.8%)

48(78.7%)of the typical cases were infrequent relapser, while 13(21.3%) were frequent relapser. 8(57.2%) of the atypical cases were infrequent relapser while 6(42.8%) were frequent relapser. p-value calculated was 0.183 which is statistically insignificant.From the above table we conclude that frequency of relapse could not be predicted from typical and atypical cases. It was found that the newly diagnosed patients were the majority in different age groups, however, the incidence of relapsers increased with the advance in age . This is in agreement with the international data and literature, where approximately 75% of patients who developed Nephrotic Syndrome were younger than 18 years and having the onset younger than 6 years of age. Minimal change Nephrotic Syndrome is a primary illness of preschool children, the peak of incidence is at 3-4 years with exception of Nephrotic Syndrome during the first year. Moreover, it is steroid sensitive nephrosis, had the pattern of remission and relapse till the disease resolve spontaneously towards the end of the second decade of life.[5,6]Of the total no of relapses ,29 of the patients had relapse within 1 year and 19 were frequent relapser who relapsed within 6 months

Table 9 D: Precipitating Causes Of Relapse

cause	frequency	Percent (n=41)
Lower respiratory tract infection	3	7.32%
Urinary tract infection	18	43.90%
Upper respiratory tract infection	28	68.29%
Diarrhea	2	4.80%
Non compliance	4	9.76%

Most common cause of relapse is attributed to URTI 28(68.29%) followed by UTI, LRTI and non compliance.

Table 10: Comparison of Classification: steroid sensitive, steroid resistant and steroid dependent Nephrotic Syndrome with typical and atypical case

	Typical	Atypical	
Steroid sensitive	47 (77%)	6(42.8%)	53 (70.7%)
Steroid resistant or dependent	14(23%)	8(57.2%)	22(29.3%)
Total	61(100%)	14(100%)	75(100%)

Of the total no of 75 patients in whom steroid was started, 53 (70.7%)patients were Steroid Sensitive. Remission occurred within 15 days of starting steroid. 10 (13.3%) were Steroid Resistant and remission was achieved after 8 weeks of starting steroid therapy. While 12 (16%) were Steroid Dependent and relapsed frequently on low dose steroid (0.5 mg/kg/day).Of the 53 Steroid Sensitive cases,47(77%) were typical cases and 6(42.8%) were atypical cases , whereas out of 22 Steroid Resistant/Dependent cases 14(23%) were typical and 8(57.2%) were atypical. Hence p-value of 0.008 was statistically significant. So typical cases were predictors of steroid responsiveness. This study correlates with the study conducted in Saudi Arabia, out of 87 children with Nephrotic Syndrome were retrospectively studied within the past 10 years. Outcome was 66(76%) responded to steroid therapy, while 20% were steroid resistant.[8] Prednisolone was given according to the final work of International Study of Kidney Disease in Children (ISKDC). Steroid therapy was begun at a dose of 2 mg/kg /day and usually proteinuria disappeared in the second week in many children. Thereafter, prednisolone was continued at the dose of 2mg/kg/day for 6 weeks and then the patients were switched to alternate day therapy at the dose of 1.5/kg/day for another 6 weeks. Prolongation of initial steroid therapy for 12 weeks or longer is associated with significantly reduced risk of relapse. The regimen used for treatment of relapsers was based on a recommendation of ISKDC. Prednisolone was given at a dose of 2 mg/kg/day and continued for three days after the urine has become protein free, thereafter, alternate day prednisolone 1.5mg/kg/day was given for four weeks. Treatment for relapse usually last for 5-6 weeks. The majority of the patients in the study group were steroid sensitive. Whereas,10 (13.3%) of atients were Steroid Resistant, 12(16%) of patients were Steroid Dependent. It was documented that, patients with congenital renal malformation (absent left kidney) were steroid responsive. Almost all patients, who were not biopsied were steroid responsive. This is strongly in agreement with the report of ISKDC, where patients who were 6 years old or yonger, not hypertensive, without persistent gross haematuria and having normal biochemical renal functions were likely to have Minimal Change Nephrotic Syndrome and who greatly benefit from empirical steroid therapy.[7] Of the total of 13 patients on levamisole, 8(61.5%) were typical cases and 5(38.5%) were atypical cases.Those patients who were frequently relapsing, steroid resistant or steroid dependent were given levamisoleat a dose of 2 mg/kg/day as single dose on alternate days. Of which 5(38.4%) has achieved complete remission after addition of this drug while the remaining 8(61.5%) patients has not achieved complete remission but frequency of relapse has decreased. Of the total 5 patients on complete remission on levamisole 3(60%) patients were typical cases and 2(40%) patients were atypical cases. This treatment was prescribed by the ISKDC report, which suggested that, approximately one-half of the initial non-responding to steroid would remit by 12-24 months following this therapy. The same proportion of patients were reported in ISKDC randomized trial, comparing the combination of levamisole and prednisolone with prednisolone alone.[7]

Out of 75 patients, 56(74.7%) of the patients went into complete remission during follow up with steroid therapy while 19(25.3%) have not undergone remission. Typical cases have 1.385 times higher chances of going into remission compared to atypical cases.

Table 12: Comparison of response to treatment with typical and atypical cases

outcome	typical	Atypical	Total
Complete remission	49 (80.3%)	7(50%)	56(74.7%)
Not achieved complete remission	12(19.7%)	7(50%)	19(25.3%)
Total	61(100%)	14(100%)	75(100%)

In comparison with other published data from Western World and Europan countries, there was excellent response to steroid therapy with remission rate of 80-87%. Relapses after complete remission with steroid therapy (3-4 monthly after stop steroids) following upper respiratory tract infections, UTI, LRTI was reported in (75.61%) of the studied group. This was more frequent than what was published in the report of ISKDC, where 10-20% relapsed several months after treatment was discontinued.[7] No evidence of chronic renal failure has been observed in the study. There was a high rate of remission among patients between 3-6 years of age, while this rate was observed to be decreasing among those above 10 years. This in agreement with ISKDC report, where the steroid responsive nephrotic syndrome occurs, when the child is younger than 5 years, because of the likelyhood, that the lesion being a Minimal Change Nephrotic

Syndrome is greater than 90%, while the risk of Focal Segmental Glomeruosclerosis (FSGS) and Membroproliferative Glomerulonephritis (MPGN) are 7% and 1% respectively. Conversly, when the disease onset occurs above 10 years old, the risk of MCNS drops to approximately 50% and the risk of MPGN approachs 30%.[7].In this study it was found that, the rate of remission with steroids declined among patients presenting with atypical features (hypertension at presentation or increasing age at presentation).A recent American study, hypothized the rapidity of initial steroid response without atypical features and concluded that patients with atypical features were more likely to be frequent relapser.[10]

Hypertension is the most common side effect of steroid 20(26.67%) followed by early cataract changes.

CONCLUSION

Nephrotic syndrome is a common childhood renal disease which presents at a peak age of 3-6 years and is characterized by an obviously male predominance. The pattern of clinical presentation of the Nephrotic Syndrome is generalized body swelling, followed by oliguria, URTI and abdominal pain. Abdominal pain was a significant complaint in atypical cases. The incidence of hypertension was high among atypical presentation and most common steroid side effect.Hypertension, pleural effusion, hepatomegaly and splenomegaly were dominant finding in atypical cases.Renal sonography showed nephromegaly with increased renal echogenicity was seen most commonly in atypical cases.Number of relapses were more in atypical cases as compared to typical cases. Most common cause of relapse is URTI followed by UTI. However frequency of relapse could not be predicted from typical and atypical cases. Majority of the typical cases were Steroid Sensitive while atypical cases were Steroid Resistant or Steroid Dependent. Typical cases were predictors of steroid responsiveness.

LIMITATIONS

Less number of patients, smaller study period with less follow up of patients upto 6 months only were the major limitation of this study. The total number of atypical cases were 14, but renal biopsy was done only for 5 patients as we could not get consent for renal biopsy as the parents were apprehensive of the invasive procedure.

REFERENCES

1. Bagga A, Srivastava RN. Nephrotic syndrome. Pediatric Nephrology. Fifth edition. Delhi : Jaypee;2011. 195-234.
2. Mahmud NU, Sharma JD, Azad AK, Barua CC, Kamal AH. Clinical and biochemical evaluation of atypically presented childhood nephrotic syndrome. JCMCTA 2010;21(1):56-61.
3. Malaga Gverrero S, Sanchez Jacob M, Santos Rodriguez F, *et al*.Nephrotic syndrome in infancy:clinical,therapeutic and follow up characterstics in 100 cases.An Esp Paediatr 1991;34:220-4.
4. Vijayalakshmi P, B. Chandrashekar, Venugopal S, Veeresh S.M."A Prospective Study of Nephrotic Syndrome in Children". Journal of Evidence based Medicine and Healthcare; Volume 2, Issue 22, June 01, 2015; Page : 3233-3237.
5. Shishkin AN, Sosunora AV, Romonona VI.Anti-infectious immunity and bacteriuria in patient with the nephrotic syndrome.Klin Med Mosk 1992;70(1):101-3
6. Okoro BA, Okafor HU, Nnoli LU. Childhood nephrotic syndrome in Enugu, Nigeria. West Afr J Med. 2000 Apr-Jun;19(2):137-41.
7. Taylor CM, Chapman S. The primary nephrotic syndrome in children. Identification of patients with minimal change nephrotic syndrome from initial response to prednisone. A report of the International Kidney Disease in children. J Pediatr. 1981 April; 98(4):561-4
8. Bagga A, Sinha A, Gulati A. Renal biopsy. Protocols in Paediatric Nephrology.First edition reprint. Greater Noida: CBS Publishers and Distributors;2015.14-18.
9. Zaki M,Helin I,Manandhar DS,Hunt MCJ,Khalil AF.Primary nephrotic syndrome in Arab children in Kuwait.Pediatr Nephrol (1989) 3:218-220.

Source of Support: None Declared
Conflict of Interest: None Declared