"CLINICAL PROFILE OF RENAL DISEASES IN CHILDREN IN TERTIARY CARE CENTRE"

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ABSTRACT

Introduction

Renal diseases in children and young adult can be difficult to diagnose early as it may present only with few symptoms, tends to have different course than adult and respond variously to different treatment. The pattern of renal disease in children is different from developing countries as compared to developed countries.

Objective

To know the current profile and aetiology of renal disease in children

Methodology

This is a hospital based prospective observational study carried from March, 2014 to February 2015 at BPKIHS. Patients with renal disease, both inpatient and outpatient from birth to 14 years of age were enrolled in the study. The diagnosis of renal disease was be made on clinical and laboratory criteria.

Result

Total of 120 patients were enrolled in our study which contributed to 3.74% of total admission. The commonest feature of presentation was edema (75%) , followed by fever (65%), hypertension (60%), decreased urine output (45%) and hematuria (25%) . Most common diagnosis was acute glomerulonephritis (40%) followed by Nephrotic syndrome (25%) and UTI (25%). Renal biopsy was done for 10% of cases and most of them were steroid dependant nephrotic syndrome. 5% of our cases expired because of MODS, sepsis and AKI.

Conclusion

Renal disease contributes to a large part of hospital pediatric admission as well as mortality and morbidity to the children. There is scanty data and need for detailed study on specific renal disease is of great need to plan optimal renal care for these children.

KEYWORDS

Acute kidney injury, children, renal diseases

INTRODUCTION

The profile of childhood renal disease varies from one geographic region to another and even within the same country.[1-5] The presentations are different from developing countries as compared to developed countries and reported pediatric renal disease varies from 4.5-8.7 % of total paediatric admission.[1,2] The variation is influenced by factors such as genetic predisposition, environmental background and to a large extent the level of awareness. Renal disease in children and young adult can be difficult to diagnose early as it may present only with few symptoms, tends to have different course than adult and respond variously to different treatment. Renal disease in hospitalised children and young adult can be difficult to diagnose. Unexplained fever or failure to thrive may be the only manifestation during infancy and early childhood. Standard definition of the following renal diseases were used in our study.

a) Renal Parenchymal Diseases
   Acute post infectious glomerulonephritis
   Nephrotic syndrome
   Immunoglobulin A nephropathy
   Henoch- Schonlein purpura nephritis
   Hemolytic Uremic syndrome
   Systemic Lupus Erythematosus
   Cystic kidney diseases
b) Diseases of Tubular Transport
   Renal tubular acidosis
c) Renal Failure
   Chronic kidney disease
   Acute kidney injury
d) Developmental and urologic disorders
   Obstructive uropathy
   Urinary tract infection
   Voiding disorders

Globally diseases of the kidney and urinary tract account for approximately 830,000 deaths and 18,467,000 disability-adjusted life years annually.[6] Data describing the spectrum of renal diseases in children in Nepal is scanty, because of lack of paediatric renal disease registry.[7] The prevalence of renal disease in asymptomatic school children is 0.71%.[8] In addition the annual inpatient burden of pediatric renal disease is about 6.3%.

METHODOLOGY

It was a cross sectional study done over a period of 1 year with the objective to quantify the occurrence of renal diseases in children at BPKIHS a tertiary referral centre of eastern Nepal and to know the current pattern and aetiology of renal disease to provide some insights to profile of renal diseases in children. We analysed all the patients coming to the department of paediatric and adolescent medicine diagnosed with renal disease over a period of one year from 1st March 2014 to 28th February 2015 at BPKIH. Patient managed as outpatient as well as hospitalized were included. Those denying for the consent and readmission were excluded from the study. The diagnosis of renal disease was made on history, clinical presentation and laboratory criteria. The pattern of presentation, physical examination and relevant investigation was recorded in a proforma. The children were divided in to several age groups. BMI, Height percentile and BP percentile were calculated according to standard reference. Initial investigation such as complete blood count, erythrocyte sedimentation rate, urine analysis, urine culture and sensitivity, serum electrolytes, blood urea and serum creatinine and further investigation done as needed including renal ultrasonography, intravenous urogram, micturating cystourethrography, serum cholesterol and protein, Anti Streptolysin O titer, 24 hour urinary protein estimation, dsDNA, renal biopsy and Hepatitis surface antigen was recorded.

Diagnosis and management including special management like dialysis was recorded. Each patient was followed from admission to discharge on a daily basis and discharged cases were kept under regular follow up in our special Renal OPD.

Data regarding information about demography, clinical features, examinations, investigations, and main hospital discharge diagnosis, use of invasive devices, referral and final outcome were prospectively collected and recorded in a pre designed proforma. Informed written consent was taken and the ethical codes were followed. Further written consent was taken while performing renal biopsy. Relevant data were entered from proforma in Excel and a master chart was prepared. Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 20.0. For Descriptive statistics mean, standard deviation (SD), range, percentage, proportions were calculated. And also graphical as well as tabular presentations were made while preparing results. For inferential statistic in comparing categorical variable Pearson's chi-square test was used and to compare mean independent T- test and ANOVA test were used at 95%confidence interval. Statistical significance was considered at p values <.05 and that of <0.001 was termed as highly significant.

RESULTS

During the study period a total of 120 cases with renal disease were enrolled. The age and sex distribution of cases is shown in table 1.

Table 1: Age and Sex distribution

Age (years)	Female	Male	Total
	N(%)	N(%)	N(%)
1-5	6(5)	9(7.5)	15(12.5)
6-10	24(20)	33(27.5)	57(47.5)
11-15	21(17.5)	27(22.5)	48(40)
Total	**51(42.5)**	**69(57.5)**	**120(100)**

Edema was commonest presentation (71.42%) followed by fever (59.60%). Urinary symptoms were oliguria, hematuria, and dysuria present in 45%, 25%and 12.5% respectively (Table-2).

Table 2: Relative frequency of symptoms at presentation

Symptoms	Number (%)
Edema	90(75)
Fever	78(65)
Oliguria	54(45)
Hematuria	30(25)
Pain abdomen	24(20)
Sore throat	24(20)
Dysuria	1512.5)
Pyoderma	12(10)
Dyspnea	11(9.1)
Convulsion	10(8.3)
Joint pain	9(7.5)

Table 3: Different renal diseases

Diseases	Frequency (%)
Acute glomerulonephritis	48(40)
Nephrotic syndrome	32(26.66)
Associated Acute kidney injury	30(25)
Obstructive uropathy	2(1.66)
Chronic kidney disease	2(1.66)
Polycystic kidney disease	1(0.83)
Nephrolithiasis	2 (1.66)
IGA nepropathy	1(0.83)
Haemolytic uremic syndrome	2(1.66)
Total	**120(100)**

Diagnosis of renal disease on the basis of clinical and laboratory criteria was made (Table-3). Most common renal disease was Acute glomerulonephritis (AGN) making 40% followed by nephrotic syndrome (NS) (26.66%). Out of 48 cases of AGN, post infectious glomerulonephritis (PIGN) was the commonest cause in 40 cases followed by SLE Nephritis in 5 cases and HSP Nephritis in 3 cases.

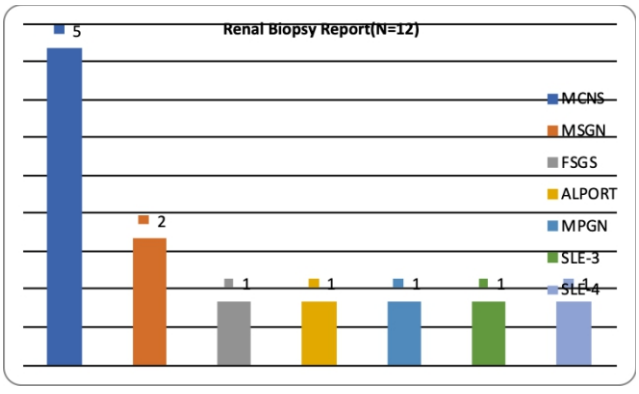

Figure 1: Renal Biopsy Report

Renal biopsy as a part of diagnostic work-up was done in 12 paients. The commonest finding in renal biopsy was minimal change disease (41.66%), followed by mesangio proliferative glomerulonephritis (MPGN) (16.66%) and with 1 case each of FSGS, ALPORT, MPGN, SLE-3 and SLE-4. Out of 120 cases, 104 (86.66%) cases improved and discharged home and 8.33% cases were referred to other centre for biopsy and advanced treatment. While 6 patients expired with cause of death as shown in table 7.

Table 4: Causes of expired cases

Diagnosis	No.	Percent (%)
SRNS	1	16.66
Lupus Nephritis	1	16.66
Sepsis(MODS)	2	33.33
Pre-renal (dehydration)	1	16.66
DKA	1	16.66
Total	**6**	**100**

Since the most common disease were AGN and NS these patients were further categorised as shown in table 5. Most cases of nephrotic syndrome presented as 1st episode (31.25%) with mean age of 5 years followed by infrequent relapse nephrotic syndrome (26.66%).

Table 5: Categorisation of Nephrotic Syndrome (NS) (N=32)

Category	Frequency	Percentage	Common mean age group
Ist episode of NS	10	31.25	(5-10), 5yrs
Frequent relapse NS (FRNS)	4	12.5	(5-10), 8yrs
Infrequent relapse NS (IFRNS)	8	25	(5-10), 8yrs
Steroid dependent NS (SDNS)	7	21.87	(5-10),9yrs
Sterois resistant NS (SRNS)	3	9.37	(10-15),10yrs
Total	**32**	**100**	**(5-10), 8yrs**

Table 6: Characteristics of nephrotic syndrome(N=32)

Characteristics		Number	Percentage
Age group(5-10yrs)		29	90.62
Sex	Male	20	62.5
	Female	12	37.5
Hypertension (>95th centile)		8	25
Renal dearrangement		7	21.87
Albuminuria (2+)		21	65.6
Hematuria		5	15.62

As shown in Table 6, albuminuria (65.5%) was one of the commonest presentations of nephrotic syndrome followed by hypertension and renal derangement.

Table 5: Characteristics of Glomerulonephritis (N=48)

Characteristics		Frequency	Percentage
Age group (years)	1-5	5	10.41
	5-10	18	37.5
	10-15	25	52.08
Sex	Male	23	47.91
	Female	25	52.08
Hypertension		42	87.5
Urine analysis	<or=2 protein	29	60.41
	>2 protein	19	39.58
	Hematuria	41	85.41
	Pyuria	15	31.25
Renal derangement		19	39.58
Complication at presentation	AKI	3	6.25
	ALVF	1	2.08
	HTN	5	10.41
	Encephalopathy	4	8.33
	Nephrotic range proteinuria	4	8.33

As depicted by table 7, common age group for AGN was 10-15 years, with average age at 9yrs. Hypertension was observed in 87.5% along with hematuria in 85.41% and proteinuria < or equal to 2 in 60.41% and rena derangement in 39.28%. The most common complication being HTN encephalopathy (10.41%), followed by CCF (8.33%), nephrotic range proteinuria (8.33%) and AKI and ALVF.

DISCUSSION

Pediatric renal diseases are common in our society. Diagnosis is difficult at times due to diverse clinical manifestation. Thus early diagnosis and intervention can be boosted by the knowledge of current trends in paediatric renal disease. In our series, edema was the commonest symptom at presentation (75%) followed by fever (65%), oliguria (45%) and hematuria(25%). 60% were hypertensive in our study. In a study conducted by Malla T et al[7] 51% were fever, 46% were edema, followed by hypertension (39%), hematuria (38%) and oliguria (31%). So edema, fever, hypertension, oliguria were higher in our study whereas hematuria were less in our study. Out of 120 cases enrolled in the study, AGN was the commonest renal problem (40%). The causes were infectious PIGN, Lupus nephritis, HSP nepritis. The results were comparable to study done by Bhatta NK et al[3].

Regarding gender, in our study, 57.5% were male and 42.5% were female. In nephrotic syndrome were 63.33% male and 36.66% were female which is comparable in study done by Malla T et al[7] While in AGN 47.91% were male versus 52.08% were female, but in contrast female are less compared to male in same study.

Among cases of AGN, the causes were infectious PIGN, Lupus nephritis, HSP nephritis. The results were comparable to study done by Bhatta NK et al[3] and A.Y. Elzouki et al.[12] In our study, after AGN, neprotic syndrome was the second most common disease which is similar to study by Etuk IS et al[14] but different from a study done by Zhongguo et al[15] where nephrotic syndrome accounts for most of the cases. In the developing country like ours, PIGN still accounts for the commonest cause of renal disease. Of the majority 1st episode were NS(33.33%), followed by IFRNS(26.66%), SDNS(20%), FRNS(13.33%) were modes of presentation. In biopsy MCNS(42.66%) were most commonly present followed by MSGN(16.66%) and FSGN(8.33%) which is similar to as reported earlier in other studies.[16,17]

Common mode of presentation of AGN were hypertension (87.5%), followed by hematuria (85.41%), proteinuria less than or equal to 2 (60.41%). Among complication HTN encephalopathy (10.41%) most common followed by CCF (8.33%) and nephrotic range proteinuria (8.33%). Isaac E. Ocheke et al[9] documents hypertension (92.3%) as commonest presentation followed by oliguria (88.5%) and hypertensive encephalopathy (23.1%) being the commonest complication. The finding suggests that modes of presentation were similar but relatively lower complication in our study.

In our study, 25% cases of UTI were present (not shown in table in results). UTI was seen along with other renal pathology and not as an isolated finding. The occurrence was comparable to Ibadin et al (32%),[10] but lower than Benin and Eke et al.[11] and Bhatta NK.[3] Amongst the presentation, AKI present in 30 cases (25%), 2(1.66%) cases each of obstructive uropathy, chronic kidney disease and haemolytic uremic syndrome. One cases each of polycystic kidney disease, nephrolithiasis and IGA nephropathy. Elzouki[12] found 0.8% cases of CKD. Malla T et al [7] also documented 3.5% cases of CKD. Bhatta NK[3] reported CKD occurrence to be 4.2%, etiology being urological malformation secondary to glomerulonephritis. 5% expired amongst the cases and were referred. Most cases expired due to AKI, sepsis and MODS similar to AKI leading to death according to Adedoyin OT et al.[13]

CONCLUSION

Late presentation and inability to afford interventional measures including renal replacement therapy were the main constrain among these patients. Implication of this findings emphasis need of routine screening for renal disease so that evidence of kidney damage can be identified early enough.

The early detection of renal diseases in childhood leads to better therapy and reduction in morbidity and mortality. The present study depicts clinical profile of renal disease and attempts to find out burden of renal diseases. As facilities for treatment is either too expensive or not available, many children die before getting optimal treatment or present late in the course of disease, where timely intervention is required to improve outcome.

LIMITATION OF STUDY

This study has smaller sample size so to know further pattern of renal disease in pediatric population large scale study is to be done.

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CONFLICT OF INTEREST

None

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