

Magnitude and clinico-etiological profile of renal disorders in children – a retrospective study in tertiary care hospital

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Abstract

Objectives: This study was undertaken to know about the magnitude, clinical spectrum and etiology of renal diseases in children in a tertiary care teaching hospital. **Materials and Methods:** This is a hospital based, retrospective, descriptive study, done on children with renal diseases admitted to pediatric department of Velammal Medical College, Madurai from Jan 2016 – Dec 2016. **Results:** Renal disorders are contributing to 4.6% of total admissions. Males (61.1%), outnumbered, females (38.9%) in our study. Children less than 5 years of age were most commonly affected (47%). Most common symptom in children with renal disorders were burning micturition/increased frequency/urgency (36.4%), fever (29.4%), decreased urine output (28.4%), abdomen distension (25.4%), pain abdomen (18.4%), vomiting (17.6%), red/cola coloured urine (11.6%). The most common sign observed was peri-orbital puffiness (22.3%), pedal edema and ascitis in (18.8%) each, tachypnea in (10.5%) of children. The most common etiology of renal disorders was UTI (36.4%), PUJ obstruction (18.8%), Nephrotic syndrome in (16.4%), and renal calculi (14.1%). **Conclusion:** Our present study has revealed that, the magnitude of childhood renal disorders is in the increasing trend, associated with wide clinical spectrum and predominance of infective etiology. Emphasis is therefore placed on high index of suspicion for atypical presentation of renal disorders and preventing progression to chronicity.

Keywords: Children; Acute kidney injury, UTI, Chronic kidney disease

Introduction

Renal diseases are major causes of morbidity and mortality in hospitalized pediatric patients. Paediatric patients with renal diseases, especially younger ones may present with nonspecific signs and symptoms unrelated to urinary tract. Unexplained fever or failure to thrive may be the only manifestation. Paediatricians, therefore, should be familiar with the modes of presentation of renal disease and should have a high index of suspicion of these conditions [1]. Studies from different geographical areas around the world have reported variable patterns of renal diseases in paediatric population. These variations could be related to

genetic predisposition, environmental factors, or lack of awareness about importance of early diagnosis of such disorders [2]. The patterns of renal disease in children are different from developing countries as compared to developed countries and paediatric renal disease form about 4.5-8.7% of total paediatric admission. Renal disease in hospitalized 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 [3]. Renal disease in children is an important group of disorders from both mortality and morbidity point of view, incurring significant expenses on both family and health services [4]. Analysis of various registries indicates that the epidemiology and spectrum of renal disease

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in the pediatric age group differ from one geographic place to another [5]. Acute kidney injury (AKI), formerly known as acute renal failure is common in children admitted to hospitals. In contrast to developed countries where AKI is more common in older children admitted to intensive care units with multiple co-morbidities and multi-organ failure, previous studies of AKI in children in developing countries, documented single disease entities such as diarrhoeal diseases, malaria, hemolytic uremic syndrome and acute glomerulonephritis as the major causes of AKI [6]. Previous studies have reported that the largest proportions of CKD cases in children are caused by congenital anomalies of the kidney and urinary tract, 30-60%; hereditary nephropathies, 10-35%; and glomerulopathies, 3-25% [7].

Materials and Methods

Study design: This is a retrospective, descriptive study.

Setting: Hospital based study in a tertiary care centre in south India

Participants: Children aged 3 months to 15 years of age admitted and treated in pediatric department from January 2016-December 2016 in velammal medical college, Madurai.

Inclusion Criteria

- 3 months to 15 years old children presenting to the pediatric department with renal diseases.
- Complete patient information along with the investigation reports in the medical records.

Results

Out of 2259 children, admitted in pediatric ward from Jan 2016- Dec 2016, about 85 children had renal disorders, with 104 admissions (some of the renal cases had repeated admissions) contributing to 4.6% of the total number of admissions. The analyses of 85 children with renal disorders are given below.

Table-1: Distribution of children according to demographic data.

Demographic data	Number	Percentage
Gender		
Male	52	61.1
Female	33	38.9
Age group		
3 months – 5 years	40	47
6-10 years	28	32.9
11-15 years	17	20

According to table 1- it was seen that males 52 (61.1%), outnumbered female children 33(38.9%). Renal disorders was most commonly seen in children less than 5 years of age 40 (47%), followed by, children of 6-10 years of age 28 (32.9%) and 11-15 years of age 17 (20%).

Exclusion Criteria

- Children less than 3 months and more than 15 years of age.
- Medical records with incomplete information/ Evaluation done in other hospitals.

Variables: Magnitude, clinical spectrum, etiology

Data source: The patients needed for this study were identified by reviewing our department nominal register. The hospital records of the children with renal diseases were retrieved from the medical records department following due permission.

Study size: 85 children

Quantitative variable: magnitude

Statistical analysis: simple proportion test.

The following data was collected from the medical records department (MRD) about the children included in this study.

- Age, sex, symptoms and signs of renal diseases.
- Results of urine tests (culture, microscopy, dipstick test, protein quantitative test), blood test (complete blood count, peripheral smear, urea, creatinine, electrolytes, albumin, ASO titers, CRP test, autoimmune antibodies, C3, C4 levels, serum calcium /uric acid levels), imaging studies (abdominal ultrasound, micturating cystourethrogram, DMSA / DPTA scans) cystoscopy, renal biopsy report was noted.

Table-2: Distribution of children according to clinical profile of renal disorders.

Clinical profile	No.	Percentage
Symptoms		
Burning-micturition/increase frequency/urgency	31	36.4
Fever	25	29.4
Decreased urine output	24	28.4
Abdomen distension	22	25.4
Pain abdomen	16	18.4
Vomiting	15	17.6
Red/cola coloured urine	10	11.6
Decreased-appetite/poor feeding	9	10.5
Dribbling of urine	7	8.2
Altered sensorium/irritability	3	3.5
Bed wetting	2	2.3
Deformity of limbs	2	2.3
Headache	2	2.3
Seizures	1	1.1
Signs		
Peri orbital puffiness	19	22.3
Pedal edema	16	18.8
Ascitis	16	18.8
Tachypnea	9	10.5
Pallor	5	5.8
Short stature	4	4.7
Renomegaly	3	3.5

According to table- 2, it was observed that, most common symptom in children with renal disorders were, symptoms of UTI in 31 (36.4%), fever in 25 (29.4%), decreased urine output 24 (28.4), abdomen distension in 22 (25.4%), pain abdomen 16 (18.8%), vomiting 15 (17.6%), red/ cola coloured urine 10 (11.6%).

Table-3: Distribution of children according to etiology of renal disorders.

Etiology	No/percentage
UTI	31 (36.4)
PUJ obstruction/hydronephrosis	16 (18.8)
Nephrotic syndrome	14 (16.4)
Renal calculi	12 (14.1)
AGN	5 (5.8)
Congenital anomalies	3 (3.5)
Right ureter double moiety	
Ureterocele	
Ectopic ureter	
HUS	3 (3.5)
Nocturnal enuresis	3 (3.5)
Renal rickets	2 (2.3)
VUR	2 (2.3)
AKI	2 (2.3)
CKD	2 (2.3)
Urethral-stricture(posttraumatic)	1(1.1)
Wilms tumor	1(1.1)
Neuroblastoma	1(1.1)
Rhabdomyosarcoma-bladder	1(1.1)

The most common sign observed was, peri-orbital puffiness in 19 (22.3%), pedal edema in 16 (18.8%), ascites in 16 (18.8%), tachypnea in 9 (10.5 %), pallor in 5 (5.8 %).

This table depicted that the most common etiology of renal diseases were UTI in 31 (36.4%), PUJ Obstruction in 16 (18.8%), nephrotic syndrome 14 (16.4%), renal calculi in 12 (14.1%), AGN in 5 (5.8%).

Other uncommon etiologies were, post traumatic urethral stricture, wilms tumor, neuroblastoma, rhabdomyosarcoma of bladder in (1.1%) each.

Discussion

The common causes of ARF in children include acute tubular necrosis secondary to various causes (including congestive cardiac failure and sepsis), haemolytic uremic syndrome, and glomerulonephritis and urinary tract obstruction. Ischemia, toxins as well as primary parenchymal disease, have to be considered.

The most common symptom of renal disorders noted in our study was history suggestive of UTI (36.4%), fever (29.4%), decreased urine output (28.4%), abdomen distension (25.4%), pain abdomen (18.8%), vomiting (17.6%). Most common sign noted was periorbital puffiness (22.3%), pedal edema (18.8%), ascites (18.8%). This is similar to other studies [1,2]. The high incidence of ARF due to infective diarrhoeas and dysentery reflects poor socioeconomic and hygienic conditions, inadequate facilities in rural areas, delay in seeking medical advice [8,9]. Childhood CKD presents clinical features that are specific and totally peculiar to the paediatric age group, such as the impact of the disease on growth. It is an important cause of morbidity and mortality in children worldwide. Congenital disorders, including congenital anomalies of the kidney and urinary tract and hereditary nephropathies, are responsible for about two thirds of all cases of CKD in developed countries, while acquired causes predominate in developing countries [10-12].

It was observed that the magnitude of renal disorders was 4.6% (104 out of 2259 admissions), during the study period of 12 months. Other authors have observed similar observations [13-15]. In contrast, another study has shown that, paediatric renal disorders accounted for only 1.1% of the total outpatients and hospital admissions [19].

In our study it was seen, that males (61.1%) outnumbered female children (38.8%) in prevalence of renal disorders. Similar results were reported by

various authors [16-20]. The most common age group affected in our study was children less than 5 years of age (47%), followed by 6-10 years (32.9%), & 11-15 years of age (20%). But, in contrast, study done in Kashmir showed that, 6-12 years of age were most commonly affected by renal disorders [20].

The most common etiology of renal disorders revealed by our study was UTI (36.4%). This was followed by PUJ obstruction with hydronephrosis (18.8%), nephrotic syndrome (16.4%), renal calculi (14.1%), AGN (5.8%), congenital anomalies, HUS and nocturnal enuresis in (3.5%) each. Other etiologies were AKI (pre-renal) & CKD in (2.3%) each. Malignancies such as wilms tumor and neuroblastoma and rhabdomyosarcoma of bladder was seen in (1.1%) each. Similar to our study, UTI was the most common cause of renal disorder observed in various authors [17,18]. But, UTI was less common (8.9%) etiology observed in Nigeria [25]. In contrast to our study, nephrotic syndrome was the most common cause of paediatric renal admissions in other countries [22,23,26]. Ethiopian study has revealed congenital anomalies as the most common (26.8%) cause of renal disorder in children, which was less common (3.5%) in our study. A retrospective study in contrast, has observed acute glomerulonephritis (36.9%) as the most common childhood renal disorder [25].

As about 2.3% of children in our study, had acute kidney injury (pre-renal), related to volume loss in diarrhea, because of late referral. But HUS complicating bacillary dysentery was the most common cause of acute renal failure in other studies [21,24].

The major limitation of our retrospective study was lack of follow up and analysis of outcome in children with renal disorders. In addition outpatient records were excluded. The magnitude reported in this study, may therefore be an underestimation.

Conclusion

Our present study has revealed that, the magnitude of childhood renal disorders is in the increasing trend, associated with wide clinical spectrum and predominance of infective etiology. Emphasis is therefore placed on high index of suspicion for atypical presentation of renal disorders and preventing progression to chronicity.

But since this is a retrospective study with small sample size, the authors would like to recommend for further detailed prospective studies in future, with emphasis on morbidity and mortality point of view, to plan provision of optimal health care services for children with renal disorders.

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Abbreviation

UTI- urinary tract infection
 PUJ- pelvi-ureteric junction
 AGN- acute glomerulonephritis
 HUS- hemolytic uremic syndrome
 VUR- vesico-ureteric reflux
 AKI – acute kidney injury
 CKD – chronic kidney disease

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