

## Chronic Renal Failure in Children Admitted to Children Welfare Teaching Hospital

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### ABSTRACT:

#### BACKGROUND:

Chronic renal failure (CRF) is a devastating medical, psychological, social and economic problem for patients and their families.

#### AIM OF THE STUDY:

The aim of the present study was to determine the etiology, clinical presentations and highlight treatment modalities used for patients with CRF admitted to children welfare teaching hospital.

#### PATIENTS' AND METHODS:

A Retrospective study of all children with CRF admitted to children welfare teaching hospital during the period from 1<sup>st</sup> of jan.2002 to 1<sup>st</sup> of jan.2007 were included in the study. CRF was defined as having glomerular filtration rate less than 80ml /min/1.73m<sup>2</sup>.

#### RESULTS:

The study group included 50 patients with CRF below 17 years of age, 29(58%) males and 21(42%) females. Male: female ratio 1.38:1

Their age ranged between (1m -17 year). Twenty (40%) patients were above 10 years of age. In this study the mean glomerular

Filtration rate was (29.5 + 18.5ml /min/1.73m<sup>2</sup>).

Congenital abnormalities were the major cause of CRF, it was found in 18 patients (36%), followed by hereditary conditions in 14 (28%) patients and glomerular diseases in 13 (26%) patients.

The most common presenting symptom was anemia. It was found in 16(32%) patients followed by hypertension in 12 patients (24%) and failure to thrive in 12(24%) patients.

Twenty-one patients (42%) received peritoneal dialysis, four (8%) received hemodialysis. Renal transplant was done to 3 patients (6%).

#### CONCLUSION:

Congenital abnormalities was to the most common cause of CRF in our patients. Establishing registry system that provide detailed information concerning the incidence, causes, and overall outcomes of mild to severe renal functional impairment acquired during developmental age can clarify further the natural history of the disease and the factors that influence its course.

**KEY WORDS:** chronic renal failure, children

### INTRODUCTION:

Chronic renal failure (C.R.F) is defined as slowly progressive irreversible decrease in glomerular filtration rate for months to year. <sup>(1, 2)</sup>

The real incidence of chronic renal failure in children is uncertain; Most estimates are based on the number of patients accepted into dialysis and transplantation programs. <sup>(1, 3)</sup>

Causes of CRF in children related to the age of the child at which renal failure occurred. Between 1<sup>st</sup>.year and 10 years congenital diseases and obstructive abnormalities are most common causes of CRF, after 10 years acquired diseases such as focal segmental glomerulosclerosis, chronic

glomerulonephritis, reflux nephropathy, hereditary diseases (eg. Alport syndrome ,cystic diseases )and hemolytic uremic syndrome are common <sup>(1,4,5,6)</sup>

In up to 10% of cases the causes of CRF are unknown. <sup>(7)</sup>

In each category, renal function progressively deteriorate and is accompanied by contraction of renal parenchyma with subsequent end stage renal failure. <sup>(6)</sup>

The children with CRF may present with various clinical abnormalities dependent on the underlying disease and the progressive loss of renal metabolic and haemostatic function, <sup>(1, 4, 8)</sup>

The GFR is considered the best measure of overall kidney function. In February 2002, the Kidney Disease Outcome Quality Initiative of the National Kidney Foundation published clinical practice guidelines on chronic kidney disease and it is

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included staging CRF patients based on the glomerular filtration rate <sup>(9)</sup>.

The management of children with chronic renal failure and their complex problems requires a team of pediatric nephrologists, clinical nursing specialists, nutritionists, social workers, psychiatrists, child life and occupational therapists and various other professionals <sup>(1,5)</sup>.

### PATIENTS AND METHODS:

A Retrospective study of all children with chronic renal failure admitted to child welfare teaching hospital during the period from 1<sup>st</sup> of Jan. 2002 to 1<sup>st</sup> of Jan. 2007 were included in the study.

Chronic renal failure was defined as having glomerular filtration rate (GFR) < 80 ml/min/1.73m<sup>2</sup>. The following informations were taken from parents and patients files:

Age and gender.

Causes of CRF (primary diagnosis).

Clinical presentation.

Serum urea and creatinine at time of recording.

Height.

Duration of follow up.

Treatment.

G.F.R was calculated for all patients from serum creatinine and height based on Schwartz formula (1).

G.F.R (ml/min/1.73m<sup>2</sup>) =  $\frac{k \times \text{height (cm)}}{\text{Serum creatinine (mg/dl)}}$

Serum creatinine (mg/dl)

K=0.45 for term infant < 1 yr.

=0.55 for children and adolescent females.

=0.70 for adolescent males.

Patients with chronic renal failure were divided to four stages according to K/DOQI (The kidney disease outcomes quality initiative). <sup>(9)</sup>

I- kidney damage with Mild decrease in GFR (60-80ml/min/1.73m<sup>2</sup>).

II- Moderate decrease in GFR (30-59 ml/min/1.73m<sup>2</sup>).

III- Severe decrease in GFR (15-29 ml/min/1.73m<sup>2</sup>).

IV-End stage renal disease (ESRD) GFR < 15 ml/min/1.73m<sup>2</sup>.

The results are given in mean.

### RESULTS:

1-In this study, a total of 50 patients with CRF are distributed according to their gender. We found that males are more affected than females.

Table (1): Distribution of CRF children by gender.

		No. Of Patients (%)	
Sex	male	29	(58)
	female	21	(42)
Total		50	(100)

Male: Female ratio 1.38 / 1

2-According to their age and gender distribution, our patients were distributed into 4 groups.

- Those with age group (< 1 yr), one (2%) patient were male and one (2%) patient was a female.

-Patients with age group (1-5 yr) included 9 (18%) males and 4(8%) females.

-Those with Age group from (6 –10 yr.), 9 (18%) patients were males and 6(12%) females.

-Patients with age group more than 10 year, 10 (20%) patients were males and 10 (20%) patients were female.

Table No. (2) Distribution of patients with CRF according to their age and gender.

Age	gender		Total No.(%)
	Male No.(%)	Female No.(%)	
< 1 year	1(2)	1(2)	2(4)
1-5 years	9(18)	4(8)	13(26)
>5-10 years	9(18)	6(12)	15(30)
>10 years	10(20)	10(20)	20(40)
Total	29(58)	21(42)	50(100)

3-According to glomerular filtration rate (GFR) level, patients classified to four stages. From mild stage to end stage renal disease (ESRD).

We found that number of patients with moderate stage renal insufficiency group were 16 (32%).

Followed by severe stage 15(30%) patients and the end stage group were 10 (20%) patients and only 9(18%) patients were in mild stage renal insufficiency, as shown in table (3).

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**Table No.(3) distribution of patients according to stages of CRF**

Stages	No.(%)
Mild (GFR 60-90)	9(18)
Moderate (GFR 30-59)	16(32)
sever(GFR 15-29)	15(30)
ESRD(GFR<15 or dialysis)	10(20)
Total	50

4- In this study ,congenital abnormalities of the urinary tract was the most prominent cause Of CRF, it was found in 18(36%) patients.

Neurogenic bladder found in 6(12%) patients ,and it was the most common form of congenital abnormalities.

Hereditary diseases were found in 14(28%) patients, and the cystinosis was the most frequent cause of hereditary diseases, it is found in 8(16%) patients.

Glomerular diseases were the third common etiology of CRF, It was found in 13(26%) patients, and nephrotic syndrome with focal segmental glomerulosclerosis has highest frequency, It was found in 6 (12%) patients, as shown in (Table 4).

**Table 4:- Distribution of patients according to causes of CRF.**

causes	No.	(%)
I-congenital abnormalities	18	36
a-Neurogenic bladder	6	12
b-Hypoplasia	4	8
c-Reflux nephropathy	5	10
d-Obstructive uropathy	2	4
e-Renal agenesis	1	2
II-Hereditary conditions	14	28
a-cystinosis	8	16
b-Oxalosis	2	4
c-Nephrocalcinosis	2	4
d-Alport disease	2	4
III-Glomerulopathy	13	26
a- focal segmental glomerulosclerosis	6	12
b- membranoproliferative glomerulonephritis	3	6
c- Diffuse mesangial sclerosis	2	4
d- Poststreptococcal glomerulonephritis	1	2
e- Henoch-shonlein purpura	1	2
IV -Hemolytic uremic syndrome	3	6
V- Idiopathic	2	4
Total	50	100

5-In this study ,we found that Congenital abnormalities was the major cause of CRF in the age group less than 10 years, it was found in total 14(28%) patients, while the hereditary diseases in 10(20%) patients.

For the age group more than 10 years ,the glomerular disease was the most common cause of CRF, it was found in 7 (14%) patients. The hereditary diseases as a cause of CRF was found mainly in the age group 1-5 years in 7 (14%) patients, as shown in table (5).

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**Table 5: - Causes of chronic renal failure at different age groups.**

causes	<1 year No. (%)	1-5 years No. (%)	>5-10 years No. (%)	>10 years No. (%)	Total No. (%)
Congenital abnormalities	2(4%)	5 (10)	7(14%)	4(8%)	18(36)
Hereditary diseases	0	7(14)	3(6%)	5(10%)	14(28)
Glomerular Diseases	0	1(2)	4(8%)	7(14%)	13(26)
Hemolytic uremic syndrome	0	0	1(2%)	2(4%)	3(6%)
Idiopathic	0	0	0	2(4%)	2(4%)

6-In this study the anemia was the most frequent clinical manifestation in patients with CRF, it was found in 16(32%) patients, Followed by hypertension in total 12 (24%) and failure to thrive in 12 (24%) patients. Polyurea and polydipsia found in 2(4%) patients only.(Table 6)

**Table (6):- Distribution of clinical features in patients according to their age groups**

Clinical features	> 1 year No. (%)	1-5 years No. (%)	6-10 years No. (%)	>10 years No. (%)	Total No. (%)
Anemia	0	4(8)	4(8)	6 (12)	12(32)
Hypertension	0	6(12)	6(12)	5(10)	12(34)
Failure to thrive	0	6(12)	6(12)	1(2)	5(26)
Polyur&polydypsia	0	1(2)	0	1(2)	
Oedema	0	0	1(2)	0	
Acidotic breathing	1(2%)	0	1(2)	0	
Total	1(2%)	14(28)	19(38)	16(32)	

7- In this study, we have 21 patients( 42%) received peritoneal dialysis and 22 patients( 44%) still on conservative medical line of management and only 4 patients(8%) had vascular access and put on hemodialysis program. Finally, we have 3 patients with CRF under went live (related and unrelated) renal transplantation as shown in table (7).

**Table 7:- Distribution of number of patients according to renal replacement therapy**

Mode of renal replacement therapy	No. of patients (%)
Conservative medical treatment	22(44)
Peritoneal dialysis	21(42)
Hemodialysis	4(8)
Renal transplant	3(6)

### DISCUSSION:

The existing studies concerning CRF in children concentrate on the late and more severe stages of renal impairment. The reports may underestimate the true incidence because historically not all infant and children with CRF have been offered end – stage therapy.<sup>(10)</sup>

In this study, CRF was more predominant in males (58.0%) than females. This result is in agreement with the study done by Jameela (2006)<sup>(11)</sup>.

Mean GFR in this study was 29.5 + 18.5 ml/min/1.73m<sup>2</sup>. And after classification of our patients according to their stages of CRF depending on their GFR (9), we noticed that 16(32%) patients were in moderate stage as shown

in table(3).This result differ from other study done by Sakhujav who noticed that large percent of CRF were in ESRD<sup>(13)</sup>, but it is in agreement with study done by Edward Saca at King Hussein medical center.<sup>(12)</sup>

Congenital abnormalities in this study were the prominent etiology for C.R.F, which is seen in(36%) of patients.

Early detection and treatment often can prevent or delay some adverse outcomes of chronic kidney disease. Screening for urinary tract anomalies by antenatal ultrasonography is likely to detect significant structural disorders which can be treated postnatally.<sup>(1)</sup>

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Reflux nephropathy was found in (10%) of our patients, while in Turkish children (1995) vesicoureteric reflux (VUR) found in (32.4%) which was a major cause of CRF in their study<sup>(14)</sup>. Hereditary nephropathy is cause of CRF in 14 (28%) of patients in our study and Glomerulopathies were found in 13(26%) of our patients. This result nearly similar to study done for Tunisian children that showed hereditary nephropathy (29%) and (19%) for the Glomerulopathy.<sup>(15)</sup>

In this study ,Focal segmental glomerulosclerosis (FSGS) was a major cause of CRF in patients with nephrotic syndrome, it was found in 6(12%) of cases and this is in agreement with studies done by Mark Mitsnifes et al. and the study of Dr. Janan, in which FSGS account (7.7% )and (9%) of total patients.<sup>(16, 17)</sup>

In this study, 16(32%) of the patients were anemic. This in agreement with study done by pinkie (2003).<sup>(18)</sup>

Hypertension was found in (16%) of patient with C.R.F in this study & this result is similar to the study done by Mark Mitsnifes<sup>(16)</sup>.

In this study ,( 24% )of patients with CRF had short stature and failure to thrive and this is comparable to other study<sup>(19)</sup>.

Treatment of patients with chronic kidney disease includes replacement of kidney function by dialysis or transplantation if signs and symptoms of uremia are present.

Twenty-one of our patients (42%) with CRF underwent intermittent peritoneal dialysis and 4(8%) patients referred to the specialized surgical hospital to be put on hemodialysis program and prepared for renal transplant. Three patients (6%) enrolled in this study, under went renal transplant.

### CONCLUSION:

Congenital abnormalities were the most common cause of CRF in our study.

To change the course of the kidney diseases and avoid end-stage renal failure, an early referral of patients to the nephrologists is important to provide optimal care for these children and to understand the events resulting in chronic renal failure and its complication in children more studies should be encouraged to develop in this field.

This study also recommend Application of simple tests for the detection and evaluation of the kidney disease and development of comprehensive cooperation and treatment plan between primary care physicians and pediatric nephrologists in order to provide optimal care.

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