The Changing Spectrum of end Stage Renal Disease at Queen Rania Al-Abdullah II Hospital of Pediatrics

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ABSTRACT

Objective: End stage Renal Disease is a rare condition in children. It is usually the result of slowly progressive irreversible kidney damage. The aim of this study is to determine the causes, outcome and describe the demographic features of all children with end stage renal disease on regular dialysis at Queen Rania Al-Abdullah II Hospital of Paediatrics. This is the referral centre for all pediatric subspecialties in Jordan.

Methods: A retrospective review of all computerized data for all children with end stage renal disease who were on regular dialysis at Queen Rania Hospital during the period January 2006 to April 2011 were done. The data was reviewed regarding gender, age at the initiation of dialysis, mode of dialysis and primary disease. The outcome of these children was also followed and reviewed.

Results: Out of 98 children who were on regular dialysis at Queen Rania Hospital, 90 (92%) were on hemodialysis and eight (8%) were on peritoneal dialysis, 53 (54%) were female, 45 (46%) were male. The mean age at the initiation of dialysis was 8.2±2.3 years; the commonest cause of end stage renal disease was congenital anomalies of the kidney and urinary tract which occurred in 34 (34.5%) children. However unknown causes were found in four cases (4%). Thirty-nine children (39.5%) were transplanted and 25 (25.5%) children died while they were on dialysis.

Conclusions: The most common cause of end stage renal disease at our center was congenital anomalies of the kidney and urinary tract, which is a preventable cause when detected early. The increased percentage of renal transplants observed among patients with end stage renal disease on regular dialysis at our centre is promising as it offers the best choice of renal replacement therapy.

Key words: End stage renal disease, Haemodialysis, Peritoneal dialysis, Regular dialysis

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Introduction

End stage renal disease (ESRD) is a devastating chronic health problem in children, for which there is no lifelong cure, not even after kidney transplantation.[1] It occurs in five to 10 children per million each year.[2] Fifty years ago, all children with ESRD died.[1] Now, almost all such children are treated with dialysis or renal transplantation.[3] The first pediatric dialysis programs were started in the 1960s and the first pediatric renal transplants took place in the 1970s.[3] Awareness of the cause of ESRD helps the nephrologists anticipate problems during renal replacement therapy (RRT) and plan preventive measures for the community.[4] Unfortunately in most of the developing world,

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patients with renal disease present late because of the lack of proper follow up and can only be evaluated while they are undergoing dialysis or enlisted for renal transplantation.[5] In the USA incidence and prevalence of ESRD is expected to increase by 44 and 85%, respectively from 2000 to 2015 and incidence and prevalence rates per million population by 32 and 70%.[6] There is limited data on pediatric ESRD in Jordan due to the lack of a national registry system. However, the incidence of pediatric ESRD was estimated in 2005 to be 7.5 patients per million children.[7] While the incidence and prevalence of chronic kidney disease among Jordanian children was estimated in 2002 to be 10.7 and 51 patients per million children, respectively.[8]

The aim of this study was to determine the causes, outcome and describe the demographic features of all children with ESRD who were on regular dialysis for the last 5 years at Queen Rania Al-Abdullah II Hospital for Paediatrics.

Methods

This is a retrospective review of all the computerized data of 98 children with ESRD at Queen Rania Al-Abdullah II Hospital of Paediatrics (QRH) during the period from January 2006 to April 2011. These data were reviewed regarding gender, age at the initiation of dialysis, mode of dialysis, either haemodialysis (HD) or peritoneal dialysis (PD). The outcome of those children were followed and reviewed. Patients who under went urgent dialysis for acute renal failure were excluded from this study. Data were analyzed using SPSS 10 (statistical package for social studies); results were presented in number, percent, mean and standard deviation (SD).

Results

There were a total of 98 children with ESRD on regular dialysis at (QRH) during the period between January 2006 to April 2011. Fifty-three (54%) were female and 45 (46%) were male. The mean age at the time of dialysis initiation was 8.2 ± 2.3 years. Ninety (92%) children were on HD, while eight (8%) children were on PD. The outcome of patients with ESRD from the study group is shown in Table I. The most common cause of ESRD was congenital anomalies of the kidney and urinary tract which occurred in 34 (34.5%) children. However, glomerulopathy and hereditary nephropathy was found in 29 (29.6%) and 27 (27.9%) children, respectively. Multisystem disease like those with renal amyloidosis (one patient secondary to Hyper IgD syndrome, the other secondary to FMF), Hemolytic uremic syndrome (Diarrhea positive-D+) and Henoch Schonlein Purpura nephritis occurred in four (4%) children. Four cases had no identifiable causes and accounted for 4% of the total. The etiology of ESRD among our study is described in Table II.

Discussion

The underlying causes of ESRD are different in children than those in adults. Diabetic nephropathy and hypertension, predominant causes of ESRD in adults, are rare causes of ESRD in childhood.[9] The predominance of congenital anomalies of the kidney and urinary tract and glomerulopathy are the main causes of ESRD in children and are similarly observed in other studies.[7,9] However, other studies[10-13] reported congenital and hereditary reasons as the main cause of ESRD in children. In the United States, the most common primary renal diseases found in chronic kidney disease are glomerulonephritis followed by cystic, hereditary and congenital diseases. Diabetes is rare.[14] Congenital anomalies of the kidney and urinary tract account for the majority of preventable causes of ESRD in our study which included reflux nephropathy, neurogenic bladder which occurred in 10.2% and 16.3%, respectively, and is comparable to other studies[7] which reported it in 11.9% and 14.3% respectively. In the Arab world, genetic factors associated with consanguinity are important factors leading to a high percentage of hereditary diseases and congenital malformations, for which primary oxalosis, polycystic kidney disease, juvenile nephronophthesis, Bartter syndome, Alport syndrome which appears to cause ESRD in our study in a considerable percentage which is comparable to other studies.[15]

In the present study, ESRD was more common in females than males, in contrast to other studies.[7] The mean age at the time of dialysis initiation in our study was comparable to what has been reported in other studies.[7,16]

Table I: Outcome of ESRD patients among the study group

Out Come	Number	%
Transplanted	39	39.5
Dialysis	34	35
Died	25	25.5

Table II: Etiology of ESRD among the study group

Etiology	Number	%
CAKUT*	34	34.5
-Neurogenic bladder	16	16.3
-Reflux nephropathy	10	10.2
-Obstructve nephropathy	4	4.0
-Hypoplastic /Dysplastic kidney	4	4.0
Glomerulopathy	29	29.6
-Focal segmental glomerulosclerosis	20	20.4
-Mesangiocapillary GN**	5	5.2
-Rapidly progressive GN	4	4.0
Hereditary nephropathy	27	27.9
-Polycystic kidney disease	9	9.35
-Primary oxalosis	9	9.35
-Juvenile nephronophthesis	5	5.2
-Alport syndrome	1	1.0
-Bartter syndrome	1	1.0
-Bardet Biedel syndrome	1	1.0
-Cystinosis	1	1.0
Multi system disease	4	4.0
-Hemolytic uremic syndrome	1	1.0
-Henoch Schonlein purpura	1	1.0
-Amyloidosis	2	2.0
Unknown causes	4	4.0

*Congenital Anomalies of Kidney and Urinary Tract **Glomerulonephritis

The mean age at the time of dialysis initiation was 11.1 and 12.1 years, respectively. In our centre, HD is the primary mode of dialysis, accounting for 92% of children in this study, while PD is done for less than 8% of the children for reasons related to parental choice and technical reasons. In some European countries, HD was often preferred for children over the age of five years.[17] In contrast, PD is offered to younger children, especially under the age of two years or weighing less than 10 kilograms.[18] Nevertheless, the 2005 USRDS annual report noted a re-emergence of HD as the modality of choice over PD for which now in United States more than two thirds of children receive HD rather than PD.[16] Despite improvement in long-term survival of patients with ESRD, mortality rate among children requiring RRT remains substantially higher than those among children without ESRD.[3] Transplantation remains the major modifiable factor in improving the long term survival of children with ESRD.[3,16,19] In the Royal Medical Services of Jordan the first pediatric renal transplant was performed in April 2003. Sacca *et al.*[7] reported that 30% of children were transplanted during the period between January 2001 to December 2005 which is a low percentage when compared to the western world where more than 66% of children are transplanted.[16] In our study, 39% of children on regular dialysis were transplanted, and this appears to be a good percentage, when taking into consideration that we excluded pre-emptive transplants from our study, and the high percentages of patients with oxalosis which requires a combined liver and kidney transplantation, an option not yet available in our center.

Conclusion

The most common causes of ESRD in our centre were the congenital anomalies of the

kidney and urinary tract, which is a preventable cause if detected early.

Increasing percentage of renal transplantation among patients with ESRD on regular dialysis in our centre is promising as it offers the best choice of RRT.

The establishment of a Renal Registry in Jordan would be helpful as it would improve organization in our health care system.

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