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Pattern of Childhood Renal Disorders in Enugu

BA Okoro HU Okafor+*

Summary

Okoro BA, Okafor HU. Pattern of Childhood Renal Disorders in Enugu. *Nigerian Journal of Paediatrics* **1999; 26: 14.** A prospective study of children with renal disorders was undertaken over a 13-year period. There were 854 patients, aged between birth and 16 years and of these, males constituted 65.1 percent. Children with renal disorders constituted four percent of all paediatric admissions over the period. The commonest five disorders in our series were nephrotic syndrome (40.5 percent), acute glomerulonephritis (31.9 percent), renal failure (acute and chronic 10.1 percent), urinary tract infection (5.6 percent) and nephroblastoma (4.9 percent). These five disorders constituted 93.0 percent of all childhood renal disorders. Less common disorders included obstructive uropathy, sickle-cell nephropathy, renal hypertension, nephrogenic diabetes insipidus, enuresis, neurogenic bladder and benign isolated haematuria.

Among those with nephrotic syndrome, there was a remission rate of 64 percent, using various combinations of therapeutic regimes including pooled plasma, diuretics, prednisolone and cyclophosphamide. Acute glomerulonephritis which was preceded mostly by pyoderma rather than by pharyngitis, was associated with a very good prognosis. Urinary tract infection was probably underdiagnosed, with some radiologically documented cases of renal scarring, but no vesico-ureteric reflux. Besides sickle-cell nephropathy, there were no cases of inherited, metabolic or genetic disorders, possibly due to the prevalent cultural practice of non-consanguinous marriages.

Introduction

THE pattern of childhood renal disorders is similar in most parts of the world, although the frequency of occurrence of the various types of disorder appears to be different.[1] Renal disorders causing significant morbidity in the third world need to be identified because of the necessity for early diagnosis and treatment in order to prevent chronic renal failure.[2] Hendrickse and Gilles[3] documented the profile of renal diseases in children in western Nigeria over a four-year period (1959-1963). A similar study over a four-year period (1978-1982) was carried out by Abdurrahman, Babaoye and Aikhionbare in Zaria, northern Nigeria.[4] More recently, Eke and Eke[2] over a five-year period (1986-1991), studied renal disorders in children in Port Harcourt, a costal city in eastern Nigeria. These earlier studies, while demonstrating a similar spectrum of renal disorders, differed in the frequencies of occurrence of the various disorders. It is against this background that the present study was undertaken at Enugu, an upland city in eastern Nigeria.

University of Nigeria Teaching Hospital, Enugu

Department of Paediatrics

* Professor

+ Senior Lecturer

Correspondence: BA Okoro

Subjects and Methods

After the establishment of a Renal Unit in the Department of Paediatrics, University of Nigeria Teaching Hospital (UNTH), Enugu in 1983, a register of renal cases was opened. Children from birth to 16 years, presenting with features suggestive of renal problems at the paediatric out-patient clinics or children's emergency room, were admitted for investigations and treatment and were followed-up after discharge.

In the present study, the case notes of all the children in the Renal Register were analysed. Information extracted included name, age, sex, duration of illness before presentation, occupation of parents, mode of presentation and clinical findings at examination, laboratory results, diagnosis, inpatient management and follow-up and findings after discharge.

Investigations routinely carried out included full blood count (FBC), erythrocyte sedimentation rate (ESR), haemoglobin genotype, malaria parasite, urinalysis, urine culture and sensitivity, serum electro-

lytes, urea and creatinine. Other tests carried out, depending on the initial provisional diagnosis, included renal ultrasonography, intravenous urogram, micturating cystourethrogram, serum proteins, cholesterol, hepatitis B surface antigen, Human Immunodeficiency Virus 1 and 2, ASO titre, 24-hour urinary protein estimation, throat swab and renal biopsy. In addition to drug therapy, peritoneal dialysis was performed on those who required this procedure and haemodialysis for older children with good vascular access.

Table I

Pattern of Renal Disorders in 854 Children in Enugu

Disorder	*No of Patients*	*Percent of Total*
Nephrotic syndrome	346	40.5
Acute glomerulonephritis	272	31.9
Acute renal failure	61	7.1
Urinary tract infection	48	5.6
Nephroblastoma	42	4.9
Chronic renal failure	25	2.9
Obstructive uropathy	12	1.4
Nephropathy	11	1.3
Hypertension	8	0.9
Neurogenic bladder	6	0.7
Nephrogenic diabetes inspidus	5	0.6
Enuresis	4	0.5
Benign isolated haematuria	4	0.5
Miscellaneous	10	1.2
Total	854	100.0

Results

Eight hundred and fifty four patients with renal disorders were studied over the 13-year period (1984-1996). These constituted four percent of all paediatric admissions during the period. There were 561 males (65.7 percent) and 293 females (34.3 percent). The pattern of disorders is shown in Table I.

The commonest disorder was nephrotic syndrome which accounted for 40.5 percent of all the renal disorders. The age range was two to 16 years with a peak at five to seven years. Twelve patients (3.5 percent) had homozygous sickle-cell disease, renal biopsy in four patients showed membranoproliferative glomerulonephritis (MPGN) and one each with focal segmental sclerosis (FSGS) and minimal change. Treatment consisted of various combinations of high protein diet, diuretics, pooled plasma, prednisolone and cyclophosphamide. The overall remission rate was 64 percent, with prednisolone alone accounting for 30 percent. Remission was sustained (no relapses) in 40 percent, frequent relapses in 16.3 percent and infrequent relapses in 43.7 percent. Mortality rate was 5.5 percent and most of the 19 deaths (Table II) were caused by chronic renal failure, pneumonia and hypertensive encephalopathy. Acute chest syndrome which was the presumed cause of death in one child with sickle cell anaemia, is a well known pulmonary complication of the haemoglobinopathy which manifests as fever, pleuritic chest pain, non-productive cough, hypoxaemia and leucocytosis.

Table II

Causes of Deaths in 19 Children with Nephrotic Syndrome

Causes	No of Deaths	Percent of Total
Chronic renal failure	11	57.9
Pneumonia	2	10.5
Hypertensive encephalopathy	2	10.5
Aplastic anaemia	2	10.5
Cerebrovascular accident	1	5.3
Acute chest syndrome	1	5.3
Total	19	100.0

Acute glomerulonephritis (AGN) was the second most frequent disorder, occurring in 272 (31.9 percent) of the patients. There were 154 males and 118 females, whose ages ranged from nine months to 16 years and a peak at five to eight years. Antecedent history of pyoderma was obtained in 84 (31 percent), and that of pharyngitis in 49 (18 percent). The manifestations in the 272 children with AGN are shown in Table III. Complications included hypertensive encephalopathy in 31 (11.4 percent), acute renal failure in 27 (10.0 percent) and heart failure in 22 (8 percent). Five (1.8 percent) of the cases died from acute renal failure; the deaths occurred within 72 hours of admission.

There were 65 cases (46 males and 19 females) of acute renal failure (ARF) with an age range of nine

months to 13 years. The main cause of ARF was severe gastroenteritis associated with severe dehydration, which occurred in 34 patients (52.3 percent). Twenty-seven patients received peritoneal dialysis of whom five died, while 38 were treated conservatively with 12 deaths. The overall mortality in ARF was 17 out of 65 (26.1 percent). Chronic renal failure (CRF) was present in 25 patients and of this number, 14 received intermittent peritoneal dialysis with three survivors, while all the 11 who were treated conservatively, died. The overall mortality in CRF was 88 percent.

Symptomatic urinary tract infections (UTIs) were found in 48 (5.6 percent) of the patients in the series and the age range was three weeks to 10 years. The male to female ratio was 1:1. The commonest clinical manifestations were dysuria in 21 (43 percent) and pyuria in 34 (71 percent) of the cases. *Escherichia coli* was the most frequently cultured organism; it was responsible for 43.8 percent of the cases. All the 48 patients with symptomatic UTI underwent radiological investigations which revealed abnormalities in 10 (21 percent) of the cases with posterior urethral valve (PUV) and hydronephrosis each contributing seven percent. There was no evidence of vesicoureteric reflux (VUR).

Nephroblastoma (Wilms tumour), a major childhood renal malignancy, was found in 42 children, with a male to female ratio of 3:2. The age range was two weeks to nine years, with a mean age of 3.9±2.4 years. The tumour was unilateral in all the 42 patients. Treatment of these cases consisted of nephrectomy and chemotherapy, using Actinomycin D and Vincristine. Two patients with recurrent tumour received additional radiotherapy with good results. One patient was discharged against medical advice. There were six deaths, a mortality of 14.3 percent. Less common disorders included sickle-cell disease nephropathies, and schistosomiasis which accounted for 11 (1.28 percent) cases. These patients had either haematuria or proteinuria and casturia. The study revealed no cases of inherited metabolic renal disorders.

Comparative patterns of renal disorders reported from Ibadan,[3] Zaria,[4] Port Harcourt[5] and Enugu in the present series are summarized in Table IV.

Table III

Clinical Manifestations in 272 Cases of Acute Glomerulonephritis

Manifestation	*No of Cases*	*Percent of Total*
Oedema	256	94.1
Hypertension	185	68.0
Oliguria	133	48.9
Gross haematuria	131	48.2
Antecedent pyoderma	84	30.9
Antecedent pharyngitis	49	18.0

Table IV

Pattern of Renal Diseases in Enugu, compared with those in other Centres

Disorder	*Ibadan*[3]	*Zaria*[4]	*Port Harcourt*[5]	*Present Series*
	N=196	*N=517*	*N=699*	*N=854*
	Percent of Total			
Nephrotic syndrome	79.6	19.3	14.6	40.5
Acute glomerulonephritis	11.2	39.1	11.4	31.9
Acute renal failure	-	6.6	4.7	7.1
Urinary tract infection	3.6	7.0	68.9	5.6
Nephroblastoma	-	3.1	1.6	4.9
Chronic renal failure	-	4.4	2.1	2.9
Obstructive uropathy and other congenital abnormalities	-	7.7	2.7	1.4
Nephropathy	-	2.3	-	1.3
Hypertension	-	9.5	-	0.9
Others	5.6	-	-	3.5

N = number of cases

Nephrotic syndrome was the commonest disorder in all the four centres, although the highest percentage was reported from Ibadan followed by that in our series. By contrast, AGN was the commonest (39.1 percent) disorder in Zaria followed by 31.9 percent in the present study.

Discussion

Socio-economic, geographical and genetic factors play important roles in determining the prevalence and pattern of renal disease in various parts of the world.[5] In Nigeria in general, prevailing local conditions such as malnutrition, poor environmental and personal hygiene and poverty play a major role in the development of renal diseases in childhood. The pattern of childhood renal disease in the present study was similar to that reported from other parts of Nigeria[2-4] and elsewhere,[1, 5] although the frequency of occurrence appeared to be different.

Nephrotic syndrome was the commonest renal disorder in our series, accounting for 40.5 percent of all the cases. This high prevalence was similar to those in Nigeria,[3] Jordan[6] and elsewhere.[7] Using various therapeutic regimes, a 64 percent remission rate was achieved in the present study with prednisolone alone accounting for 30 percent. This contrasted with other reports that nephrotic syndrome in African children is characterized by a poor response to corticosteroids.[3, 4, 8, 9] Good response to steroid therapy is reported in Europe,[10] Middle East,[6] and USA.[7] Acute glomerulonephritis (AGN) was the commonest non-suppurative sequelae of *β-haemolytic streptococcus* infection in the present series, an experience similar to a previous study[11] in the same institution and other centres in Nigeria[2, 4, 12] as well as in East Africa.[13] The prevalence of AGN in the present series was higher than those reported from Ibadan,[3] Port Harcourt[2] and Uganda,[13] but it was less than those obtained from Zaria[4] and Ilorin.[12] AGN secondary to pyoderma was commoner than that secondary to pharyngitis in the present series. This finding was also reported in Zaria,[14] but different from that of other centres in Nigeria,[3, 15] Europe[16] and Middle East,[1] where pharyngeal infections were reported to be commoner than skin infections. Another important feature of AGN in the present series was a 68 percent incidence of hypertension, a feature also reported by other workers in Africa[3, 13, 14] and this is in contrast to those found in children in temperate countries. Significant reduction in the incidence of AGN in our communities could be achieved by improvement in personal hygiene, environmental sanitation and an early and adequate treatment of pyoderma and pharyngitis, as the association between low socio-economic standards and AGN has been well documented.[17]

Urinary tract infection (UTI) accounted for 5.6 percent of the cases in our series, in contrast to 68.9 percent reported from Port-Harcourt.[2] There was an under-diagnosis of UTI in the present series and in an earlier report[18] which documented only symptomatic UTI. Such under-diagnosis had been reported from Ibadan[3] and Zaria[4] because, as in our study, not all children with UTI were admitted. Similarly, not all children with fever were screened for UTI by urine examination, while some of the children had received antibiotics before attending the hospital. Prospective screening studies carried out on outpatients basis by Morton and Lawande[19] in Zaria, revealed UTI in 10 percent of children with fever, 22 percent of those with diarrhoea and 43 percent of those with dysuria, while at Ibadan, Akinkugbe, Familusi and Akinkugbe[20] found asymptomatic bacteriuria in six percent of urban children and 24 percent of rural children. A significant radiological feature of children with UTI in Nigeria was the conspicuous absence of vesico-ureteric reflux (VUR) as revealed in the present study, as well as in others.[2, 18, 21]

Acute and chronic renal failure in the present series, some causes of which were preventable, carried high mortality rates of 26.1 percent and 88 percent, respectively. This gloomy picture had been reported by others in Nigeria[2, 4] as well as in most other developing countries.[1, 6] The reasons for the high mortality rate in these studies included late presentation, delay in institution of treatment, inadequate facilities for treatment such as lack of dialysing fluids and catheters, problem of vascular access in young children and lack of paediatric dialyser for haemodialysis, as well as prohibitive costs to parents. As there are presently no facilities for kidney transplantation in the country for cases of end-stage renal failure, it is recommended that preventive nephrology at the primary medical institutions should be vigorously pursued.

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