

# Chronic Renal Insufficiency in an Adolescent Male with Bilateral Urolithiasis: A Case Report

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## Summary

Ibadin OM, Woghiren IE, Marchie T. **Chronic Renal Insufficiency in an Adolescent Male with Bilateral Urolithiasis: A Case Report.** *Nigerian Journal of Paediatrics* 2003;30:96. The rare case of a 15-year-old male adolescent with chronic renal insufficiency, bilateral hydronephrosis, and urolithiasis, is presented. Characteristic features included abdominal mass, delayed presentation, marked growth retardation and profound anaemia. In the absence of a lithotripter, a combination of ureteroplasty and nephrectomy of the more severely affected kidney was carried out. Other constraints encountered in the course of management included parental poverty and ignorance and dearth of facilities for renal replacement therapy.

**Key words:** Chronic renal insufficiency, Bilateral urolithiasis

## Introduction

CHRONIC renal failure (CRF) is commoner in adults than in children.<sup>1,2</sup> Prevalence figures for CRF vary widely per million-child population with higher figures being reported among Caucasians,<sup>3</sup> and children in the Middle East.<sup>1</sup> Aetiological considerations for CRF also vary with age. While an acquired condition such as chronic glomerulonephritis accounts for the majority of cases in adults,<sup>4,5</sup> acquired lesions play a less significant aetiological role in children.<sup>6,7</sup> Among acquired causes commonly listed in children are the glomerulonephritides and vascular nephropathies.<sup>1</sup> Obstructive uropathies do play some documented roles in the aetiology of CRF in children, however such lesions are mainly congenital and present commonly in infancy and early childhood.<sup>1</sup>

Unlike in adults, urolithiasis as a cause of obstructive uropathy is less frequently encountered in childhood and even when found, it is usually unilateral.<sup>8</sup> Urolithiasis can result from abnormalities of urate,

oxalate, phosphate, cysteine and calcium metabolism.<sup>8</sup> Even rarer in children are reports of bilateral urolithiasis resulting in, or co-existing with CRF.<sup>9</sup> Nevertheless, infective calculi in children have been known to cause CRF by way of pyonephrosis and pyelonephric scarring.<sup>9</sup> Abnormalities of calcium metabolism characterized by renal osteodystrophy also occur in CRF,<sup>10,11</sup> while nephrocalcinosis can predispose to CRF.<sup>9</sup> In this report, we present the only case of chronic renal insufficiency (CRI) found in association with bilateral urolithiasis in a 15-year old male adolescent seen at the University of Benin Teaching Hospital (UBTH), Benin City, over two decades.

## Case Report

EO, a 15-year old male, was first seen in UBTH in September 2002, with a two-year history of progressive right flank swelling, associated abdominal pain for one year, and a non-projectile, non-bilious vomiting over six months. A month prior to presentation, he had developed watery and non-bloody diarrhoea. Urine volume, frequency, colour, and stream had remained normal from birth and throughout the period of illness. He was referred to UBTH from Central Hospital, Sapele on account of a sonographic discovery of a right renal mass.

Born into a polygamous family of peasant farmers, he was the last of his 75-year old father's surviving eight out of 10 children. His mother had died 14 years

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earlier, after a prolonged period of cough and weight loss. EO, who started formal schooling late on account of a history suggestive of anal prolapse which he had in infancy and early childhood, was currently a Junior Secondary one pupil with impressive academic records. Past medical history did not suggest rickets, hypothyroidism, hypervitaminosis D or prolonged period of immobilization. However, it was not possible to exclude repeated urinary tract infection (UTI).

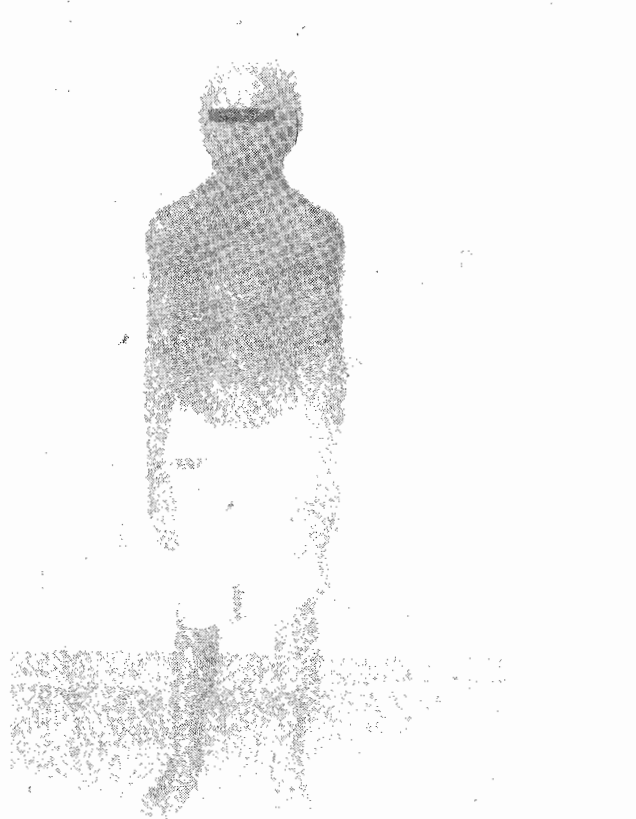


Fig. 1. Plain photograph of the patient showing marked stunting at 15 years of age.

Examination revealed a chronically ill and small-for-age adolescent [weight, 22kg; height, 1.34 metres, both parameters being less than the fifth centile for age (Fig 1)]. He had marked pallor but no peripheral lymphadenopathy or oedema. The abdomen was non-uniformly distended with a firm mass, interspersed with cystic areas, and measuring 15 x 16cm, occupying the right half of the abdomen. The mass, devoid of a bruit, and whose upper limit could not be clearly delineated, was non-tender; it was smooth surfaced and indistinguishable from the right kidney and liver. His heart rate was 88 beats/minutes. He had a mean blood pressure of 240/110mmHg, haemic murmur and features of congestive cardiac failure. He also had deep sighing respiration. Other systems appeared grossly normal. A diagnosis of chronic renal failure, resulting from polycystic kidney disease or hydronephrosis, was initially made.

Investigations revealed sterile pyuria, and a packed cell volume (PCV) of 17 percent. Apart from a serum creatinine of 318.2 $\mu$ mol/L, reduced serum calcium level of 1.5mmol/L and phosphate of 2.5mmol/L, urea and other electrolytes at admission, were normal. Subsequent values of electrolytes, blood pressure and other parameters are as shown in Table I. Glomerular filtration rate was 5.4ml/min/1.73m<sup>2</sup> surface area. Sonographic findings were those of an enlarged right kidney, bilateral hydronephrosis that was worse on the right, and a near total loss of the renal cortex. Intravenous urography utilizing double dose contrast, showed persistent radio-opaque calculi in both ureters (Fig 2) with minimal urinary bladder filling from the left kidney and a non-functional right kidney. Maximum urinary protein loss throughout admission was 0.3g/L/24hr. Urinary cysteine, calcium and oxalate levels were not determined due to a lack of facilities.

Table I

Trend in Blood Pressure PCV, Blood Urea and Serum Electrolytes

Dates (in 2002)	23/9	30/9	7/10	14/10	21/10	14/11	11/11	17/11	24/11	1/12
Systolic BP	150	120	130	130	160	170	150	100	120	110
Diastolic BP	110	90	90	90	120	140	110	70	70	60
Packed cell volume (%)	17	17	--	--	18	39	29	--	28	29
Urea (mmol/L)	5.7	5.3	--	--	--	--	30.5	--	43.1	--
Potassium (mmol/l)	3.9	4.7	--	--	--	--	3.4	--	3.9	--
Chloride (mmol/l)	104	110	--	--	--	--	102	--	104	--
Sodium (mmol/l)	132	142	--	--	--	--	130	--	132	--
Bicarbonate (mmol/L)	13	20	--	--	--	--	13	--	20	--
Phosphate (mmol/l)	2.5	2.5	--	--	2.5	--	--	--	--	--
Calcium (mmol/l)	6.4	6.1	--	--	--	--	6.1	--	--	--
Creatinine ( $\mu$ mol/l)	318.2	291.7	362.4	291.7	362.4	-291.7	415.5	--	--	--



Fig. 2. Intravenous urography showing radio-opaque stones in both ureters.

Hypertension was managed with intravenous hydralazine (0.2mg/kg/dose, 6 hourly with provision made for stat doses any time the diastolic blood pressure was in excess of 100mmHg), and alpha-methyl dopa given in three divided doses, at a dosage range of 5-12.5mg/kg/24hrs. Erythropoietin, which was prescribed, was not provided.

The patient eventually had a right nephrectomy and left pyelolithotomy and pyeloplasty done with an uneventful postoperative period of three weeks. Chemical analysis of the stone for calcium, phosphorus, ammonium, oxalate and urate could not be done for lack of facilities. Subsequent ranges of blood pressure, serum creatinine, urea and bicarbonate were 110/60-170/140mmHg, 291.7-415.5 $\mu$ mol/L, 30.5-43.1mmol/L, and 13-20mmol/L, respectively.

At the point of discharge his blood pressure had stabilized and remained normal. However, serum urea and creatinine levels were increasing, while PCV remained relatively low. The general condition of the patient had however, improved.

### Discussion

This case is presented because of its uniqueness. This stems from the fact that he had CRI and a probable acquired form of obstructive uropathy. The case is intriguing, not only because he presented with bilateral

urolithiasis, noted for its rarity in children, but also that the condition was otherwise, amenable to treatment. The most plausible sequence of events in this case is that the urolithiasis caused the CRI, although it is conceded that both conditions could have co-existed. The earliest documented feature referable to the urinary tract in the patient was flank swelling noted two years earlier. This feature appears to have been completely ignored at inception. His morbid state attracted some attention only when it became associated with marked abdominal pain a year later. Even then, the method of management was inappropriate as the patient received treatment only from traditional healers. Thus, bilateral urolithiasis could have resulted in repeated pyonephrosis and resultant destruction of the renal parenchyma.<sup>9</sup>

It is of interest that associated features of growth failure and marked weakness were also ignored in the patient. Growth failure can arise from non-renal causes but we were unable to establish any of such predispositions in the patient. Although poverty could be blamed for the attitude and practice of the parents as regards procrastination, and the use of unorthodox medical care, it is obvious from the presentation that poverty alone would not explain the entire parental response. To have waited for years before seeking medical attention for a disease process that probably started much earlier was probably due to ignorance of the potentially serious nature of the patient's condition. Repeated UTI due to *Proteus*, is known to cause both CRF and urolithiasis.<sup>8</sup> In this case, it was difficult to infer that such occurred; urine culture at evaluation, was normal. Besides, infective stones are rare after the age of five years.<sup>8</sup>

At presentation, the renal function had deteriorated markedly to a level bordering on CRI - a situation that warranted renal replacement therapy. In the absence of facilities for lithotripsy, he had pyeloplasty of the less involved kidney and a nephrectomy of the more affected side. Although prescribed, patient could not afford erythropoietin, let alone chronic dialysis. Renal transplantation, which offers a better prospect of improved quality of life and survival in this circumstance, was completely out of reach of the patient. Furthermore, there was an absence of social services or health insurance scheme that might have facilitated access to medical care despite social or financial constraints involving the patient.

We could not establish the predisposing factors for urolithiasis nor find out the nature of the stones. Such knowledge would have given further insight into the relationship between the two morbidities. Irrespective of the cause however, most stones are amenable to medical or surgical management. Perhaps an earlier

intervention would have prevented the development of CRI.

It is uncertain how many children are in similar circumstances in Nigeria and other developing economies. What is certain however, is that issues of financial constraint, inadequate facilities and inappropriate utilization of medical facilities are common features. It is on this strength that preventive nephrology is advocated as a means of reducing its prevalence, associated morbidity and mortality. This would entail measures aimed at early detection and management. Ultrasonographic screening of school children either at the point of entry into, or exit from school, would be of immense assistance in this regard.

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