

Urolithiasis in an African Population

O. MBONU,* Ch. ATTAH,* I. IKEAKOR**

*Department of Surgery, **Department of Dietetics, University of Nigeria
Teaching Hospital, Enugu, Nigeria

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Eighty-one cases of urinary tract calculi in Nigerians seen at the University of Nigeria Teaching Hospital, Enugu, Nigeria, over a period of five years are reviewed. A relative incidence of 13 per 100,000 was established.

At the time of presentation, 36 stones were found in the bladder, 21 in the kidneys, 20 in the ureters, one in the prostate and 3 in the urethra. Five patients had calculi at multiple sites.

There was a male to female ratio of 5 : 1. Forty-one per cent of the calculi occurred in the 31–40-year age group, and 14.8% of cases were found in children.

Over 80% of the calculi were secondary to obstruction, infection and immobilization. Only 15% were idiopathic.

Urinary tract stone disease is rare in the Negroid race, as confirmed by this study on Nigerians. Avenues for further studies are suggested.

There are conflicting reports on the incidence of urinary tract calculi among African Negroes. Vermooten [1] could only trace two cases of renal calculi in over a million Africans hospitalized in South Africa. The rate for those of European descent in the same area was 1 out of 460 patients. Esho [2] reported an incidence of 7 in 100,000 Nigerians seen at Lagos University Teaching Hospital. Burkitt [3] reported the rarity in Kenya, Tanzania and Uganda. He found three Africans with urinary tract calculi during nineteen years of surgical practice in Uganda. The high tropical temperatures and poor nutritional standards are thought by some to contribute to a high incidence [2].

This study, therefore, attempts to review the pattern of urolithiasis as seen at the University of Nigeria Teaching Hospital (UNTH), Enugu, Nigeria.

Materials and methods

A review was undertaken of the case records of all patients with urinary tract calculi at the University of Nigeria Teaching Hospital over a period of five years (from January 1976 to January 1981). Eighty-eight patients were treated for urinary tract calculi during this period. Seven not being Nigerians were excluded from the study.

Estimation of serum and urinary calcium, as well as serum uric acid levels were done when possible and only a number of the calculi were subjected to chemical analysis.

Results

Incidence

During the period of study, 650,015 Nigerian patients were seen at the hospital clinics, giving a relative incidence of 13 per 100,000.

Table 1
Calculi at multiple sites

Name	Sex	Number and site		
		Kidney	Ureter	Bladder
S. U.	Male	1	1	—
D. O.	Male	4	3	—
U. O.	Male	1	2	—
O. O.	Male	—	1	1
K. O.	Male	1	2	—

Age distribution is shown in Fig. 1. Twelve patients (14.8%), all males, were under the age of ten years. The youngest (2 years) had posterior urethral valves. Male to female ratio was 5 : 1. The peak age incidence (40.8%) was between 31 and 40 years.

Five patients had calculi at multiple sites as shown in Table 1. Staghorn calculi were noted in three patients — in one of them the condition was bilateral.

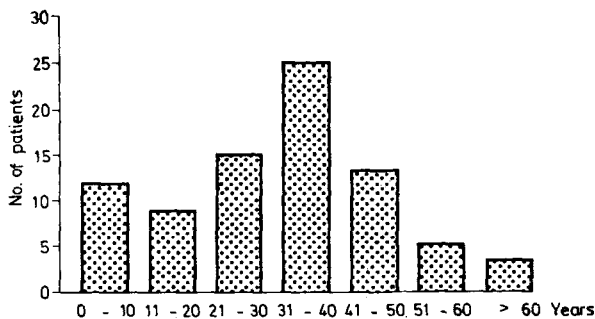


Fig. 1. Age distribution

Associated conditons

In 12 cases no obvious causes were found for urolithiasis. Associated conditions contributing to urinary tract calculi are shown in Table 2. In 48.8% of the cases some form of obstruction was contributing to stone formation.

Table 2
Associated conditions in patients with urinary tract calculi

Associated conditions	Number of patients
Urinary tract infection	15
Urethral stricture	12
Benign prostatic hypertrophy	11
Uretero-pelvic junction obstruction	7
Posterior urethral valves	5
Neurogenic bladder	4
Vesico-vaginal fistulae	3
Foreign body in bladder	3
Hypercalciuria	3
Schistosomiasis	2
Immobilization	2
Ureterocele	1
Peptic ulcer	1
Unknown causes	12

Infection and calculi

Twenty-nine patients showed evidence of urinary tract infection as proved by the organisms recovered from their urines. *Escherichia coli*, *Proteus*, *Pseudomonas* and *Staphylococcus aureus* were the most common organisms isolated.

Metabolic studies

Serum calcium studies were done in 46 patients. The results were normal in 43 (9–11 mg %); in 3 patients the levels were between 11.5 mg and 12 mg %. There were two cases of hyperuricaemia.

Twenty-four-hour urinary calcium was done in 10 patients. Three had hypercalciuria (with normocalcaemia) with levels well over 500 mg/24 hours. There were no facilities for cystine estimation. No case of hyperparathyroidism was identified.

Site involved

Figure 2 illustrates the site distribution of urinary tract calculi in males and females. The commonest site in the male was the bladder and in the female, the kidneys.

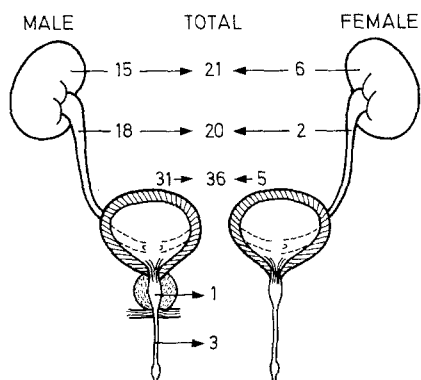


Fig. 2. Site distribution of calculi in both sexes

Chemical constituents of calculi

Calculi were chemically analysed in 32 cases. The different types are shown in Table 3. The commonest type in this series was calcium magnesium ammonium phosphate.

Table 3

Results of chemical analysis of 32 calculi

Type of calculi	Number
Calcium magnesium ammonium phosphate	22
Calcium magnesium phosphate	5
Calcium oxalate	3
Uric acid	2

Mode of presentation

The symptoms were dictated in the main by the location of the calculi. Upper tract calculi presented with colicky abdominal pains and haematuria -- macroscopic or microscopic.

Lower tract cases had disturbances of micturition. Frequency, urgency, haematuria, penile tip pain and retention were common. Few cases with bilateral obstructive uropathy presented with unexplained anaemia. There was one case of obstructive pyonephrosis which ruptured into the peritoneal cavity with signs of peritonitis.

Discussion

This study confirms the findings of others that there are racial differences in liability to stone disease [2, 4, 5]. There is a definite reduction in incidence among Negroes when compared with Caucasians. A relative incidence of 13 in 100,000 from our study contrasts strikingly with the United States where approximately 1 in every 1000 inhabitants is hospitalized for urolithiasis [6]. On the Island of Lewis in Scotland, the annual hospital admission rate for urinary tract stone disease is 68 per 100,000 [7].

The epidemiology of stone disease has been the subject of extensive studies [8, 9]. Geographic stone belts have been defined amongst the Caucasian races [10]. However, the pattern of the disease in West Africa is yet to emerge.

Secondary calculus is more common in Negroes. Over 80% of calculi were secondary to obstruction, infection and immobilization. There was definite implication of obstruction in 49% of the series, whereas the cause was undetermined in 15%. This underscores the importance of identifying and removing underlying causes to prevent recurrences.

Most calculi in this study were of the mixed phosphate variety. The incidence of asymptomatic upper urinary tract infection is high. The indiscriminate and liberal use of antibiotics in the community may diminish the overall awareness of urinary tract infection. This is in keeping with a recent re-emphasis on the significance of infection in renal calculus disease [11].

Endemic bladder stones have been associated with poor general standard of nutrition [12, 13], while improved standard of living reduces the incidence [14, 15]. It will, therefore, be expected that endemic bladder calculi would be common in Nigeria where malnutrition is rife and the diet is rich in alkaline ash content [16]. However, the present study does not confirm this concept. There are apparently also other factors involved.

Elsewhere, the increased magnesium [17] and sodium [18] excretion, and increased colloidal activity [19] in the urine have been implicated for the low incidence in the Negroid race. These factors, as well as others contributing to the rarity in Nigerians, deserve further study.

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