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Cystolithiasis in Children: A Five Year Experience in Maiduguri North Eastern Nigeria

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Abstract

Patients and Methods: The study reviewed all children under the age of 15 years diagnosed with vesical calculus and managed between January 2010 and December 2014 in the University of Maiduguri Teaching Hospital (UMTH) and the State specialist Hospital Maiduguri (SSHM). All patients had open cystolithotomy under general anesthesia.

Background: Cystolithiasis in children is fairly a common disease especially among children from low socioeconomic group, often associated with malnutrition, anemia, lower urinary tract obstruction, UTI, and rarely metabolic disorders. Holistic evaluation is therefore essential in the management of vesical calculi in children which has high tendency to recur.

Results: A total of 114 patients were analyzed age ranged from 2 – 14 years, with a mean of 6.37 years, and a male to female ratio of 6.13: 1. The peak age group was 5-9 years accounting for 49.12%. The presenting clinical features were urinary frequency, and strangury occurring in all patients, Hematuria in 53.51%, unusually long/enlarged palus in 33.67% of the male patients, and history of passage of stone in 14.91%. There were 9(7.89%) patients with history of bladder stone surgery. Post-operative complications were surgical site infection in 9.65%, vesicocutaneous fistula in 6.14%, and atelectasis in 2.63%.

Conclusions: Cystolithiasis in children is associated with malnutrition, urinary tract infection, and commoner among low socioeconomic class with high recurrence rate. The success in the management of this condition requires dealing with the stone as well as addressing the prevailing poor socioeconomic conditions.

Keywords: Cystolithiasis, Children, Malnutrition, Open Cystolithotomy, Outcome of Management.

1. Introduction

Cystolithiasis is rare in developed world and when they occur is associated with bladder outlet obstruction, infection or presence of foreign body [1]. In developing country in sub Saharan Africa where they are common in children and are related to malnutrition [2], high ambient temperature and rarely lower urinary tract obstruction [3]. The clinical symptoms vary however, cardinal features are frequency, hesitancy, urgency, dysuria, Hematuria, interrupted stream, strangury [4-5]. The treatment entails eradication of the underlying causes (malnutrition, urinary tract infection, and lower tract obstruction) as well as dealing with the stone. Treatment options where facilities exist are minimally invasive procedures such as extracorporeal shock wave lithotripsy, holmium: YAG laser lithotripsy, and transurethral cystolitholapaxy [6-8]. Where facilities are lacking or stone burden associated with complications and obstructions open cystolithotomy still remain a formidable option [9]. Cystolithiasis has a high recurrence rate and therefore comprehensive workup for metabolic disorders and long term follow up are essential.

2. Patients and Methods: The study reviewed all children under the age of 15 years diagnosed with vesical calculus and managed between January 2010 and December 2014 in the University of Maiduguri Teaching Hospital (UMTH) and the State specialist Hospital Maiduguri (SSHM). Permission for the study was granted by the Hospital Research and Ethics Committee. Written informed consent was obtained from parents of all patients. Information was obtained from clinical and laboratory notes and data analyzed using SPSS version 16. For the purpose of this study a packed cell volume of less than 30% is anemia

while under nutrition is body weight of less than 75 percentile of expected weight. The investigations done were abdominal ultrasound scan, plain radiograph of the abdomen (KUB), urine culture, urinalysis, full blood count, blood chemistry, and Hb genotype. Others were intravenous urography, and 24- hour urinary calcium and phosphate where indicated. All patients had open cystolithotomy under general anesthesia.

3. Results

A total of 114 patients were analyzed age ranged from 2 – 14 years, with a mean of 6.37years, 98 were males and 16 females with a male to female ratio of 6.13: 1. The peak age group was 5-9 years accounting for 56(49.12%), followed by <5years group with 38(33.33%) while 10-14years had 20(17.55%). The parents occupation were farming in 73(64.04%), laborers/artisans in 17(14.91%), civil servants in 13(11.40%), and petty trading in 11(9.65%). The presenting clinical features were urinary frequency, and strangury occurring in all patients, Hematuria in 61(53.51%), offensive/turbid urine in 37(32.46%), unusually long/enlarged palus in 33(33.67%), enuresis in 31(27.19%), incontinence of urine in 29(25.44%), and history of passage of stone in 17(14.91%). There were 9(7.89%) patients with history of bladder stone surgery. Background lower tract obstructions were meatal stenosis in 10(8.77%), posterior urethral valve in 4(3.51%), and Phimosis in 6(5.26%). Associated medical conditions were malnutrition in 46(40.35%), anemia in 38(33.33%), sickle cell anemia in 6(5.26%), renal tubular acidosis in 3(2.63%), acute glomerulonephritis in 13(11.40%). Associated impacted urethral stone in 11(9.65%), renal stone in 5(4.39%), and ureteric stone in 3(2.63%). Urine culture was positive in 66(57.89%), and yielded E.coli in 28(24.56%) Table 1. Stones were solitary in 92(80.70%), and multiple in 22(19.30%). Post-operative complications were surgical site infection in 11(9.65%), vesicocutaneous fistula in 7(6.14%), and athelectasis in 3(2.63%). There was no mortality.

4. Discussion

In this study 82.45% are children below the age of 10 years. The majority of the patients were from low socioeconomic status as 78.95% of the parents were farmers and artisans. This was confirmed by the findings that 40.35% showed clinical manifestation of malnutrition and 33.33% were anemic. These were comparable with findings by El Bushra [10] of 92.45% of children below the age of 10 years, 93.30% of children belonging to poor families with low socioeconomic status, 76% with features of malnutrition and 86% with Hb <10/dl. The association between under nutrition and endemic vesical calculi was documented in earlier studies [11-12]. The study found predominance in male children accounting for 85.96% this is similar to previous study [13-14]. Urinary tract infection was associated with Cystolithiasis in this series as 57.89% was urine culture positive with E.coli as the predominant isolate with 42.42% of culture positive specimen. Previous study found 22- 34% of cases associated with infection with proteus as the predominant isolate [15]. Infection with urea splitting organisms such as E. coli, proteus and pseudomonas which hydrolysis urea resulting in ammonia and carbon dioxide, raising the PH and promoting urinary supersaturation and precipitation of crystals of magnesium ammonium phosphates [16]. Open cystolithotomy was adopted in this

study due to lack of facilities for minimal access surgery, stone burden as stones are larger or multiple often with background lower tract obstruction which are indications for open surgery. The postoperative complications were vesicocutaneous fistula, surgical site infection, and athelectasis which resolved on conservative treatment. In conclusion Cystolithiasis is common in North Eastern Nigeria due to prevailing poor socioeconomic conditions high ambient temperature, UTI, and congenital obstructive uropathy. However due to lack of access to healthcare facilities patients present late with complications and high stone burden necessitating open surgery.

Tables 1: Urine culture isolates

Organisms	No	%
E.coli	28	42.42
Mixed	20	30.30
Proteus	8	12.12
Pseudomonas	6	9.09
Klebsiella	4	6.06
Total	66	100.00

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