

Endemic Vesical Stones in Sudanese Children Seen at Gezira National Center for Pediatric Surgery

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Abstract:

Objectives: To determine the pattern, demographic features, clinical features, the common types of vesical stones and diagnostic tools accuracy of endemic vesical stone in children.

Materials and Methods: In this study the records of 73 patients with endemic vesical stones were reviewed at Gezira National Center For Pediatric Surgery (GNCPS). The data were analyzed for age, sex, locality, clinical features the diagnostic tools, the treatment offered and outcomes.

Results: A total of 73 patients were included in this study, males were 64 (87.7%), < 5 years were 54 cases (74%), the majority from rural areas of low socio-economic status. **Conclusion:** Endemic vesical stones in children is common in males below 5 years and low socio-economic status, with UTI like symptoms and penile itching.

Key words: Endemic vesical stone, GNCPS

Introduction:

Endemic bladder calculi virtually disappeared from Northern Europe during the late 19th century,⁽¹⁾ and from Southern Europe by 1970.⁽²⁾ The endemic bladder calculi have become rare in developed countries due to industrialization and improvement in nutrition and diet. The incidence of these stones is very low in Central and South America, Central and South Africa. However, these stones remain an important cause of morbidity in an endemic belt extending from the

Middle-east across India and Thailand to Indonesia, including North Africa, whose economics primarily depends on agriculture. This belt includes Algeria, Sub Saharan Africa, Rwanda, Ethiopia, Sudan, and Egypt, through Iraq, Iran, Afghanistan, India, South East Asia, and Indonesia. The stones are more common in India in the northern and western regions as compared to southern and eastern regions.

There is simultaneous increase in upper urinary tract stones.^(3,4,5,6,7,8) The incidence has decreased in the Philippines, Taiwan, and Singapore.^(9,10,11) However these stones have also been found in the western Australian region, especially in aboriginal children.⁽¹²⁾ These stones are typically found in infants and children of lower socio-economic status, children younger than 10 years are most commonly affected, with a peak incidence around 3 years. The male to female ratio is 10:1.^(7,8,13)

Material and Methods:

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This retrospective, prospective study was conducted at GNCPS from June 2011 to June 2013. Study involved 73 pediatric patients with endemic vesical stone, diagnosed by US, KUB, treated by open suprapubic cystolithotomy, and stones were analyzed chemically. Data was collected by questionnaire and photographs.

Results:

There were 73 patients, 64 of them were males (87.7%) , giving a male: female ratio of 7.1:1. 21.9% of the patients were among displaced families from urban areas, whereas 78.1% were from distant rural areas. The age distribution was shown in table 1, indicating that 54 patients (74%) were \leq 5 years. Solitary and oval vesical stones were encountered (figure 1, figure 2).

Clinical presentations: 65 cases (89%) presented with burning micturition . 15 cases (20.5%) presented with haematuria . 13 cases (17.8%) presented with urine retention, . 4 cases (5.5%) presented with suprapubic pain . 11 cases (15.1%) presented with interrupted stream . 33 cases (45.2%) presented with penile itching . No case in the study presented with priapism . 3 cases (4.1%) presented with dribbling of urine table 2.

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Table 1: Age distribution

Age years.	Number of cases	Percentage
Less than 5	54	74%
5 – 10	17	23.3%
More than 10	2	2.7%

Table 2: Presenting symptoms

Symptoms	Number of cases	Percentage
Burning micturition	65	89%
Hematuria	15	20.5%
Urine retention	13	17.8%
Suprapubic pain	4	5.5%
Interrupted stream	11	15.1%
Penile itching	33	45.2%
Priapism	0	0%
Dripping of urine	3	4.1%

Table 3: Chemical Analysis of stones

Chemical Analysis of stones	Number of cases	Percentage
Uric acid	63	86.3%
Mixed	6	8.2%
Calcium	3	4.1%
Oxalate	1	1.4%
Others	0	0%

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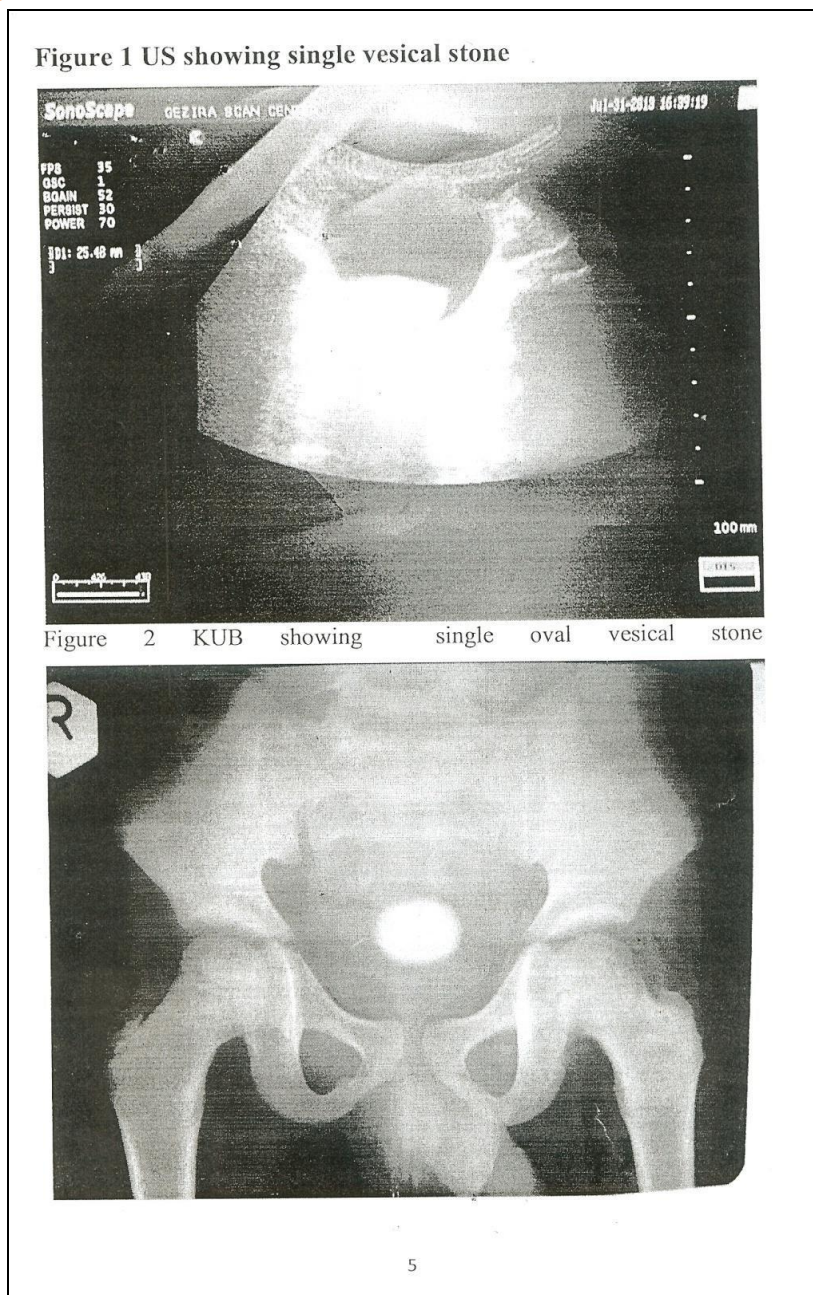


Figure 1: Ultrasound showing a single vesical stone

Figure 2: KUB showing single oval vesical stone

Discussion:

In this study, out of the 73 patients analyzed; 64 patients (87.7) were males and 9 were females (12.3). Apparently because males have long tortuous urethra where as females have short non tortuous urethra and therefore more likely to pass crystals formed in the bladder before maturing into well formed vesical stones^(7,8). 54 (74%) were below 5 years of age. As reported in the literature the incidence of pediatric endemic vesical stone is highest during the first 10 years of life with a peak incidence around the age of 3 years and then decreases thereafter⁽¹³⁾The findings in this study match those reported in other studies. Most of the patients were from rural locality (78.1%) belonging to poor families with low socioeconomic status (80.8%). This reflects the poor dietary habits, low levels of parental education and limited access to

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health facilities. It is renowned that people in rural communities tend to maintain their children on diet rich in cereals and low in protein, a diet much similar to that fed to children in rural areas in England at a time when vesical stones were rife.^(13,14,15,16) That supported by both the weight and height were found to be below the 30th centile in the majority of children indicating some degree of malnutrition. This supports the theory of nutritional deficiencies.^(13,14,15,16,17,18)

In this study we recognized four clinical presentations of endemic vesical stones in our patients. The commonest was UTI like symptoms followed by itching and manipulation of the penis, stone impaction resulting in urine retention and haematuria. We did not report any case of endemic vesical stones presenting with priapism or rectal prolapse.

US was the initial diagnostic test ordered to all patients enrolled in this study. It was diagnostic in 63 cases (86.3%). The upper urinary tract was otherwise normal in all patients excluding anomalies of the urinary tract as a cause of the stone. It can then be concluded that US is an excellent tool for diagnosis of endemic vesical calculi. US is reported to be non expensive, has wide availability, avoidance of radiation and ability to define the anatomy of the urinary tract, also can detect stones as small as 1.5 to 2 mm, for stones larger than 5 mm, US has a sensitivity of 96% and specificity of nearly 100%, but it is operator dependent.^(19,20) Being cheap is another point of advantage to US.

In our series open suprapubic cystolithiotomy was an excellent procedure for stone retrieval; only 2 cases (2.7%) from the study population developed

complications. It can be stated that open suprapubic cystolithiotomy is a simple and safe procedure that can be performed in a rural hospital with minimal equipment. Open suprapubic cystolithiotomy remains the mainstay of therapy with less complications.⁽²¹⁾

The number of stones extracted at operation: the stone was solitary in 70 cases (95.9 %). Our finding is consistent with figures quoted from the literature in that most of endemic vesical stones are solitary.^(8,13)

Regarding chemical analysis of stones, most of the stones were uric acid, 63 cases (86.3), as in table 3, due to rapid tissue turnover in children (which falls back to normal adult concentration by the age of 10 years). In literature, ammonium acid urate (ammonium and uric acid) is common also due to rapid tissue turnover in children.⁽²²⁾

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