

# Urinary Lithiasis in Children at the Abeche Chu

Vadandi Valentin<sup>1\*</sup>, Mahamat Ali Mahamat<sup>2</sup>, Ndormadjita Allah Siyengar<sup>3</sup>,  
Abdelmahamoud Chene<sup>1</sup>, Temga Ouang Michael<sup>2</sup>, Vounouzia Barthelemy<sup>1</sup>, Mingue Koldimadji<sup>2</sup>,  
Rimtebaye Kimassoum<sup>2</sup>

<sup>1</sup>Urology Department, University Hospital Center, Abeche, Chad

<sup>2</sup>Urology Department, University Hospital of National Reference, N'Djamena, Chad

<sup>3</sup>Urology Department, University Hospital of Renaissance, N'Djamena, Chad

Email: \*vadandi@yahoo.fr

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## Abstract

**Introduction:** Urinary calculosis is the presence of stones in the urinary tract. It is more common in adults than in children. The aetiologies are multiple and depend on age. The management of calculi in children requires an active aetiological search because of the frequency of hereditary abnormalities which are at the origin of recurrences. The aim of our study was to report the epidemiological, clinical and therapeutic aspects of urinary lithiasis in children in the context of our practice. **Aim:** To report the epidemiological, clinical and therapeutic aspects of urinary lithiasis in children in our practice context. **Patients and Method:** This was a retrospective descriptive study carried out in the Urology Department of the University Hospital of Abeche from January 2013 to December 2019. Thirty files of patients aged 0 to 15 years operated on for urinary lithiasis were retained. The variables studied for each patient were: age, sex, clinical, para-clinical and therapeutic aspects. **Results:** We selected 30 cases. Patients ranged in age from 0 to 15 years, with an average age of 5.5 years. There were 26 boys and 4 girls. 62% of the patients were from rural areas. The antecedents were bilharziasis, urinary tract infections, congenital malformation, trauma and bladder lithiasis. Clinical symptoms were dominated by acute urinary retention (n = 16) and dysuria (n = 14). Urine cytobacteriological tests were positive in 16 cases. The diagnosis was made in the majority of cases by ultrasound and/or unprepared abdomen (UA). The location of lithiasis was mainly the bladder (n = 16). Treatment was surgical in 96.7% of cases, with cystolithotomy predominating. Therapeutic results were satisfactory in 90% of cases. **Conclusion:** Urinary calculi in children are less common than in adults. In our region, stones are most often found in the bladder. Open surgery is still the preferred method of treatment in our practice.

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## Keywords

Abeche, Surgery, Child, Etiology, Urinary Lithiasis

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### 1. Introduction

Urinary lithiasis is the presence of one or more stones in the urinary tract. It is more common in adults than in children [1]. The incidence of urinary calculi is higher in tropical, arid and mountainous regions [2]. In developed countries, lithiasis affects 13% of the male population and 6% of the female population [3]. The incidence of lithiasis has been rising in industrialised countries in recent years [4]. In developing countries, since the end of the Second World War, the incidence of lithiasis seems to have increased in parallel with rising living standards [5].

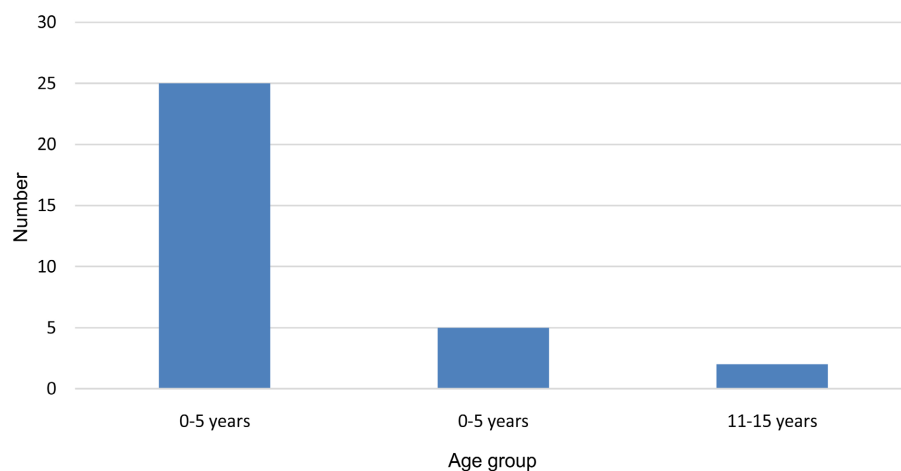
There are many different causes of urinary lithiasis, depending on age, dietary habits and geographical location. In children, the most frequent causes are related to malformative uropathies, urinary tract infections and hereditary diseases, infections and hereditary diseases [6]. Urinary lithiasis in children is characterised by a higher rate of recurrence than in adults [7] [8]. The first step in the management of calculus in children is an active search for the cause, as hereditary abnormalities are frequently the cause of recurrences [9]. The aim of our study was to report on the epidemiological, clinical and therapeutic aspects of urolithiasis in children in our practice context.

### 2. Patients and Method

We conducted a retrospective descriptive study of the records of patients operated on at the University Hospital of Abéché for urinary lithiasis. We collected 30 records of patients aged 0 to 15 years operated on for urinary lithiasis during the period from January 2013 to December 2019. Patients with complete medical records were included. Patients with incomplete records and those lost to follow-up were excluded. The variables studied were: patient age, sex, region of origin, history of lithiasis, clinical symptoms, paraclinical features, site of stone, factors contributing to lithiasis, treatments instituted and results. Data were collected and analysed using SPSS 11.0 software. We calculated the mean frequency, and the values were statistically significant for  $\alpha = 5\%$ . The research was authorised by the Faculty of Health Sciences of the UNABA and the University Hospital of Abeche.

### 3. Results

During the study period, 30 cases were selected. Patients ranged in age from 0 to 15 years, with an average age of 5.5 years. There were 26 boys and 4 girls. The age distribution shown in **Figure 1** reveals a predominance of the 0 - 5 age group.



**Figure 1.** Distribution of patients by age group.

62% of patients came from rural areas with a low socio-economic level and 38% from urban areas. The dietary habits of our patients consisted mainly of milk and milk derivatives (54% of cases). 5 patients had no particular history ( $n = 5$ ). The histories found were bilharziasis, urinary tract infections, congenital malformation, trauma and bladder lithiasis (**Table 1**).

Clinical symptoms were dominated by acute retention of urine ( $n = 16$ ) and dysuria ( $n = 15$ ), as shown in **Table 2**.

The cytobacteriological study of the urine of 20 patients was positive in 16 cases. The germs most frequently encountered were *E. coli*, *Proteus mirabilis* and *Klebsiela*. Tests for bilharzia eggs in urine were positive in 10 cases. Creatinine and blood urea levels were normal in 7 patients. The unprepared abdomen performed in 17 patients allowed the diagnosis of urinary lithiasis to be made in all cases. Ultrasonography was performed in 15 patients and was diagnostic in all cases, with hydronephrosis identified in 3 cases. Intravenous urography was performed in 3 patients, identifying the exact location and number of stones and pyelocaval dilatation in all cases. The different locations of urinary lithiasis are shown in **Table 3**.

A contributing cause was identified in 6 patients. These were valves of the posterior urethra in 4 cases and post-traumatic narrowing of the urethra in 2 cases. Treatment was surgical in 96.7% of cases. The most common procedure was cystolithotomy. It was preceded by urethral flushing in 2 cases. Instrumental extraction was used in 1 case of a stone lodged in the penile urethra. The different procedures performed according to the site of the stone are shown in **Table 4**.

In our study population, the outcome was favourable, with simple post-operative follow-up in 27 cases (90%). However, we noted complications in 3 cases (10%). The complications observed in our study were parietal suppuration in 2 cases cases (6.7%) and vesico-cutaneous fistula in 1 case (3.3%). Postoperative follow-up was 3 months. The average hospital stay was 18 days (extremes: 9 and 30 days).

**Table 1.** Distribution of patients by medical history.

History	Number	Percentage (%)
Urinary tract infection	10	33.3
Bilharzia	7	23.3
Congenital malformation	4	13.3
Trauma	2	6.7
Bladder lithiasis	2	6.7
None	5	16.7
Total	30	100

**Table 2.** Distribution by symptomatology.

Clinical signs	Number	Percentage (%)
Dysuria	15	26.8
Burning urine	10	17.8
Lumbar pain	4	7.1
Pollakiuria	5	9
Urine retention	16	28.6
Haematuria	6	10.7
Total	56	100

**Table 3.** Distribution by location.

Location	Workforce	Percentage (%)
Kidney	2	6.6
Ureter	1	3.4
Bladder	24	80
Urethra	3	10
Total	30	100

**Table 4.** Distribution according to gesture.

Gestures performed	Workforce	Percentage (%)
Neprolithotomy	2	6.6
Ureterolithotomy	1	3.4
Cystolithomy	24	80
Flush + Cystolithomy	2	6.7
Instrumental extraction	1	3.3
Total	30	100

## 4. Discussion

The frequency of urinary lithiasis is assessed in different ways and varies according to geographical area and age [10]. The mean age of patients in our series was 5.5 years, with extremes of 1 and 15 years. This is comparable to the series by Alaya in Tunisia, who reported 6.5 [11]. The age group most affected was children aged 0 to 5 years, who accounted for more than half the patients in our series (76.7%). This can be explained by the fact that this age group is a vulnerable group in our regions, exposed to chronic diarrhoea which leads to malnutrition. The number of cases decreases as age increases. Nowadays, the diet in Chad is richer in animal proteins, milk and dairy products, which are thought to be responsible for endemic lithiasis.

Our results are similar to those in the literature, according to which the younger the child, the more frequent urinary lithiasis is [12]. The sex ratio in our series was 6.4. This predominance may be explained by the length of the urethra in boys, whereas the shortness of the urethra and its relatively large diameter in girls allows a small stone to be expelled easily. This result corroborates the literature, which reports that boys are more affected by urinary lithiasis than girls [7] [8] [11] [13]. Clinically, symptoms depend on the location of the stone.

Urinary retention accounted for 28.6% of all cases. This rate can be explained by the predominance of men with a very long urethra, which is a factor in urinary retention, and by the higher frequency of bladder lithiasis in our series. This result is comparable to that of Ouedraogo in Burkina Faso, who found 29.85% in his series [14]. Low back pain was the least frequent sign in our series (7.1%). This corroborates data from the literature, which reports that the symptoms of urinary lithiasis are less typical than in adults, and true nephritic colic is rare [15]. Dysuria and acute retention were the most frequently encountered signs relating to the high frequency of urinary lithiasis of the lower urinary tract in our series.

In our study, urinary tract infection accounted for 33.3% and bilharzia infestation for 23.3% of patients, which were considered to be the main factor in lithogenesis. Several studies have reported that urinary tract infection plays a key role in the development of lithiasis, particularly phosphate and urea lithiasis [16] [17].

Bilharzian lesions constitute a favourable terrain for lithogenesis provided that climatic and nutritional factors are present [18] [19]. Congenital malformation in our study was 13.3%. This is comparable to the Alaya series in Tunisia [11]. Some studies have linked lithiasis in children with congenital malformations of the urinary tract [20] [21]. Several lithogenesis factors have been cited in children [15]:

- Infections with ureasic germs, especially proteus.
- Urinary malformations (pyeloureteral junction anomalies, vesicoureteral reflux, posterior urethral valves, etc.).
- Recurrent episodes of diarrhoea and/or dehydration.

- Metabolic and genetic abnormalities.

However, in a certain number of cases no cause is found [7].

Diagnosis was most often made by an unprepared abdomen/ultrasound combination. The bladder was the most common site in our series (76.7%). This corroborates data from the literature, which reports that bladder lithiasis is frequent in developing countries and rare in industrialised countries [6] [22] [23].

The treatment of urinary lithiasis has undergone real progress in recent years in developed countries, where this pathology is more common in developed countries where this condition is very common [24] [25] [26] [27]. Extracorporeal lithotripsy is currently described as the reference technique for the treatment of urinary lithiasis in children [22].

In our series, open surgery was the only curative surgical treatment used, due to the lack of minimally invasive techniques. Most of our patients (96.7%) underwent conventional surgery for their urinary calculi. Our results are in line with those of Sow [20] in Senegal and Zoung-Kany [18] in Cameroon.

Cystolithotomy was the most commonly used surgical procedure for treating large bladder stones. It accounted for 86.7% of surgical procedures, 6.7% of which were urethral calculi that were pushed back into the bladder by the benicus before cystolithotomy. We noted 2 cases (5%) of urethral lithiasis not far from the meatus which was based on Kelly's forceps. This same procedure was used by Ouedraogo in Burkina in his series [14]. We recorded 10% complications, including 2 cases of parietal suppuration and 1 case of vesico-cutaneous fistula. Ouattara in Mali reported 12.5% of complications [28]. Despite the postoperative complications and the long hospital stay, open surgery gives better results. However, due to a lack of technical resources, open surgery is still the most commonly used method of treating urinary lithiasis in our regions.

## 5. Conclusion

Urinary calculosis in children is less common than in adults. Upper urinary tract calculi are common in children in developed countries, often linked to hereditary metabolic factors. In developing countries, the most common site of stone formation is the bladder, secondary to dehydration and malnutrition. In our regions, open surgery is still the main method of treating urinary lithiasis due to the lack of minimally invasive techniques.

## Conflicts of Interest

The authors declare that they have no conflict of interest.

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