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Open Surgery for Urolithiasis in Patients over 15 Years of Age at the Ouahigouya Regional University Hospital (CHUR/OHG)

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Abstract

Objective: to study the management of urolithiasis by open surgery in patients over 15 years of age at the Regional University Hospital of Ouahigouya (CHUR/OHG). **Method:** this was a descriptive cross-sectional study with a retrospective aim extended over a three-year period from January 1, 2020 to December 31, 2022. **Result:** the number of patients treated by open surgery for urinary stones was 58 in 3 years, with a frequency of 19.3 cases operated on per year. There was a predominance of men with a sex ratio of 2.05. The age of the operated patients ranged from 17 to 80 years old for an average age of 44 years. The most affected age group was between 31 and 40 years old, with the majority of farmers at 37.9%. In 78% of cases, the patients came from rural areas. Renal colic was the main symptom in 55.2% of patients. Among our patients, 34.5% had a history of urinary schistosomiasis. UroCT and ultrasound of the urinary tract accounted for 56.9% and 89.7% of the requested paraclinical examinations, respectively. Pyelic lithiasis was the most common (39.7%). Open surgery was the only way used to extract stones with complications recorded in 10.3% of patients (uretero-renal dissociation with bleeding, two parietal suppuration, vesicocutaneous fistula, lumbar region eventration, postoperative anuria). **Conclusion**: the stone pathology operated on generally affects adults. This study has shown that it is of pyelic topography. Open surgery is the only surgical technique that is practiced in our context.

Keywords

Urinary Calculus, Open Surgery, CHUR-OHG

1. Introduction

Urolithiasis, a multifactorial disease that leads to the formation of stones in the urinary tract, occupies a very important place in urology, due to its frequency, diversity, clinical aspects and the therapeutic discussion it requires. Its incidence is increasing worldwide. Urolithiasis may remain asymptomatic or lead to obstruction with severe symptoms, which may require surgical treatment. In Burkina Faso and more precisely in the northern region, the equipment for endoscopic surgery, although existing, is not functional, so that open surgery remains the only surgical means we have to extract obstructive stones.

The aim of this work is to analyze the epidemio-clinical aspects, and the management by open surgery of urolithiasis at the Regional University Hospital Center of Ouahigouya.

2. Methodology

This was a descriptive cross-sectional study with a retrospective aim over a period of three years from January 1, 2020 to December 31, 2022. We included in our study all patients aged over 15 years who underwent open surgery for urinary stones, either isolated or associated with another urological condition, at the Regional University Hospital Center of Ouahigouya, and who had a medical record with an exploitable operative report.

The variables studied were age, sex, residence and occupation, stone site, eating habits, chest X-ray, urinary tract ultrasound, UroCT scan, type of surgical intervention. Quantitative variables were expressed in terms of mean and standard deviation. Qualitative variables were expressed in terms of number and proportion. The data were analyzed by the Epi info software in its version 7.2.5.0.

3. Results

The number of patients over 15 years of age treated by open surgery for urolithiasis at the Regional University Hospital of Ouahigouya was 58 in 3 years, *i.e.*, a frequency of 19.3 cases per year (Table 1).

Table 1. Frequency of intervention by year.

Year	Frequency (n)	Percentage (%)
2022	21	36.2
2021	20	34.5
2020	17	29.3
Total	**58**	**100**

The mean age of patients was 44 ± 18 years with extremes of 17 and 80 years. The most represented age group is 31 to 40 years old. Male sex accounted for 67.2% (n = 39) and female sex for 32.8% (n = 19), *i.e.*, a sex ratio of 2.05. Patients were from rural and urban areas in 78% (n = 45) and 22% (n = 13) of cases, re-

spectively. Renal colic was the most frequent reason for consultation (55.2%). In terms of medical history, 20 people had had urinary schistosomiasis either in childhood or in adulthood (Tables 2-5).

Table 2. Associated surgical pathologies.

Associated surgical pathologies	Number	Percentage (%)
Prostatic hypertrophy	12	20.7
Ureteral stenosis	6	10.4
Vesicovaginal fistula	2	3.4

Table 3. Eating habits and lifestyle.

Habit and eating lifestyle	Number	Percentage (%)
Dairy	5	8.6
Purines, offal, deli meats	5	8.6
Cereals, starches	58	100

Table 4. Imaging.

Imaging	Number	Percentage (%)
Uninjected UroCT	1	1.7
Uroscanner	32	55.2
Ultrasound of the urinary tree	52	89.7
Urinary tract without preparation	20	34.5

Table 5. Frequency of the organs involved.

Site of the stones	Frequency	Percentage (%)
Kidney	**5**	**8.6**
Right	2	
Left	3	
Pyelon	**23**	**39.7**
Rigth	9	
Left	14	
Ureter	**12**	**20.7**
Lumbar	7	
Iliac	3	
Pelvic	2	
Bladder	**21**	**36.2**
Urethra	**2**	3.4

Five patients each had two different sites of stones:
pyelon + ureter: 1,
pyelon + bladder: 1,
left ureter + right ureter: 1,
ureter + bladder: 1,
bladder + urethra: 1.
Figure 1 illustrates a calculus extracted from a ureter.

Source: Urology-andrology department of the CHUR-OHG.

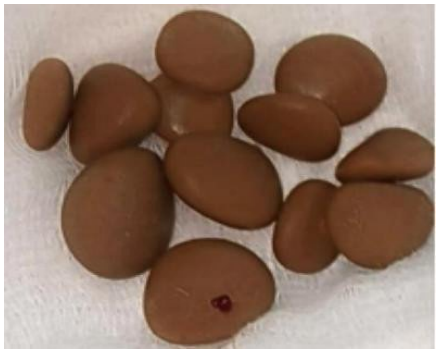
Figure 1. Ureteral calculus.

Table 6. Number of stones extracted per patient.

Number of stones	Number	Percentage (%)
1	43	74.1
2	8	13.8
3	7	12.1
Total	**58**	**100**

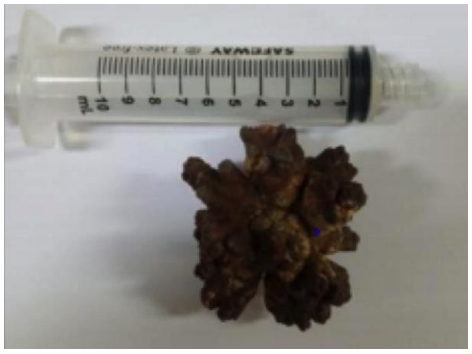
A total of 101 stones were extracted and 7 patients had more than 3 stones at the same time (Tables 6-7).

One patient had 12 stones in his bladder as illustrated in **Figure 2**. **Figure 3** shows a macrocalculus extracted from a bladder.



Source: Urology-andrology department of the CHUR-OHG.

Figure 2. Bladder stones extracted from the same patient during a prostatic adenomectomy.



Source: Urology-andrology department of the CHUR-OHG.

Figure 3. Bladder stone.

Table 7. Surgical procedures associated with stone removal.

Associated gestures	Workforce
Prostatic adenomectomy	12
Uretero-vesical reimplantation	5
Ureteral resection with ureteroureteric anastomosis	1
Vesicovaginal fistula cure	2

4. Discussion

In three (3) years, 58 patients have been operated on for urolithiasis with a frequency of operated cases of 19.3 cases per year as of CHUR-OHG. Ngaroua D *et al*. in 2017 in Cameroon reported 15 cases of lithiasis operated on per year [1]. The average age of our operated patients was 44 ± 18 years old with extremes of 17 and 80 years old. The 31 - 40 age group was the most affected. This trend is found in other studies [2]. These results show that urolithiasis remains a condition of young adults. Male sex was the most represented (67.2%) with a sex ratio of 2.05. Ngaroua D *et al*. as well as Bissirou M *et al*. also found a male predominance with a sex ratio of 2.53 and 1.8 respectively [1] [2]. This predominance of urolithiasis in humans could be explained by organic factors that may be in favor of lithogenesis in humans.

The majority of patients came from rural areas with a percentage of 78% and farmers were the most concerned (37.9%). Indeed, the heat due to field work promotes abundant water consumption from wells and backwaters which can potentially contribute to the formation of urinary stones due to the presence of dissolved minerals (calcium, magnesium) and contaminants (bilharzia eggs). The occurrence of urinary stones appears to be related to dietary habits and lifestyle. Kirakoya B. *et al*. and Kabore F A *et al*. [3] [4], in a study using infrared spectrophotometry of stones in Burkina Faso, found a predominance of calcium oxalate stones. The diet of the Burkinabè population, rich in local cereals, starches, and tubers, may play an important role in the genesis of stones. The same observation has been reported in Algeria, Tunisia, and Morocco [5]-[7]. Dairy product con-

sumption accounted for 8.6%. Indeed, high consumption of dairy products may promote hypercalciuria, with an increased risk of developing lithiasis disease.

We were unable to perform the morpho-constitutional analysis of the stone, which would have allowed us to establish the diagnostic concordance of the lithogenic mechanisms involved in its formation. This represents a limitation of our study.

Among our patients, 20 had a history of urinary schistosomiasis in childhood. Burkina Faso is a bilharzian endemic area. Authors have also found an association of urinary schistosomiasis with urinary stones [3] [8]. Schistosomiasis eggs cause chronic inflammatory reactions leading to ureteral stenosis responsible for urinary stasis in the upper urinary tract promoting lithogenesis.

Certain pathologies are responsible for urinary stasis, which promotes the formation of urinary stones [9]. Prostatic hyperplasia found in 12 patients who underwent surgery, ureteral strictures probably due to urinary schistosomiasis found in 5 patients. Two cases of vesicovaginal fistulas were complicated by urinary stones. One of the two women presented a macro stone that followed the fistula's path from the bladder, where it occupied almost all of the bladder lumen, to the vagina. It was a 7-year-old fistula, who had undergone multiple operations. The extraction of the stone was laborious by the upper route with cure of the fistula plus a bilateral uretero-vesical reimplantation at the same time as the operation. Bouya P *et al.* found that foreign bodies, non-absorbable surgical threads and urinary tract infection could explain the mechanism of lithogenesis and that the evolution is towards a voluminous stone with a hard consistency that can measure up to 7 cm in large diameter and whose surgical extraction is often laborious [10]. The association of vesicovaginal fistula and calculus, although rare, has been reported in the literature.

Pain was the main symptom in 60.4% of our patients. It was renal colic (CN) in 55.2% of cases and in association with hematuria in 3.5%. AD was the primary reason for consultation in many studies [11]-[13]**.** The presence of renal colic in the clinic would therefore be very suggestive of urolithiasis, especially since there is a predominance of lithiasis of the upper urinary tract.

Urinary tract infection is considered an important factor in lithogenesis, due to urease germs. A total of 18 patients were able to perform this examination. Indeed, eight (08) ECBUs were positive and the isolated germs are: *Escherichia coli* (5), *Staphylococcus aureus* (2), *Pseudomonas aeruginosa* (1). The failure to perform urine culture (ECBU) in some patients could be explained by the lack of permanent availability of this examination at CHUR-OHG.

The UroCT scan was performed on 33 of our patients. The UroCT scan measured the sizes of the stones and assessed whether or not they were obstructive. All these patients had obstructive stones in the upper urinary tract with an impact on the upper urinary tract. Among the 33 CT scans, pyelic dilatation was observed in 10 patients, pyelocaliceal dilatation grade 2 or 3 in 21 patients, isolated caliceal dilatation in 1 patient, and a silent kidney in 1 patient.

This impact could be explained by the delay in consultation due to self medication, the use of traditional products and socio-cultural considerations. The preferred location of the stones was the upper urinary tract in 69%. Urolithiasis of the upper urinary tract has become largely dominant in both developed and developing countries [4] [11].

Open surgery was the only method of stone extraction in our study. Indications for surgery included pain, obstruction, renal impairment for upper tract stones, and LUTS or associated pathologies for lower tract stones. Open surgery is a method rarely used in the West where the vast majority of stones are treated by minimally invasive or non-invasive means or are used as a last resort in case of failure of minimally invasive means [1]. But to this day, in some developing countries, open surgery continues to occupy a prominent place in the treatment of urolithiasis [12] [14]. We performed three (03) nephrotomies: two (02) nephrolithotomy with stone extraction and one (01) white nephrotomy from which we could not extract the stone. Also, two (02) nephrectomies were performed. A nephrectomy for a kidney destroyed by a colariform stone and another for intraoperative bleeding. The extracted staghorn calculus is presented in **Figure 4**.

Source: Urology-andrology department of the CHUR-OHG.

Figure 4. Coralliform calculus.

Twenty-three (23) pyelolithotomies and twelve (12) ureterolithotomyies were performed. Pyelolithotomy and ureterolithotomy were the most common at 39.7% and 20.7% respectively. This is justified by the fact that the greatest number of stones were preferentially located on the upper urinary tract. Similar results to other studies [15] [16]. The left urinary tree was the most affected without any obvious explanation. We encountered a case of bilateral ureteral stone complicated by severe AKI operated on in an emergency. Five (05) patients underwent uretero-bladder reimplantation on a ureteral tube kept for 14 days for ureterovesical junction stenosis and one patient underwent ureteral resection followed by ureteroureteral anastomosis on a double-J catheter. All patients received transurethral bladder drainage.

We carried out a total of 21 surgical procedures, comprising 4 isolated cystolithotomies, 3 cystolithotomies combined with an upper urinary tract approach, 12 cystolithotomies associated with prostatic adenomectomy, and 2 cystolithotomies performed in conjunction with vesicovaginal fistula repair. In Lomé Abago *et al*. [17] had performed 20 adenomectomy associated with cystolithotomies in 9 years.

We recorded two cases of parietal suppuration after cystolithotomy, managed by daily dressings with a very good evolution, a case of bladder-cutaneous fistula that benefited from prolonged bladder drainage with spontaneous bladder closure and a case of minimal lumbar hernia observed during the third month of control for which the patient refused repair. At follow-up appointments in the first, third and sixth months following surgery, no complaints were reported. We did not record any deaths intraoperatively or in follow-up.

5. Conclusion

Urolithiasis is a common pathology in northern Burkina Faso. We found a frequency of 19.3 cases operated on per year and the male sex was the most affected. Renal colic was the master symptom. Patients were treated with open surgery. Pyelolithotomy was the most common procedure. However, the contribution of new technologies such as extracorporeal lithotripsy (ECL), percutaneous nephrolithotomy (PCNL), laser ureteroscopy is essential to improve the quality of the management of urolithiasis.

Statement

The study had been approved by the CHURO's medical ethics committee.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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