

## Epidemiological, clinical, and therapeutic aspects of urinary lithiasis in two hospitals of Douala

Aspects épidémiologiques, cliniques et thérapeutiques de la lithiase urinaire dans deux hôpitaux de la ville de Douala

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### Original Article

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**Mots-clés :** lithiase urinaire, prévalence, colique néphrétique, urétérolithotomie, Douala.

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### ABSTRACT

**Introduction:** Urolithiasis refers to the presence of solid concretions at any level of the urinary tract [1]. The main objective was to study the epidemiological, clinical and therapeutic aspects of urolithiasis in the General and Laquintinie Hospitals of Douala.

**Methodology:** This was a descriptive cross-sectional study with retrospective data collection from January 2019 to December 2023 of patient files with a diagnosis of urolithiasis in which at least one imaging assessment was performed. Qualitative variables were represented as counts and percentages, and quantitative variable expressed by central tendency parameters.

**Results:** In our study, two-hospital prevalence was 3.7%. The most common age group was the 31-40 years group with a mean age of 36.64 ( $\pm 10.11$ ) years, predominantly males (59.9%). Urinary tract infection was the most common urological past history (35.9%). The most described clinical presentation was renal colic. CT scan was the most requested imaging test (64.5%), highlighting the ureteral anatomical preference of the pathology (57.1%). The most applied medical therapeutic modality was the use of analgesics, associated with dietary counselling. Two hundred patients underwent surgery (86.6%). Ureterolithotomy was the most performed surgical modality (36%).

**Conclusion:** Urolithiasis is common in adult male. Renal colic is its main presenting form. CT-Scan is the most requested imaging modality, and ureterolithotomy is the most commonly performed surgical therapeutic modality.

### RESUME

**Introduction :** La lithiase urinaire correspond à la présence de concrétions solides dans l'appareil urinaire. Cette étude visait à décrire les aspects épidémiologiques, cliniques et thérapeutiques de la lithiase urinaire dans deux hôpitaux de Douala.

**Méthodologie :** Il s'agissait d'une étude transversale descriptive, réalisée de janvier 2019 à décembre 2023 à l'Hôpital Général Douala et l'Hôpital Laquintinie de Douala, incluant les dossiers des patients diagnostiqués pour lithiase urinaire et ayant bénéficié d'au moins un examen d'imagerie. Les variables qualitatives ont été exprimées en effectifs et pourcentages, et les variables quantitatives par des paramètres de tendance centrale.

**Résultats :** La prévalence hospitalière dans les deux structures était de 3,7 %. L'âge moyen était de 36,64 ( $\pm 10,11$ ) ans, avec une prédominance masculine (59,9 %). La tranche d'âge la plus représentée était celle de 31 à 40 ans. L'infection urinaire constituait l'antécédent urologique le plus fréquent (35,9 %). La colique néphrétique était la principale manifestation clinique. La tomodensitométrie était l'examen d'imagerie le plus demandé (64,5 %), révélant une prédominance des localisations urétérales (57,1 %). Le traitement médical reposait principalement sur les antalgiques associés à des conseils diététiques. Deux cent malades ont été opérés (86,6%). L'urétérolithotomie était l'intervention chirurgicale la plus réalisée (36%).

**Conclusion :** La lithiase urinaire est une pathologie fréquente chez l'homme adulte. La colique néphrétique constitue son principal mode de révélation. La tomodensitométrie est l'examen diagnostique le plus utilisé et l'urétérolithotomie la modalité chirurgicale la plus pratiquée.

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## Introduction

Urinary lithiasis is a global problem that can affect all age groups and constitutes one of the main sources of morbidity in the world. The prevalence of the risk of urinary lithiasis during life has increased over time [2]. Given that its prevalence varies according to sex, age, geographical location and ethnic origin, its management is multidisciplinary [3-5]. Many studies worldwide provide information on the prevalence of this condition; in Europe, Kaulanjan et al found (2017) that in a West Indian population, out of 165 patients with stones, the median age was 55.5 years with a sex ratio of 1.61 and all had a stone in the upper urinary tract [6]. Castiglione *et al* found in 2014 in Belgium that out of 1869 cases of stones, 1293 were men (69.2) with a sex ratio >1 with a predominance of calcium oxalate stone [7]. In the United Kingdom, a study carried out in 2011 revealed an estimated incidence of 2/1000 stones for adults compared to 2/100,000 for children[8]. In Asia, Yu Liu *et al* found that around 1% to 19.1% of the Asian population suffered from urinary stones, depending on climate [9].

In Africa, Kabore *et al.* found in Ouagadougou a consultation prevalence for lithiasis of 12.5% with a median age of 35 years. The 21-35 age group was more represented, predominantly males (65.7% ) with the most affected organ being mainly the right kidney 23.7% [10]. Bouslama *et al.* found in Algeria a sex ratio of 1.32 [11]. In Cameroon, Ngaroua et al (2014) established in that out of a population of 46 patients operated for lithiasis, 71.7% were men for a median age of 38.6 years with a predominance of bladder lithiasis 56.5% followed by renal lithiasis 36.9% [1]. Mbouche *et al.* established that out of 120 patients included, the average age was 40.5 ( $\pm 12.6$ ) years, with a male predominance at 60.8%; here renal lithiasis was found mainly on the left (35%) with a normal clinical examination in 55.8% and insufficient hydration as an associated factor in 45% of cases [12].

In view of the tropical climate of Douala, which constitutes a predisposing factor for stone formation, and the frequent presentation of urinary stone disease in our referral centers, we conducted a study to evaluate the epidemiological and therapeutic characteristics of urolithiasis in two referral hospitals in Douala.

## Methods

We conducted a descriptive cross-sectional study with retrospective data collection, in two hospitals in the city of Douala: the Douala General Hospital and the Laquintinie Hospital, first and second category university hospital in Cameroon's healthcare system respectively. Our study took place from January 15 to April 15, 2024, and included records from January 1, 2019, to December 31, 2023. The study included

all patient files, male or female, aged 20 years or older, diagnosed with urolithiasis, in whom at least one imaging assessment (CT scan Kidney-Ureter-Bladder or urinary tract ultrasound) was performed, and whose management was either medical or surgical. Incomplete and Non-exploitable files were excluded from this study. Sampling was consecutive and exhaustive for files following the pre-established criteria.

After drafting a protocol validated by our supervisors and the Faculty of Medicine and Pharmaceutical Sciences, we submitted it to the Institutional Ethics Committee of the University of Douala and obtained ethical clearance. We also obtained research authorization from the various health facilities targeted by our study.

After obtaining the various authorizations, we contacted the hospital director, physicians, and staff members of the departments involved in our study to access the archives. We then sorted the data from patients' medical records respecting ethical considerations according to the inclusion and exclusion criteria. We then transcribed the collected data into a pre-established and pre-tested data sheet. Data collected included: Sociodemographic data; Personal history; Clinical data; Paraclinical data; and Treatment data.

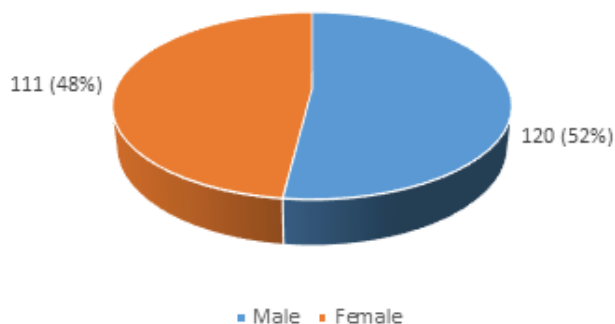
Data analysis was performed using Microsoft Excel 2020 software. Qualitative variables were summarized numerically as counts and percentages and graphically using pie charts and bar graphs. Quantitative variables were summarized numerically as mean, standard deviation, and median. Results were illustrated using Excel and Word 2020 software and presented in tabular form.

## Results

During our study period from January 1st, 2019 to December 31st, 2023, 3241 patients were hospitalized in the surgery department (urology) of Laquintinie Hospital in Douala, and 119 were diagnosed with urolithiasis, accounting for a frequency of 3.6%. on the other hand, approximately 2947 patients were admitted at the Douala General Hospital, with 112 diagnosed with urolithiasis, accounting for a frequency of 3.8%, giving a total hospital frequency of 3.7%. The 31-40 age group was the most represented with 38.5% (figure 1). The mean age (SD) was 36.6 ( $\pm 10.1$ ) years with a minimum age of 20 and a maximum of 73 years. Our population consisted of 51.9% men (n=120) with a sex ratio of 1.08.

In our series of 231 patients, urinary tract infection was the most common past history with a frequency of 35.9%. The most common clinical presentations were renal colicky pain (64.9%), and pelvic pain (39.8%). Location were mainly at the ureteral stricture sites (57.1%) and the renal pelvis. Urine culture

was performed in most cases (55.2%) and only one sample was positive (table 3).



**Figure 1:** distribution of the studied population according to sex

**Table 1:** distribution of the studied population according to pass history

Variables	n	(%)
Family history of urolithiasis	76	32,9
Personal history of urolithiasis	52	22,5
Goute	29	12,6
Lithogenic drug intake	46	19,9
Urinary tract infections	83	35,9
Others	55	23,8

**Table 2:** distribution of the studied population according to clinical signs

Variables	n	(%)
Pelvic pain	92	39.8
Renal colic	150	64.9
Hematuria	36	15.6
Dysuria	68	29.4
Pollakiuria	25	10.8
Incidental finding	25	10.8
Stone in urine	47	20.3

**Table 3:** distribution of the studied population according to anatomical stone location

Stone location	n	(%)
Renal calice	64	27.7
Renal pelvis	95	41.1
Ureter	132	57.1
Bladder	31	13.4
Urethra	8	3.5

**Table 4:** distribution of the studied population according to CT scan findings

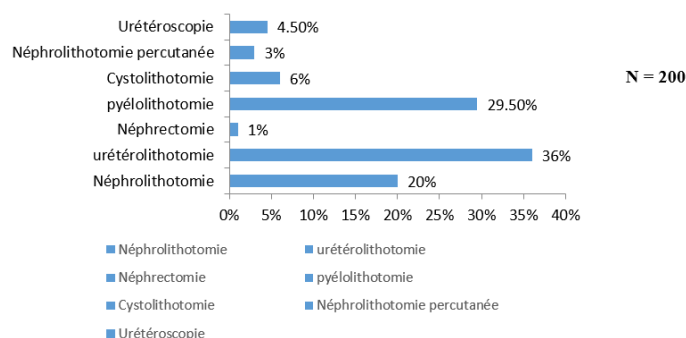
Density (UH)	n	(%)
Above de 1550	14	6.1
1250-1550	17	7.4
950-1250	28	2.1
650-950	36	15.6
350-650	28	12.1
Bellow 350	20	8.7
No response	88	38.1

**Table 5:** distribution of the studied population according to anatomical stone location

Medical management	n	(%)
Pain-killers	226	97.8
Antispasmodic drugs	109	47.2
Anti-inflammatory drugs	145	62.8
Urines Alcalinisation	3	1.3
Diet	141	61
Antibiotics	177	76.6

In our series, each patient had undergone at least one imaging workup, amongst which CT scan was the most performed (n= 149, 64.5%). It was closely followed by ultrasound (n=145, 62.7%). However, some patients had CT scan and ultrasound performed simultaneously, for better screening. Urinary tract ultrasound revealed in 100% of cases, the presence of a stone, with the preferred location being the iliac (43.5%, n=6), and 79% presenting with multiple stones. Concerning CT scan, the most common density was between 650 and 950 (Hounsfield Unit).

Two hundred patients underwent surgery (200/231, 86.6%). Concerning therapeutic management, the most common surgical treatment modality was ureterolithotomy (36%) as shown in (figure 2).



**Figure 2:** distribution of studied population according to surgical management

## Discussion

In our study, 231 hospitalized patients presented with this pathology out of a total of 6188 hospitalizations. This gave us a cumulative prevalence of 3.7%. Our results are similar to those of Liu et al. [9] in China conducted in 2018. They found a prevalence of 4%. However, this figure is significantly lower than that of Kabore et al., who recorded a prevalence of 12.5% [10]. This could be due to the fact that the later study was conducted in a semi-arid climate, unlike ours, which is tropical.

In our series, the most common age range was 31-40 years (38.5%), with a mean (SD) age of 36.64 (10.11) years. These results are similar to the studies by Kabore et al. (2013) [10] and Ngaroua et al., who found a median age of 35 years and 38.6 years respectively [1]. We can explain these results by the fact that these variations are likely the age range

between the third and fourth decades of life. This is the age range for stressful and sedentary professions.

In our series, a male predominance was noted, with a rate of 59.9% of cases and a sex ratio of 1.08. These results are similar to those of Mbouche et al., who found a frequency of 60.8% in for men [12]. Bouslama et al. in Algeria, whose sex ratio was 1.32 in favor of men [11].

In this series, we found that urban environments were the most commonly affected. This could be explained by the fact that urinary stones are a common pathology among young city dwellers due to dietary imbalances and sedentary occupations [4].

Urinary tract infection (table 1) was the most common urological pass history in 35.9% of cases, correlating with the study by Diassama et al. reporting 34.4% [13]. This could be explained by the fact that the stone was probably already present, and given that our results showed that most stones were of the struvite type, originating from urinary tract infection. Furthermore, the most common presentation was renal colic at 64.9%, perfectly consistent with findings of Mbouche et al. [12], who found renal colic as the predominant presentation at 67.5%, and Amadou et al. in Mali, who found a prevalence of 69% [14].

In our series, 57.1% of stones were located in the ureter, with a left-sided predominance (65.8%). These results correlate with, but are lower than, those of Hounnasso et al. (2015), who showed a ureteral predominance of stones at 34.1% [14]. These results are contrary to those of Mbouche et al who found a renal predominance of 35%, and Ngaroua et al. who found 56.5% bladder stones [1, 12]. CT-Scan was the first-choice examination with a percentage of 64.5%, closely followed by ultrasound at 62.7%. This result is consistent with Mbouche et al. and Idrissa Traore et al. where CT was the examination of choice in 50.7% and 65.4% respectively [12], [14]. However, in the study by Rimtebaye et al. we found that ultrasound was the examination of choice in 55.7% [2]. This could be explained by the fact that we were in reference hospitals, so CT is a common examination. Concerning the density of stones, in our series the most represented densities were between 650 and 950 HU, which corresponds to struvite and cystine in the literature (table 4).

In our series, although a healthy diet was prescribed, it was frequently combined with the prescription of analgesics, anti-inflammatory drugs, and antibiotics (table 5), corroborating the literature and the study by Rimtebaye et al. [2]. In this series, the most commonly used surgical modality was ureterolithotomy in 32.9% of cases. This result is similar to Kassogue et al. in 2019 in Mali, where we found this practice to be the most commonly used, with a frequency of 41% [14]. Contrary to the studies by Rimtebaye et al., where we had 65.2% cystolithotomy, and Ngaroua et al. where

it was 56.5% [1], [2]. In this study, open surgery is so far predominant to minimally invasive modalities. This could be related to the low socioeconomic income of the studied population in one way and the expertise of the surgeon in the other hand. Although most of our patients underwent open surgery, they were lost to follow-up few months postoperatively, hence we could not establish a consistent nutritional regimen with respect to the stones analysis.

## Conclusion

Upon completing our analysis, we state that urinary stones are common in adult males, with renal colic as the most recurrent clinical presentation. Its diagnosis is based on a set of workups, the most used here being the CT scan Kidney-Ureter-Bladder, which allowed us to highlight the struvite and cystine nature of the stone (550-950 HU). Its medical management is based on the use of analgesics combined with a healthy diet. Surgical management is mainly with ureterolithotomy in our context, perhaps minimally invasive surgery could be alleged into trained hands. There is a need for a larger scale study to confirm our results.

**Conflict of interest:** there was no conflict of interest in this article

**Author's contributions:** corresponding author contributed in editing and reviewing the manuscript. Co-authors contributed in reviewing the manuscript

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