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Renal Lithiasis: Clinical, Diagnostic and Therapeutic Aspects at the Gabriel Touré University Hospital in Bamako

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Abstract **Original Research Article**

***Introduction*:** The aim of our study was to investigate renal lithiasis in the urology department of UHC Gabriel Touré. ***Materials and Methods*:** This was a prospective and descriptive study from 1 July 2016 to 30 June 2017 (12 months). All patients were included in our study in whom at least one renal lithiasis larger than 4 mm was diagnosed on imaging and whose management was carried out in the urology department of UHC Gabriel Touré. ***Results*:** During the study period, we recorded 23 cases of renal lithiasis out of 49 cases of urinary lithiasis, i.e. 47% of cases. The age group 31 to 40 years was the most represented with 26.1% with an average age of 36 years and extremes ranging from 6 to 62 years. The sex ratio was 1.6 in favour of men. Shopkeepers were the most represented group, accounting for 34.8% of cases. The most common risk factors were meat (87%), milk (65.2%) and fish (52.2%). The main reason for consultation was lumbar pain, with 18 cases (78.3%). Caliciolithiasis of the kidney was the most common, accounting for 65.2% of cases. The right kidney was more affected with 69.6% of cases. Nephrolithotomy was performed in 65.2% of patients, pyelolithotomy in 30.5% and nephrectomy in 4.3% (1 case). ***Conclusion*:** Urinary lithiasis is a pathology whose frequency is constantly increasing in both industrialised and developing countries due to changes in socio-economic levels. It affects young adults, especially males.

Keywords: Renal Lithiasis, Lithogenesis, Nephrolithotomy, Pyelolithotomy.

INTRODUCTION

The term urinary lithiasis refers to the disease characterised by the formation and/or presence of a calculus in the urinary tract, the calculus being an agglomeration of crystals bound by an organic matrix [1].

Lithiasis, from the Greek "lithos" meaning "stone", is a clinical curiosity that has been detected since the dawn of time. It is intertwined with the history of mankind, since the first known stone dates back some 5,000 years, and was discovered by Elliot Smith in the pelvic bones of a mummy of a 15-year-old boy in Egypt [1].

It plays an important role in everyday urological practice. Depending on the country, it affects between 2% and 20% of the general population, with a recurrence rate of up to 50%. Its frequency seems to be increasing with the improvement in the standard of living (sedentary lifestyle, increased consumption of proteins, sugar and salt) [2].

Some authors, such as Matas, Rey, Ezickson and Clark in America, and others in Europe and South Africa, have reported that it is rare in the black Dembélé Z race [3], whereas studies carried out in Africa, and particularly in Mali, prove the opposite. In Morocco, Joual A. and colleagues [4], found a prevalence ranging from 3.76 to 16.3%, while Kaboré A [5], in Burkina Faso reported a prevalence of 12.52%. In Mali, Dembélé Z [3], in 2004 and Traoré Y.N [6], in 2012 found a hospital incidence rate of 7.06% and 16.56% respectively.

This pathology has multiple origins: nutritional imbalances, anatomical malformations of the urinary tract, urinary tract infection, pathologies of metabolic origin (genetic or acquired) as well as environmental factors which constitute for certain regions a significant factor in the prevalence of urinary lithiasis [2].

Urinary calculi often present with few or no symptoms and vary depending on the site of the stone. Positive diagnosis is made by imaging.

The seriousness of this pathology lies in its complications (impairment of renal function or even

renal failure) when management is delayed. Investigation of the impact of the stone on the renal parenchyma and renal function is essential and determines the prognosis [2].

For a long time dominated by the bladder form, calculi of the upper urinary tract (UUT), particularly the kidney, gradually came to the fore with industrialisation and, above all, the boom in diagnosis that followed the discovery of X-rays in 1895. This discovery made it possible to locate calculi throughout the urinary tract (kidneys, ureters, bladder, urethra). The uroscanner is now the gold standard for diagnosing urinary calculi.

The treatment of lithiasis has evolved considerably over the last 20 years. Technological advances have brought to light a new therapeutic arsenal dominated by extracorporeal lithotripsy (ECL) (which consists of breaking up a hard object, the stone, in a soft organ, the kidney, without damaging the latter) and endo-urology, which have limited the indications for open surgery, which currently accounts for only 5% of urinary stone treatments in technologically developed medical environments. In Mali we are not there yet [7].

Urinary lithiasis, particularly renal lithiasis, remains a topical issue in urological practice in Mali because of its frequency, diagnostic and therapeutic difficulty (costs and resources). The particularity of our study is that it concerns only renal lithiasis, and to this end we set ourselves the following objectives:

The data were entered using Microsoft Excel 2013 and analysed using SPSS version 21.0.

METHODOLOGY

Methods

Type and Period of Study: This was a prospective, descriptive study from 1 July 2016 to 30 June 2017 (12 months).

Study Location

Our study was conducted within the urology department of the university hospital centre (UHC) of Gabriel Touré.

UHC Gabriel Touré is located in the administrative centre of Bamako, between Commune II and Commune III.

It was established as a hospital in 1959 in memory of a young doctor from the first generation of African physicians, who died in 1934.

To the east is the Médina Coura town; to the west, the engineering school; to the south, the railway station; and to the north, the garrison of the army headquarters. The Emergency Department is located in the south-west and the Urology Department on the ground floor of the Bénitiéni Fofana in the north.

The UHC has twenty (20) specialists, 418 beds and 465 staff.

The urology department consists of :

Three doctors' offices

Two on-call rooms for interns and nurses.

Five hospital wards with fourteen beds and a dressing room.

A consultation cubicle

The staff consists of :

Three urological surgeons:

A professor who is the head of department

An assistant professor

A hospital practitioner

A medical assistant specialising in operating theatre, the department's major.

One senior healthcare technician.

Six health technicians.

Two surface technicians.

Doctoral students acting as interns at the Faculty of Medicine and Odontostomatology (FMOS).

The department also receives post-graduate students, trainee doctors, external students from the FMOS, students from the NIFTHS (National Institute for Training in Health Sciences), the Red Cross and other private health science training schools.

Study Population: All patients admitted to the urology department of the UHC Gabriel Touré, regardless of age, sex, race or ethnic.

Sample:

Inclusion Criteria: All patients with at least one imaging diagnosis of renal lithiasis greater than 4 mm in size were included in our study.

Non-Inclusion Criteria: The following were not included

- Patients in whom the diagnosis of renal lithiasis was not confirmed by imaging.
- Patients whose lithiasis was located in a part of the urinary tract other than the kidney.

Admission: All patients admitted to the study underwent a full clinical examination and, depending on the presenting signs, additional tests were ordered.

Surgical Procedures : They were performed by the surgeon-urologist and his assistants (interns in the department).

Post-Operative Follow-Up: A visit directed by the surgeons is organised every day to assess the general condition of patients, the need for dressing the surgical wound and any readjustment of post-operative medical treatment.

Post-Hospital Follow-Up: All patients were reviewed on an outpatient basis after left hospital (at 1 week, 1 month, 3 months, 6 months and 1 year).

The Phases of the Study

- A bibliographical research phase.
- A questionnaire preparation phase.
- A data collection phase.
- A data analysis phase.
- A writing phase.

The Parameters Studied Were : Age, sex, clinical, biological and radiological signs, treatment methods and disease progression.

The Media Used

- an individual survey form for data collection,
- the patient's medical file
- the operative report register,
- data was entered using Microsoft Word and Excel 2013
- The data was analysed using SPSS 20.

RESULTS

In the Course of Our Study :

We found 23 cases of renal lithiasis out of 49 cases of urinary lithiasis, iether 47% of cases. We recorded 49 cases of urinary lithiasis out of 338 surgical pathologies, iether 14.5% of cases. Renal lithiasis accounted for 6.8% of all surgical pathologies (23/338), 5.6% of hospitalisations (23/412) and 0.48% of consultations (23/4803).

The 31 to 40 age group was the most represented with 26.1%.

Average Age:

36 age. Male predominance with 60.8% of cases, with a sex ratio of 1.6 in favour of men. The main reason for consultation was low back pain in 18 cases (78.3%).

Urinary tract infection was found in 39.2% of our patients, and 30.4% had high creatinine levels. Calculi in six (06) of our patients were see in x-ray.

Ultrasound revealed the stone in 95.5% of the patients in whom it was performed. Uroscanner was used to make the diagnosis in all our patients.

Urinary bilharziasis was the most common antecedent among patients, accounting for 34.8% of cases. Hydronephrosis was the most frequent impact on the upper urinary tract, accounting for 52.2% of cases.

Our patients were treated with antibiotics and diuresis was performed in all of them. Pure analgesics were used in 21.7% of patients, anti-inflammatory drugs were given to 34.8% of patients and the combination of analgesics and anti-inflammatory drugs was used in 43.5% of patients. 65.2% of patients underwent nephrolithotomy, 30.5% pyelolithotomy and 4.3% nephrectomy (1 case). We recorded 21.3% intra- and post-operative complications.

SOCIO-DEMOGRAPHIC

1. Age:

Table I: Age distribution of patients.

Age[years]	Number	Percentage
0 -10	1	4.3
11- 20	3	13.1
21 -30	4	17.4
31- 40	6	26.1
41 - 50	5	21.7
51 - 60	3	13.1
61 - 70	1	4.3
71et plus	0	0
Total	23	100

The 31 to 40 age group was the most represented with 26.1%.
Average age: 36
Extremes: 6 to 62 years
Standard deviation: 15.502.

2. Uroscan

2.1. Result

Table II: Distribution of patients according to uroscanner findings

Result	Numbers	Percentage
Calculations seen	**16**	**100**
Calculations not seen	0	0
total	16	100

The uroscan was conclusive in all patients who underwent it.

2.2. Impact on the urinary system:

Table III: Distribution of patients according to impact on the urinary system

Impact	Numbers	Percentage
Hydronephrosis	**12**	**52.2**
Pyonephrosis	2	8.7
Dumb kidney	1	4.3
Absent	8	34.8
Total	23	100

Hydronephrosis was the most frequent impact on the upper urinary tract, accounting for 52.2% of cases.

2.3. Therapeutic Aspects:
Medical Treatment

Table IV: Distribution of patients according to medical treatment

Drugs	Numbers	Percentage
Antibiotic therapy	**23**	**100**
Dietetics	**23**	**100**
Analgesics	5	21.7
Anti-inflammatories	8	34.8
Antal+anti-inflam	10	43.5

Antibiotic therapy and diuresis treatment were used in all our patients. Pure analgesics were used in 21.7% of patients, anti-inflammatory drugs were given to 34.8% of patients and the combination of analgesics and anti-inflammatory drugs was used in 43.5% of patients.

Surgical Treatment:

Table V: Distribution of patients according to surgical treatment

Surgical method	Numbers	Percentage
Nephrolithotomy	15	65.2
Pyelolithotomy	7	30.5
Nephrectomy	1	4.3
Total	23	100

Nephrolithtomy was performed in 65.2% of patients, pyelolithotomy in 30.5% and nephrectomy in 4.3% (1 case).

DISCUSSIONS

During the 12-month survey period (July 2016 to June 2017) in the urology department of UHC Gabriel Toure, 338 patients underwent surgery, including 49 cases of urinary lithiasis pathology, among which 23 cases of renal lithiasis. In the urology department of UHC Gabriel Touré, urinary lithiasis was the 2nd most frequent pathology with 14.5% of cases. Among this lithiasis pathology, kidney stones ranked 1st with 47% of cases. The same observation was made by Daffé S.I [7], and Dembélé Z [3]. Elsewhere, the frequency of renal lithiasis varies from one country to another and from one region to another. Kaboré A.F [5], in 2013 in Burkina Faso, Mounia G [66], in 2016 in Morocco, Diakité G.F [15], in 1985, Ongoïba I [16], in 1999 and Dembélé Z [3], in 2005 in Mali found respectively 45.1%; 56.8%; 43.4%; 43.8% and 44.45% cases. This result is significant at p=0.02 (p<0.05). This could be due to their geographical location, eating habits and frequency of exposure to bilharzian infection.

In our study, the 31 to 40 age group was the most affected with 6 cases, iether 26.1%. The mean age of our patients was 36 years, with extremes ranging from 6 to 62 years and a standard deviation of 15.502. This result is comparable to those obtained by Mounia G [66], and Dembélé Z [3], who found respectively 26% for the 26-36 age group and 27.6% for the 21-35 age group. This result is highly significant, p=0.007 (p<0.05). It coincides with what the literature tells us, namely that urinary lithiasis is more frequent in young adults.

In our series, males predominated with a rate of 60.9%. The ratio was 1.6 in favour of men. This result is lower than that reported by Diakité G.F [15], who found 79.7% for the same sex. This difference may be explained by the fact that his study covered the entire urinary tract, including the lower urinary tract which, with its multiple bladder, prostate and urethral pathologies (sclerosis of the bladder neck, prostatic hypertrophy, urethral stricture) absent in women, means that lithiasis of the lower urinary tract is very common in men.

Shopkeepers dominated the sample with 8 patients, i.e. 34.8%, followed by housewives and students with 4 cases each, i.e. 17.4%.

This predominance could be explained by the use of small shops by the population as a result of unemployment and low literacy rates.

Lithiasis is Linked in Some Cases To :

Professional activities involving prolonged exposure to the sun and high temperatures, with their corollary, dehydration, which, if not compensated for, facilitates the precipitation and aggregation of urinary crystals.

A Sedentary Lifestyle

We chose certain risk factors on the basis of whether they were consumed regularly and in significant quantities. Meat, milk and fish were the risk factors consumed most regularly, with a frequency of 87%, 65.2% and 52.2% respectively. These three foods were eaten regularly by 39.1% of our patients. These risk factors were mentioned by Dembélé Z [3], who found similar results in his study, with milk being consumed by 75% of lithiasis patients, fish by 81.95% and meat by 91.70%. This is significant with $p=0.04$ ($p<0.05$).

Some of our patients regularly consumed other lithogenic risk factors, in particular coffee (30.4%) and chocolate (21.7%).

In the absence of any means of analysing the chemical composition of the stones, we were unable to establish the relationship between the risk factors and the occurrence of lithiasis in our patients.

Low back pain was the main reason for consultation in 18 cases (78.3%), followed by haematuria in 3 cases (13%). The combination of low back pain and haematuria was the reason for consultation in 2 patients (8.7%). Dembélé Z [3], and Kaboré A [5], had renal colic as their main reason for consultation, with 40.27% and 32.7% respectively. These results are classic, pain being the predominant symptom in upper lithiasis. Haematuria could be explained by micro-lesions caused by lithiasis on the mucosa of the intra-renal excretory tract.

Functional Urinary Signs

were absent in our patients because these signs mainly concern lithiasis of the lower urinary tract (mictional burning, pollakiuria, dysuria due to bladder irritation by a bladder stone, acute retention of urine due to a stone embedded in the urethra).

Nephrolithotomy : was performed in 15 patients (65.2%), followed by uretero-vesical reimplantation in 2 patients at a later stage.

Pyelolithotomy: was performed in 7 patients (30.4%), 2 of whom were fitted with a JJ catheter.

Nephrectomy: was performed in one patient. This was a patient with pyonephrosis due to renal lithiasis.

For the 2nd pyonephrosis, the kidney was considered viable and so we drained the pus and proceeded to extract the calculus.

Our results are comparable to those obtained by Dembélé Z [3], and Traore Y.N [6], who described open surgery as the main therapeutic alternative in their studies. On the other hand, in the study by Mounia G [66], in Morocco in 2016 NLPC was performed in 65.92% of patients.

We also gave our patients antibiotic treatment and used analgesics and treatment of inflammation. A dietary treatment based essentially on good diuresis was also indicated to patients.

Post-Operative Follow-Up :

They were simple in 18 patients, i.e. 78.3% of cases. The complications observed were
1 case of intraoperative haemorrhage.

3 cases of parietal suppuration with delayed healing of the surgical wound. After sterilisation of the site, these patients underwent secondary suturing.

There was one case of death during the operation due to cardiovascular arrest.

Time taken to remove the various drains :

Bladder Catheter: on D1 post-op, once it has been established that the appearance of the urine is normal

Loge Drain: at D2 post-operatively, once it has been established that it is no longer returning fluid

Catheter J-J: 6 months after the operation

Overall, therefore, we can say that we have had good results in the management of our patients with renal lithiasis, since out of our 23 patients we have had only 5 cases of complications, 4 of which were resolved.

However, we regretted the loss of the 5th patient on the operating table.

CONCLUSION

Urinary lithiasis is a pathology whose frequency is constantly increasing in both industrialised and developing countries due to changes in socioeconomic levels. It affects young adults, especially males.

Pain is the most frequent clinical manifestation, and can sometimes lead to serious complications. Investigation is based on a clinical, biological and, above all, imaging work-up.

Its management combines medical treatment of the acute episode and surgical treatment to remove the stones. Open surgery remains the only surgical option in our context.

The disease often recurs, so close monitoring is essential.

Good dietary hygiene, physical activity and good diuresis are important means of preventing the disease.

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