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# Epidemiology of Urinary Lithiasis in a Population of Western Morocco: Retrospective Study of 100 Patients

**Mohamed Tebaa[1], Mohamed Cheqboub[2], Othmane Mouslim[3], Mohamed Amine Lakmichi[4], Zakaria Dahami[5], Said Mohammed Moudouni[6], Ismail Sarf[7]**

[1-7]Arrazi Urology Service, CHU Mohammed VI, Faculty of Medicine and Pharmacy, Cadi Ayad University, Marrakech, Morocco

**ABSTRACT**

Urinary lithiasis is a common condition, 5-9% in Europe, 12% in Canada and 15% in the United States of America (USA). Few studies exist on urinary lithiasis disease in other developing countries, factors of clinical and morphological variations of patients with urinary lithiasis. The aim of this work was to report the epidemiological aspects and to describe the clinical and imaging characteristics of urinary lithiasis in urological settings. This is a retrospective descriptive study of a cohort of 100 patients. Data were collected from the patients' medical records, consultation and hospitalization registers. The mean age of our patients was 48 years, with extremes ranging from 22 to 81 years. Our series is characterized by a slight female predominance with 54% of the cases and men (46% of the cases) graph 1. 29.6% of the women represented in our study have an age ranging from 50 to 59 years while 32% of the men have an age of 50-59. The distribution according to rainfall zones shows a predominance of patients from semi-humid zones with a percentage of 83%. The weight distribution of the patients shows variations according to sex and age group. There was a predominance of women in the 80-89 kg weight range with a percentage of 31.48%, followed by those in the 90-99 kg range (20.3%). For men, 37% for weights between 80 and 89 kg and 26% for weights between 90 and 99 kg. Lithiasis measuring less than 19 mm was predominant in all age groups with a percentage of 65%. Complex calculus measuring more than 40 mm represent a percentage of 22%, with a predominance in the 70-79 (5%) and 40-59 (2%) age groups. There is a parallel evolution of stone size with weight. For stones larger than 40 mm, weights ranging from 70-99 kg are in the majority. The progression of lithiasis would be parallel to the protein consumption, which is directly correlated to the average per capita income. Our study showed that 59% of the patients for whom a nutritional survey was performed had an excessive consumption of lithogenic foods. In various developing countries, a progressive evolution of the epidemiological profile of calculi towards that observed in industrialized countries. There is an increased risk of lithiasis demonstrated in cases of overweight or obesity which are frequently accompanied by metabolic syndrome.

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**KEYWORDS:**
urinary lithiasis - stone - risk factors.

## INTRODUCTION

Lithiasis is defined as abnormal precipitation of normal urine components in the urinary tract. It is a common condition, 5% to 9% in Europe, 12% in Canada and 15% in the United States of America (USA) [1].

There are few studies on the factors of clinical and morphological variations of urinary lithiasis in developing countries [2,3].

The objective of this work was to report the epidemiological aspects and to describe the clinical and radiographic features of urinary lithiasis in the urinary tract.

## OBJECTIVE OF THE WORK

Clearly establish the various epidemiologic aspects and describe the clinical and imaging features of urolithiasis in the urologic setting.

***Corresponding Author: Mohamed Tebaa***

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## PATIENTS AND METHODS

**Study setting: This is a** retrospective descriptive study of a cohort of 100 patients with calculi at the Arrazi Urology Department, CHU Mohammed VI.

**Data sources/measures:** The study was conducted at the Arrazi Urology Department, UHC Mohammed VI, Faculty of Medicine and Pharmacy, Cadi Ayad University. All patients with urinary lithiasis whose archived medical records included the following minimum information were included in this study: age, sex, occupation, and a complete medical observation (history, background, clinical examination, and medical imaging data.

**Data collection:** data were collected from patients' medical records, consultation and hospitalization registers. Data analysis was performed by both SPSS and Excel software.

## RESULT

**Participants:** 100 participants in our study. The mean age was 48 years. The average follow-up was 36 months.

**Descriptive data:**

The mean age of the patients was 48 years, with extremes ranging from 22 to 81 years. The most represented age group was 50-59 (31% of cases) followed by 40-49 (19% of cases). Our series is characterized by a slight predominance of women (54% of cases) and men (46% of cases) Figure 1. 29.6% of women represented in our study have an age ranging between 50 and 59 years while 32% of men have an age of 50-59. There is a predominance of the age range 50-59 for both sexes Figure 2.

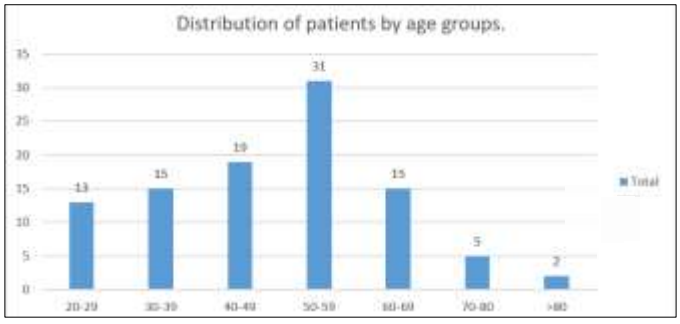


**Figure 1: Distribution of patients by age groups.**

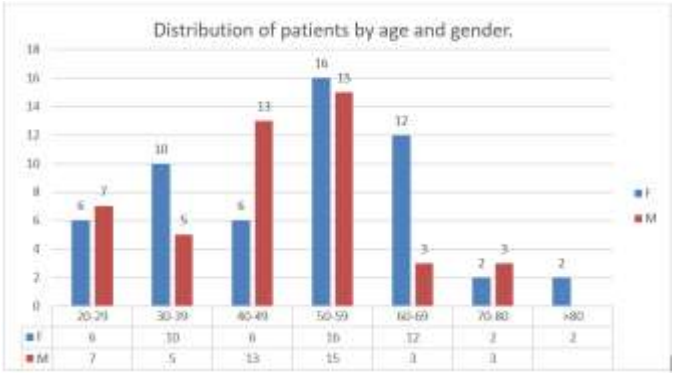


**Figure 2: Distribution of patients by age and gender.**

In our series, 72% of the patients had a urological history. The majority of patients had a history of renal colic, low back pain and recurrent urinary tract infections. Pain dominated the clinical picture, in fact low back pain was found in 90% of the patients, while 19.5% of the patients had consulted for urinary disorders with a female predominance of 60%.

The distribution according to rainfall zones shows a predominance of patients from semi-wet areas with a percentage of 83% Figure 3.

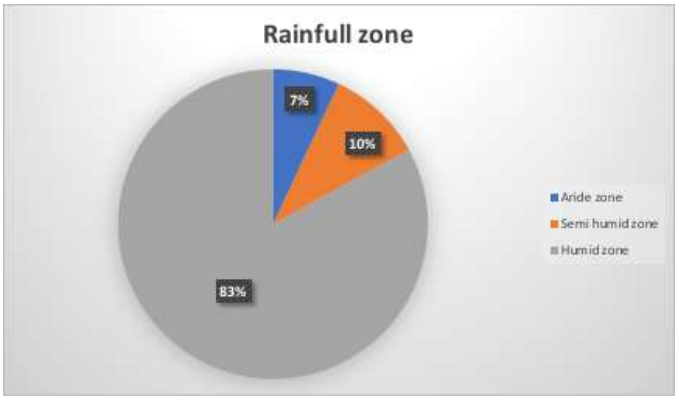


**Figure 3: Distribution of patients by rainfall zones.**

On general examination, we found that 15 patients had a blood pressure greater than or equal to 14/9, i.e. 15%, and that 24 patients had a temperature greater than or equal to 38°C, i.e. 24%. The weight distribution of the patients showed variations according to sex and age group. There was a predominance of women in the 80-89 kg range with a percentage of 31.48%, followed by those in the 90-99 kg range (20.3%). For men, 37% for weights between 80 and 89 kg and 26% for weights between 90 and 99 kg. There is a predominance of both sexes for weights ranging from 80-89 (33%) followed by 90-99 (23%) Figure 4.


**Figure 4: Weight distribution by gender.**

Physical examination of the patients revealed the following findings: lumbar tenderness in 76% of the patients, normal examination in 19% of the patients; large kidney in 1.5% of the patients and gross hematuria in 4.7% of the patients.

**Imagery:**

The kidneys, ureters, bladder (KUB) radiograph was performed in 70% of patients and had allowed to demonstrate lithiasis in 57 cases. Ultrasound was performed in all patients and revealed stones in 90% of patients. All our patients had a CT scan. We note the predominance of stones smaller than 19 mm, all ages combined, representing 65%. Complex stones larger than 40 mm accounted for 22%, mainly in the age groups 70-79 (5%) and 40-59 (2%) figure 5.

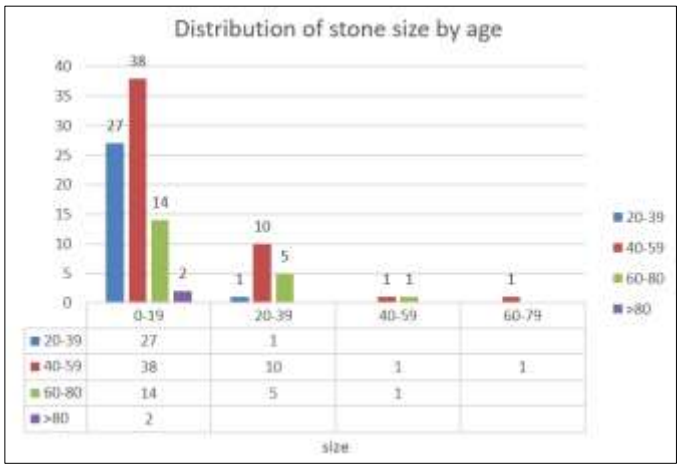


**Figure 5: Distribution of stone size by age.**

Stone size varied with body weight, with a 70% predominance of patients weighing 70-99 kg. The weight of 40 to 69 kg was 15%. The predominant weight for gems 20 to 39 mm was 70 to 99 kg, or 62.5%. For stones over 40 mm the weights ranging from 70-99 kg are in the majority. Figure 6.

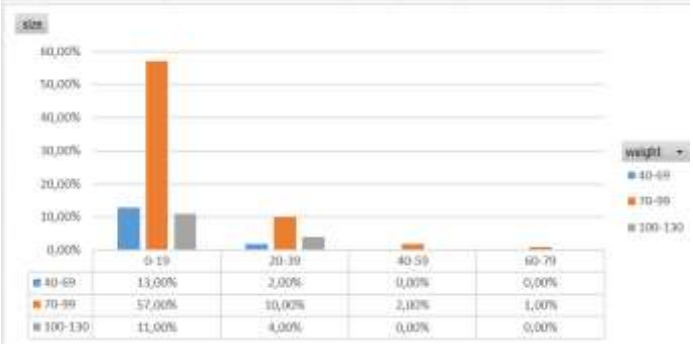

**Figure 6: Distribution of calculations by weight.**

## DISCUSSION

Our patients ranged in age from 22 months to 81 years. The mean age was 48 years. Our results are consistent with those reported by other studies. A study in Africa by Coulibaly et al showed an age between 40 and 50 years, comparable to our study [4]. The mean age in the Middle East is 35 and 41 years respectively [5].

The progression of lithiasis disease will occur in parallel with protein consumption itself, which is directly related to per capita income. Our study showed that 59% of the patients who underwent nutritional surveys were eating too much lithogenic food. In various developing countries, the epidemiological characteristics of calculus have gradually evolved towards those observed in industrialized countries [6]. Our patients ranged in age from 22 months to 81 years. The mean age was 48 years. Our results are consistent with those reported by other studies. A study in Africa by Coulibaly et al showed an age between 40 and 50 years, comparable to our study [4]. The mean age in the Middle East is 35 and 41 years respectively [5].

The progression of lithiasis disease will occur in parallel with protein consumption itself, which is directly related to per capita income. Our study showed that 59% of the patients who underwent nutritional surveys were eating too much lithogenic food. In various developing countries, the epidemiological characteristics of stones have gradually evolved towards those observed in industrialized countries [6].

Our series showed a slight predominance of women, 54% of cases and men (46% of cases); in our study, 29.6% of women were between 50 and 59 years old while 32% of men were between 50 and 50. Between 59 years of age. This ratio is comparable to that observed in other Moroccan series [7,8] in France [9] in Belgium [10].

The increased incidence of lithiasis disease seen in developed countries is associated with excess weight. An analysis of the Health Professionals Follow-up Study and the Nurses' Health Study concluded that there is an association between weight gain and the incidence of stone disease. Comparing a group of patients weighing more than 100 kg with a group of patients weighing an average of 68 kg, they found a 44% increased risk of kidney stone formation in men and 90% in women.

Weight gain after the age of 21 years also increased the risk in comparable proportions [11,12]. These results are comparable to our study where we note a predominance of both sexes for weights ranging from 80-89 (33%) followed by 90-99 (23%).

An increased risk of lithiasis has been demonstrated in cases of overweight or obesity, which are frequently accompanied by metabolic syndrome. Recent epidemiological studies have shown that the prevalence of lithiasis is increased in diabetics [13-14]. In non-diabetic subjects who are overweight or obese, urinary hyperacidity related to the fractional excretion of uric acid is notably reduced [15,16]. There is therefore essentially a risk factor for lithiasis related to overweight, as shown in our study.

## CONCLUSION

Urinary calculosis is a disease that is constantly increasing in developed countries as well as in developing countries. The epidemiology of stones reflects the evolution of dietary habits and health status. Stone disease is one of the most important pathologies, like hypertension, cardiovascular disease or diabetes, in which environmental factors play an

important role. Future studies on urolithiasis will help to better define the epidemiological profile of this pathology and to determine the risk factors in our country.

## CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

## AUTHORS' CONTRIBUTIONS

All authors contributed to the conduct of this work. All authors also declare that they have read and approved the final version of the manuscript.

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