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Contribution of Imaging in the Management of Urinary Lithiasis at the Urology-Andrology Department of Ignace Deen Hospital

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Abstract

Introduction: Medical imaging plays a predominant role in the diagnosis of urinary lithiasis. **Objective:** To evaluate the contribution of imaging in the management of urinary lithiasis in the Urology-Andrology department of Ignace Deen hospital. **Methodology:** This was a descriptive retrospective study lasting 2 years from January 1, 2020, to December 31, 2021, covering 51 cases of urinary lithiasis. Results: The hospital frequency was 5.09%. The age group of 41 - 50 years was the most represented, with an average age of 44.14 years. The sex ratio was 7.5. Dysuria was the main reason for consultation at 54.90%. The couple of urinary ultrason + KUB radiography was the most performed imaging examination at 49.02%. The pyelic location of the stone was 33.33%. Cystolithotomy was performed in 58.82% followed by pyelolithotomy in 27.45%. The evolution was favorable in 90.20%, and we noted 5 cases of complications in the form of peritoneal breach. **Conclusion:** Lithiasis is a common pathology in urology. Radiological examinations have made it possible to diagnose lithiasis, identify the location of the stone, highlight certain characteristics, and guide the therapeutic approach.

Keywords

Urinary Tract, Stone, Medical Imaging

1. Introduction

Urinary lithiasis is a disease characterized by the formation of solid concretions

(stones) in the urinary tract [1]. Several factors are involved in the predisposition to lithiasis, notably [2]. Medical imaging plays a crucial role in the diagnosis of urinary lithiasis and therapeutic decision-making; performing this imaging allows for the specification of the number of stones, their location, and size to search for any potential complications related to the stones [3].

To date, several imaging methods are used in the exploration for the diagnosis of urinary stones, notably Uro-computed tomography (UroCT) [4]. The objective of this study was to:

- Determine the frequency of urinary stones at CHU Ignace Deen.

- Highlight the proportion of different imaging examinations in the diagnosis of urinary stones.

- Describe the radiological aspects of urinary stones.

2. Methodology

This was a retrospective descriptive study conducted over a duration of 2 years from January 1, 2020, to December 31, 2021, at the Urology-Andrology Department of Ignace Deen National Hospital. We collected 51 records of urinary lithiasis during this study period. The data studied included age, sex, clinical and paraclinical data (ultrasound of the urinary tract, urinary ultrasound + KUB radiography, Uro CT scan), anatomical location of the lithiasis, size, number, consistency, the surgical treatment performed, and the postoperative follow-up.

3. Results

During the study period, out of 1002 patients followed in the department, 51 had urinary lithiasis, representing a frequency of 5.09%. The age group of 41 - 50 years was the most represented (29.41%) with an average age of 44.14 years, ranging from 2 years to 85 years. Men were more prevalent (88.24) with a sex ratio of 7.5. Dysuria was the main reason for consultation in 28 patients (54.90%), followed by nephritic colic in 25 patients (49.01%). Tenderness in the lumbar region was the main physical sign documented (41.17%), followed by bladder distension (19.60%).

All our 51 patients had a urine culture, of which 29 (56.86%) had sterile urine, compared to 22 (44.14%) who had a urinary infection. The most commonly found germ was Escherichia coli in 9 patients (17.65%), followed by Staphylococcus aureus in 6 patients (11.77%). The combination urinary ultrason + KUB radiography was the most commonly performed imaging examination in 25 of our patients (49.02%). This was followed by urinary ultrasound alone in 15 patients (29.4%), according to **Table 1**. The pelvic location of the stone was the most frequent location in 22 patients (33.33%), according to **Table 2**.

There was an impact of the stone on the upper urinary tract in 5 of our patients, including 3 cases of ureterohydronephrosis and 2 cases of hydronephrosis. All 51 of our patients underwent surgery as treatment for the stone. Cystolithotomy was performed in 30 patients (58.82%), followed by pyelolithotomy associated with

the placement of double J stent in 14 patients (27.45%). In our study population, out of the 51 operated patients, the outcome was favorable with simple postoperative results in 46 of our patients (90.20%); however, we noted 5 (9.80%) cases of complications such as peritoneal opening.

Table 1. Distribution of patients according to the imaging examination performed.

Imaging	Number	Percentage (%)
Urinary ultrason + KUB radiography	25	49.02
Urinary ultrason	15	29.41
UroCTscan	11	21.57
Total	51	100

Table 2. Distribution of patients according to the location of the stone (N = 66).

Localization	Number	Percentage (%)
Bladder	**37**	56.07
Pelvic renal	22	33.33
Ureteral	7	10.6
Total	66	100

N = 66 because some patients had more than 1stone.

4. Discussions

During the study period, 1002 patients were treated, fifty-one (51) patients of urinary lithiasis were managed, which represents 5.09%, and nine hundred fifty-one (951) cases of non-lithiasic pathologies, amounting to 94.91%. This is similar to the European rate of 1 to 5% for emergency admissions. In our series, the most affected age group was 41 to 50 years, accounting for 29.41% with an average age of 44.14 years. The youngest patient was 2 years old and the oldest was 85 years old.

In a study conducted by ABAGO *et al.* in 2021 in Togo, the most affected age group was 40 to 50 years old, with an average age of 44.5 years, and extremes of 1 and 88 years [5]. Y DIALLO *et al.* [6] in 2015 in Senegal found that the age group of 40 to 60 was the most affected. These results indicate that the age group frequently affected by urinary lithiasis is explained by the high frequency of metabolic diseases. The male predominance was very marked in our series with a sex ratio of 7.5. Our result is similar to those in the literature, which states that the male sex was more likely to develop lower urinary tract stones [7].

This male predominance could be explained by the length of the male urethra and the multiplicity of certain factors favoring lithogenesis in men (subvesical obstructions), whereas women have a shorter urethra and a high urinary flow rate and are less exposed to lower urinary tractstone disease. During this study, dysuria was the most frequent reason for consultation at 54.90%, followed by nephritic

colic and pollakiuria. Our results are consistent with those of many studies dedicated to urinary lithiasis, which found that urinary disorders of all kinds dominated the clinical table [8].

This phenomenon could be explained by the location of the calculus, its association with urinary infections and pathologies of the lower urinary tract. The search for urinary infections was essential, pathogenic germs were found in 43.14%, with Escherichia coli being the most isolated germ at 17.65%, followed by S. aureus at 11.77%. Our results are consistent with the literature data indicating that urease-producing germs are implicated in the formation of urinary stones [9].

The paraclinical imaging assessment mainly consisted of the combination of urinary ultrasound and KUB radiography in 49.02% of cases, followed by ultrasound at 29.41% and uro CT scan at 21.57%. These results could be explained by the high rate of prescription for urinary ultrasound and X-ray in any suspicion of urinary lithiasis, considering their accessibility and the average income of patients. In our series, bladder lithiasis was the most represented at 56.07%, followed by pyelic lithiasis at 33.33%. Our results are similar to those of DAUDON M *et al*., who reported a high rate of bladder lithiasis at 35.3% [10].

We noted an effect of the stone on the upper urinary tract in 5 of our patients in the form of ureterohydronephrosis and hydronephrosis.

In this study, cystolithotomy was the most common surgery performed, accounting for 58.82%. In the literature, the therapeutic indications are better established and take into account the patient's background, the nature, size, and location of the stone. Postoperative outcomes were favorable in 90.20% of our patients and 9.80% intraoperative complications like peritoneal opening repaired during the procedure. Our results could be explained by the good mastery of surgical techniques and the low incidence of associated pathologies.

5. Conclusion

Lithiasis is one of the most common pathologies in Urology. It affects all ages and sexes, with a male predominance. The diagnosis was based on imaging; during this study, the combination of urinary ultrasound and KUB radiography was the most performed imaging examination. These radiological examinations allowed for the diagnosis of lithiasis, indicated the location of the calculus, provided certain characteristics, and guided the therapeutic approach.

Conflicts of Interest

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

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