

# Outcomes of Ureterorenoscopy for Lower Pole Kidney Stones ( $\leq 3$ cm) to the Omar Bongo Ondimba Army Instruction Hospital

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## Abstract

**Introduction:** The management of kidney stones has benefited from endoscopic techniques, in particular the development of flexible ureteroscopy (ureterorenoscopy). This endoscopic treatment has made it possible to treat many upper urinary tract stones, with satisfactory results and less morbidity. This innovative minimally invasive technique was introduced in our country in 2018. It is not practiced in all health structures. We report our experience. **Objectives:** The aim of our study was to evaluate the place of flexible ureteroscopy laser, its feasibility, and the results on stones up to 30 mm in size only in the lower calicinal group, while assessing the postoperative quality of life. **Patients and Methods:** We conducted a monocentric observational retrospective study at the Omar Bongo Ondimba Army Training Hospital (OBO ATH) on 22 patients with symptomatic inferior calicel stones, over a period of January 2019 and December 2020 treated by flexible ureteroscopy laser (FUR-L), once or twice depending on the size of the residual fragments. **Results:** All the patients had symptomatic urolithiasis, diagnosed on the clinical elements, and confirmed in 77% by urinary computed tomography. The average age was  $35.47 \text{ years} \pm 12$ , with a clear female predominance (64%). All the stones sat in the lower calice. 66.5% of stones were larger than 10 mm. 75% of patients were “stones free” after one FUR-L session, and 100% after the second session. 10% of patients still had residual pain at 01 month which was absent at 03 month. 18% of postoperative urinary tract infections were treated with antibiotics. 90% of the patients had resumed an activity prior to 1 month. At 1 month and 3 months, 82% and 100% respectively were satisfied with the mode of treatment according to self-questioning. **Conclusion:** FUR-L

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remains a therapeutic modality for stones in the lower calicial group, for stones whose diameter is close to 30 mm. A sequential approach should be considered for diameter stone up to 30 mm.

## Keywords

Renal Stone, Lower Calyx Group, Flexible Ureteroscopy (FUR), Laser (L)

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## 1. Introduction

Flexible laser ureteroscopy (FUR-L) has become the essential treatment in the management of kidney stones measuring less than 2 cm [1] [2]. Its indication in stones larger than 2 cm is increasingly popular today, and its place is better defined within the therapeutic arsenal of this class of stones [3] [4].

The aim of our study was to evaluate through a retrospective analysis of 22 patients with lower calyx stones treated by flexible laser ureteroscopy, the feasibility and results of this technique on stones of size between 3 and 30 mm. And as a secondary objective, to assess the overall rate of patient satisfaction through postoperative self-questioning.

## 2. Patients and Methods

We have carried out a single-center retrospective study in the urological surgery department of the OBO ATH. We included 22 patients between 2019 and 2020, presenting kidney stones of the lower calicial group treated by reusable URS, with a regular follow-up over 1 year.

We included all patients who presented with simple or complicated renal colic due to urolithiasis, the size of which is between 3 and 30 mm. The diagnosis of nephrolithiasis had been strongly suggested clinically and confirmed on imaging. The biological assessment had served as a standard preoperative assessment and an infectious assessment according to the clinical situations, supplemented by an CBUE, and Ds. All the patients had been operated under prophylactic antibiotic therapy, with a negative CBUE, and under spinal anesthesia. The treatment modalities were either a one stage treatment by ureteroscopy on a ureter not previously prepared by a JJ stent probe, or in two stages (JJ then ureteroscopy). A postoperative evaluation by CT scan without injection of fine sections was carried out 1 month after removal of the JJ stent probe, to assess the existence of residual fragments and their size. The decision to re-treat with ureteroscopy was based on the size of the residual fragments, their location, the impact on the kidney and whether they were symptomatic. The material used was JJ stents, a rigid ureteroscope (R-URS), and a flexible ureteroscope (FLEX-X2). The laser device used was the MEGA Pulse from 1.6 to 20 W of power with a fiber of 230  $\mu\text{m}$ . We used Re-Trace access sheaths (12/14Ch, Coloplast). The laser was used in Dusting or Fragmentation mode. A Dormia-type forceps made it possible to

recover the residual fragments.

The patients had been clearly informed about the possibility of one or more FUR-L sessions when choosing the treatment and developing the therapeutic plan.

The monitoring was only clinical and especially radiological by performing a CT scan without injection of the urinary tract at 03 months. The absence of residual stone conferred on the patient the status of “stone free”. Success was defined by the absence of fragments or the presence of fragments less than 2 mm asymptomatic at the time of the control. The duration of the Total Temporary Incapacity (TTI = sick leave), the quality of life was assessed based on a questionnaire drawn up at 1, 3 and 6 months. The calculations were analyzed by spectrophotometry. A remote metabolic assessment was systematic. All patients had health insurance that covered the cost of the intervention at 90% or even 100%. A First FUR-L session costs on average 875,000 FCFA (1335.54 euros) without health coverage, the second session was calculated based on the first session, 437,500 FCFA (667.77 euros). The database had been introduced and analyzed in the Numbers software update 2021 ([Table 1](#)).

### 3. Result

All patients had symptomatic urolithiasis, diagnosed on clinical grounds, and confirmed in 77% by urinary computed tomography. The mean age was  $35.47 \pm 12$  years, with a clear female predominance (64%). All the stones were seated in the lower calice. 66.5% of stones were larger than 10 mm, with 8% representing two patients had stones larger than 20 mm. Most stones were unilateral, only two patients had symptomatic bilateral stones, which had been treated at the same time. 86% of our patients had a JJ endoprosthesis at the end of the procedure. In total, there were 24 FUR-L procedures initially with a stone free rate of 75%, and 25% residual stones with an average size of 7 mm.

6 (25%) second look FUR-L had been performed at 1 month on residual stones, with a result rate of 100% stone-free in all patients. Postoperative self-assessment ([Table 2](#)) showed 10% of patients who still had residual pain at 1 month but absent at 3 months and 6 months. 18% of postoperative urinary tract infections had been treated with antibiotics. 90% of patients had resumed activity before 1 month. At 1 month and 3 months, respectively 82% and 100% were satisfied with the mode of treatment according to the self-question.

### 4. Discussion

Urinary lithiasis disease represents a management issue in our country, with a poorly assessed incidence. Urolithiasis represents 30% of the consultation in our department each month, and half of them will be operated on.

The diagnosis remains clinical in most cases, and morphological imaging by Uroscan (gold standard) will make it possible to make an overall assessment of the disease, by confirming the positive diagnosis, but above all by specifying the

**Table 1.** Sample analysis data.

Settings	Effective (n)	%
Clinical		
Fever	17	77
Low back pain	20	90
hematuria	3	14
Additional tests		
ECBU	20	90
TDM without PC	17	77
Ultrasound – AWP	10	45
Size of stone		
≤3 mm	2	8
[3 - 6]	6	25
[6 - 10]	5	21
[10 - 20]	9	38
>20 mm	2	8
Stone number		
Unilateral	22	92
Bilateral	2	8
All Ureterorenoscopy Treatment: 24		
Without stent JJ	3	14
With stent JJ before	19	86
Number of interventions		
single ureterorenoscopy session	24	100
Two ureterorenoscopy (second look)	6	25
Results: stone free rate		
After the first FUR	18	75
After the second FUR	6	100
Size of residual stones	18	75
≤2 mm		
[6 - 7]	3	12.5
[7 - 8]	3	12.5
Infectious complications	4	18

**Table 2.** Post opérative evaluation questionnaire.

Questions?	01 month	03 month	06 month
Presence rate of residual pain at	10%	0%	0%
Rate of return to normal activity at	90%	100%	100%
Rate of acceptability of treatment by FUR-L in the future	100%	100%	100%
Overall satisfaction rate at	82%	100%	100%

number of calculations, their location, the size, the impact on the upper apparatus, their density, the anatomy of the calyx stems and calyces, that of the lower calyx [5] [6].

It is since Dretler in 1994 [1], that the flexible ureteroscopy technique has been described, this one has known enormous technological advances in particular the use of active deflection at 270° which has allowed an exploration of the of the renal cavities [4] [7], thus making it possible to treat all upper tract stones, since no stone is resistant to the laser [7] [8]. The indications for FUR-L are becoming more and more precise, in first intention in the renal stone of the upper device and take a particular place in the stones of the lower calice group [8] [9] [10]. Some authors make it a matter of course, compared to other procedures such as the mini PCNL, PCNL [9]. The international guidelines provide a high level of evidence for this indication [4] [5] [7].

We treated our patients with FUR-L, in one session for stones less than 15 mm. And in two sessions for the rest, often combined with a R-URS in 42% of cases if the fragments were found along the ureter.

Our patients were relatively young with an average age of 35, with no real comorbidities noted. Young age is often the one found in many series, although lithiasis disease affects all age groups. The existence of the metabolic syndrome is currently incriminated in the lithogenesis of another stone [3] [4]. 17 of our patients had obstructive pyelonephritis, whose management, in addition to probabilistic antibiotic therapy with quinolones, was emergency JJ stenting and treatment with FUR-L, 10 - 15 days later. Of these obstructive pyelonephritis, 15 patients had ureteric stones initially, and 2 patients presented with directly enclosed stones of the lower calyx group, with dilation of the calyx and perirenal infiltration on imaging. Paradoxically, a ureteral calculus can be relocated in the kidney (as in our series), especially in the lower calyx (most sloping area) when the initial JJ stent is raised. The risk of stone migration after ureteroscopy is estimated at 7% [1]. The whole question is that of the therapeutic approach, knowing that all infectious stones must be removed regardless of their location and size [11] [12]. Our infected patients had been treated by Dusting effect, reassuring themselves to be the closest to stone free, a JJ endoprosthesis was in place at the end of the procedure.

4% or 18% of these patients presented an infectious syndrome made of persistent fever over 72 hours, the identification of the germ on the intraoperative urine samples made it possible to modify the antibiotic therapy. Urinary tract infection remains a frequent complication in case of endoscopic procedure on the urinary tree despite sterile preoperative CBUE and intraoperative antibiotic prophylaxis, it represents 2% - 18% [1] [4], it is increased in case of infected stone [2].

The rest of the patients had hyperalgesic renal colic, including 3 on ureteral stone treated with JJ stent first, then a week later with R-URS + lithoclast, supplemented by FUR for compression of the residual fragments lodged in the low-

er calyx, the largest of which was 7 mm and was symptomatic.

FUR-L made it possible to process all our stones, the re-localization at the level of the renal pelvis in 91% made it possible to reduce the angulation constraints imposed on the ureteroscopy, this recommendation is widely described in the series, and is an integral part different times of the learning curve widely detailed by many experts including O. Traxer [2]. The optical fibers of the ureteroscopy (FLEX-X2) are very fragile, the very acute angles of the lower chalice often impose significant deflections, relocating the calculation in the axis of the light and the strike angle makes it possible to protect our devices, including maintains it at a cost [10] [13].

Six stones benefited from a two-stage treatment, these were some residual stones with a diameter between 6 and 8 mm, all symptomatic and obstructive. The contribution of the R-URS lies in the treatment or re-treatment in several sessions of these residual stones which are either infectious or obstructive depending on their size. We have deliberately chosen to re-treat all symptomatic and/or infectious stones with a diameter > 6 mm. Performing one or more FUR-L sessions must be integrated into the overall therapeutic project, and clearly explained to patients [12] [13]. Bilateral calculus treatment at the same time confirms the less morbid nature of the ureteroscopy [2] [14].

We had noticed that the size of stone was not necessarily an obstacle to the use of the FUR-L from the outset [15] [16]. A calculation of more than 20 mm, can be vaporized in a single FUR-L, with insignificant residual fragments, the work and numerous publications of Olivier Traxer and his team show this well [16] [17]. Even if very clearly the calculations of more than 20 mm, must make consider the possibility of a reprocessing, which is integrated into a project explained to the patient. We used 17 access sheaths, without increasing the morbidity at the time of the realization of the FUR-L, on the other hand the Re-Trace access sheaths offer an additional safety gain [2] [14] [18]. The ureteroscopy without an access shaft is possible provided you are a trained user because the rate of material damage is often very high [13] [14] [19]. The average duration of our interventions was 56 mn  $\pm$  15 mn, this reflects the constant learning curve. We were below the standards which are 60 min on average for a stone of 10 mm [11] [13].

The JJ stent probe made it possible to manage the first operation in 86% of cases, but almost half (53%) had discomfort secondarily, these patients were put on alpha blocker, anti-spasmodic, associated with level 1 analgesic, no JJ stent probe was removed before FUR-L [12]. A JJ stent probe was left postoperatively depending on local conditions, 68% for 7 to 10 days maximum. No major complication was noted [11] [20] [21]. The average length of hospitalization was 15 days  $\pm$  4 days, clearly due to the numerous pyelonephritis requiring intra venous antibiotic therapy 5 or 10 days [20] [22]. Endoscopic treatments on urinary stones are increasingly performed on an outpatient basis [5] [22].

Postoperative follow-up was organized at 1 month, 3 months and 6 months.

We developed a postoperative evaluation questionnaire at each consultation. At 1 month, 10% had no residual pain at 3 and 6 months. Many patients resumed almost normal activity from the first month, and all were generally satisfied and ready for a future FUR-L if the indication lent itself to it. All patients were stone free at 3 months, with a FUR-L success rate of 75% after a first ureteroscopy and 100% the second, which matches the literature success rate of nearly 90% [1] [2] [22]. No recurrence at 1 year, all patients had metabolic assessments to adapt hygienic-dietetical measures with the aim of preventing recurrence [2] [5].

In our countries where the surgical intervention equals bloodshed, abdominal scar, the FUR-L is a technique which remains less morbid and easily acceptable, with short recovery and unavailability times (TTI) of 15 days  $\pm$  4 days). Overall morbidity is estimated at 5% - 10%, the risk of major complications (avulsion, perforation) is 1%, with a conversion rate of 0.2% [2] [13]. Other minimally invasive techniques are being learned here, but do not currently constitute an alternative to the ureteroscopy in the management of stones of the lower calyx [4] [7] [9]. In terms of cost, FUR-L is not within the reach of all patients, where the minimum wage is around 229 euros, the choice of the operating technique must take this into account.

The limitations of this study are its retrospective and non-comparative nature, involving a small sample. Prospective studies would be desirable to confirm the place of FUR-L in large kidney stones.

## 5. Conclusion

Our study clarifies the place of the FUR-L in our countries where these endoscopic techniques are practiced more and more. In the absence of other minimally invasive techniques, FUR-L remains today the treatment of choice for these stones of the upper appliance and of the lower calyx, as recommended by international guidelines. Size calculations between 20 mm and 30 mm, remain a possible indication if this is integrated into a therapeutic project clearly explained to patients, health insurance facilitating this therapeutic approach.

## Conflicts of Interest

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

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## Abbreviations

CBUE: Cytobacteriological Urine Exam

Ds: Dipstick

PCR: Protein C Reactive

R-URS: Rigid Ureteroscopy

PCNL: Percutaneous Nephrolithotomy

TTI: Total Temporary Incapacity

FAFC: Franc of the African Financial Community

AWP: Abdomen without Preparation