

Retrograde Intrarenal Surgery in the treatment of upper urinary tract stones: results from 53 procedures

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Abstract

The evolution of the operative technique makes the flexible ureteroscopy -Laser (FLUR-L) an effective and safe method in the treatment of stones of the upper urinary tract (UUT). It appears as a saving option after failure of other therapeutic options. Its cost limits its accessibility and restricts its indications in certain socio-economic contexts.

We report the experience of the Department of Urology in the university hospital center Mohammed VI Oujda on the indications, results and complications of the FLUR-L in the treatment of the UUT's stones. This is a retrospective study on 1 year and 3 months involving 50 patients with UUT stones. The PUSEN disposable flexible ureteroscope was used. A CT scan made it possible to determine the characteristics of the stones before the procedure and to carry out a control afterwards in order to judge the effectiveness of the treatment. A statistical analysis evaluated the influence of the different parameters of the calculus on the effectiveness of the intervention. Follow-up was done to detect complications.

The average age of the patients was 53 years old. 53 interventions were made in 3 series. The indications were first-line in 68% followed by failures of renal surgery. The average duration of the procedure was 51 min for an average size of 13.39 mm. The overall success rate was 86%. No parameter significantly influenced the success rate. 14% of complications were recorded.

The FLUR-L is a method as effective as it is sure in the treatment of UUT stones motivating us despite its cost, to expand its indications in first intention when the calculus meet the criteria of choice.

Key words: Stone; Upper urinary tract; Urétroscopie souple; Laser lithotripsy;

Introduction

The emergence of 2nd generation ureteroscopes and the evolution of the surgical technique make Flexible Ureteroscopy-Laser (FLUR-L) an effective and safe method in the treatment of upper urinary tract stones (UUT). The therapeutic choice in the treatment of UUT stones depends on several parameters (associated comorbidity factors, symptoms, location, size, biochemical nature of the stones). The FLUR-L appears to be the appropriate treatment for lower calyceal stones inferior to 2cm

because of the low success rate of the extracorporeal lithotripsy (ECL) [1]; in other situations, such as after extracorporeal lithotripsy (ECL) failure or the persistence of residual fragments after percutaneous nephrolithotomy (PCNL), the FLUR-L stands out as a saving method in the treatment of such stones. Its low morbidity urges some urologists to prefer several sessions of USSR-L to an NLPC when the size of the calculus exceeds 20mm [2]. But its high cost and the fragility of the material limits its accessibility and restricts its indications in certain socio-economic contexts like ours. In this context we report through 53 interventions our experience on indications the results and complications of the USSR-L in the treatment of HAU stones.

Methods

Our study was retrospective concerning 50 patients (19 men and 31 women) over a period of 01 year and 3 months (from February 2017 to May 2018). The intervention involved 69 kidney stones. For all our patients, a CT urography or an uninjected abdominopelvic CT scan (CT scan) was performed to determine the characteristics of the calculus (size, seat, density and number). A sterile cytobacteriological examination of urine less than 3 weeks prior to surgery was mandatory. The PUSEN disposable flexible ureteroscope was used. Interventions were done under general anesthesia by two surgeons; a total of 53 have been completed. Administration of prophylactic antibiotherapy with cephalothin 1g was routine. The laser machine used was CALCULASE II SCB KARL STORZ delivering a power between 2 W and 20 W. Depending on the nature of the stone we used a power of 8 to 12 W. The laser fiber used was 230µm. We always used access ducts 45 cm long with an external diameter of 14 ch and internal 12 ch. In most cases the stone was vaporized but it happened that we obtained small fragments that were recovered by a Dormia type basket clamp in 2 cases. The results, the influence of the different parameters of the calculus on the results and the complications of the interventions were evaluated. Statistical analysis was done by SPSS.20 software (significant difference when $P \leq 0.01$). Unprepared abdomen shot and / or ultrasound and / or abdominopelvic CT scan were performed to evaluate the efficacy of the FLUR-L. Success was defined by the absence of

fragments or the presence of fragments of less than 3mm on the control imaging.

Results

The average age of the patients was 53 years (22-82 years); 31 women and 19 men. The etiology of the stones was mostly indeterminate. 53 interventions were performed during this period in 3 series (including 50 during the 1st, 2 during the 2nd and 1 during the 3rd). Indications for the FLUR-L were first-line in 68% of cases followed by failure of renal surgery in 28% of cases and failures of ECL in 4% of cases. The criteria for the first-line indication were: patients with blood-clotting disorder or anticoagulant therapy (in 1 patient), lower calyceal location of stones in 59% of cases, single kidney (in 14% of cases), and obesity (mean BMI was 35, with BMI > 30 in 80% of cases), computation density well above 1000UH (in 53.62% of cases with an average density of 924.8 HU). The average duration of interventions was 51 min (30 min-75 min) with an average size of 13.39 mm (6-32 mm) (Table 1). We had no perioperative

incidents requiring the intervention to be stopped. Of the 53 FLUR-Ls performed, we performed: post-operative drainage through a ureteral catheter in 44% of cases (n = 22); Performed drainage with a double JJ probe in 50% of cases (n = 25); Opted for lack of drainage in 6% of cases (n = 3). The average duration of hospitalization was 3 days (2 days - 10 days). All patients with more than 3 days of hospitalization were patients who had immediate postoperative complications (hematuria, pain or acute pyelonephritis). Control imaging was performed between 1 and 4 months after the procedure. The overall success rate (defined as no fragments or fragments less than 3 mm) was 86%. The success rate was lower when the computational density > 1000UH, or when the computation had a size > 15mm (Table 2).

Table 1: Characteristics of patients and stones

	NUMBER	PERCENTAGE (%)
Characteristics of patients		
Age	Average : 53 years	
	Min : 22 years	
	Max : 82 years	
Men	19	38
Women	31	62
Characteristics of stones		
Laterality		
Right	21	42
Left	29	58
location of stones		
Upper Calyx	3	4,35
Middle Calyx	8	11,59
Lower Calyx	41	59,42
Renal pelvis	17	24,64
Density of stones (UH)		
Average	924,8	
D ≤ 500 UH	5	7,25
500 < D < 1000	27	39,13
D ≥ 1000	37	53,62
Size of stone (mm)		
Average	13,39 mm (6-32mm)	
S ≤ 10	17	24,64
10 < S ≤ 15	25	36,23
S > 15	27	39,13

Table 2: Success rate according to the different characteristics of the calculus

Characteristics of calculus	Success rate
location of calculus	
Renal pelvis	82,35%
Upper calyx	100%
Middle Calyx	75%
Lower Calyx	95,12%
Size of calculus (mm)	
S ≤ 10 mm	100%
10 < S ≤ 15	96%
S > 15	77,78%
Density of calculus (UH)	
D ≤ 500	100%
500 < D < 1000	92,59%
D ≥ 1000	86,49%

In the end, despite these variations, no parameter significantly influenced the success rate. Few complications were recorded (14%): 4 cases of PNA having evolved favorably under adapted antibiotic treatment. Of the 4 cases of PNA, 3 occurred in the early postoperative period (less than one week after the intervention) and the other 10 days after the intervention. Among the other complications, 3 cases of lumbar pain had evolved well under symptomatic treatment. We did not record any increase in blood creatinine levels immediately postoperatively, early or late in our patients. According to Clavien-Dindo's classification, complications were grade I in 6% (42.86% of complications); grade II in 8% (57.14% of complications). No grade III, IV or V complication was recorded.

Discussion

The FLUR-L is a modern approach to the treatment of kidney and ureter stones. Because of its endoscopic nature and because lithotripsy takes place by contact LASER holmium vaporization, it responds to the treatment of all types of calculus; no stone is laser resistant [3]. Indications of the USSR-L as a first-line treatment for upper urinary tract stones are well established by the Lithias

Committee of the AFU and other learned societies [4]. In the series of B. Fall et al [5]; first-intention indications accounted for 62.3% compared to 68% in our series. Several authors have reported through their experiments the effectiveness of the FLUR-L in the treatment of stones and especially stones less than 2 cm in diameter. Indeed, E. Lechevallier and his collaborators report an overall success rate for kidney stones between 65 and 85% [6]. In the study of P-O. FAIS, the success rate for the upper calyx and pelvis are 60 to 100%, and 60 to 80% for the lower calices [7]. As for MA Ben Saddik and his collaborators who were interested in calculus of 2 to 3cm, their overall success rate was 63,1, 89,3 and 97,1% respectively after one, two and three sessions USSR laser. B.Fall et al report in their series an overall success rate of 71.7% [2]. We had an overall success rate of 86% for all stones. These results are comparable to those of the literature but it must be emphasized that the maximum size of the stones in our study was 32mm. In univariate analysis, no parameter seemed to significantly influence the success rate in our study. In the B.Fall study the surgeon's experience was the parameter that significantly modified the results of the intervention [5]. Mr. A. Ben saddik reported a significant difference related to the size of the stone but for calculus of 20-30mm [2]. A low rate of morbidity is associated with the FLUR-L in the treatment of kidney and ureteral stones. In effect, many recent studies carried out on it report very few complications and have not revealed any major complications [8]. The literature reports an overall morbidity of ureteroscopy of 5-10% [6]. The risk of major complications (avulsion, perforation) is 1%. The risk of late complications is due to stenosis and is of the order of 1%. The risk of febrile infection after ureteroscopy is 2-18% [6]. In our study we had an overall complication rate of 14%, the majority (57.12%) was of infectious origin with a good evolution under antibiotic treatment; the other cases were post-operative lumbar pain with good progression under symptomatic treatment. These complication rates are comparable to those in the literature and support the idea that the FLUR-L is a grafted method with very little morbidity. Regarding postoperative drainage, no study related the absence or the type of postoperative drainage to the occurrence of complications; for now, there is no consensus on the omission or type of drainage to be performed postoperatively. The data in favor of a postoperative drainage are: an impacted stone, a long duration of intervention, lesion of the ureteral mucosa during the intervention, presence of fragments after the intervention, the appreciation and the tendency of the 'operator. In our series, we used drainage in 94% of cases. As for the duration of the intervention, it depends on the parameters of the stone (size, location, and density), the quality of the ureteroscope for good visibility, the appropriate choice of

laser parameters according to the nature of the procedure stone but also and above all the experience of the operator. In our study the average duration of the intervention was 51 min for an average size of 13.39mm. The durations reported in the literature are extremely variable but it usually takes 60min to fragment a stone of 10mm.

Conclusion

Our study, like those already published, shows that the FLUR-L is as effective as it is safe in the treatment of renal and ureteral stones. Despite its cost, the achievement of good results and low morbidity motivates us to expand its indications in first intention when the calculus meets the criteria of choice.

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