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Upper Urinary Tract Stones Managed by Retrograde Intra-Renal Techniques

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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). In this study evaluated the experience on indications the findings and complications of the USSR-L in the treatment of HAU stones. A retrospective concerning 50 patients (19 men and 31 women) over a period of one year (February 2022 to March 2023). The intervention involved 75 kidney stones. For all our patients, a CT urography or/and abdomino-pelvic CT scan was performed to determine the characters of the calculus (size, seat, density, and number). A sterile cyto-bacteriological examination of urine was mandatory. The PUSEN disposable flexible ureteroscope was used. Interventions were done under general anesthesia. Administration of prophylactic anti-biotic with cephalothin. The laser machine used was CALCULASE II SCB KARL STORZ. The main age was 52.54 years; 31 females and 19 males. The etiology of the stones was mostly indeterminate. Indications for the FLUR-L were first-line (68%) of cases followed by failure of renal surgery (28%) and failures of ECL (4%). The criteria for the first-line indication were: patients with blood-clotting disorder/anticoagulant therapy in one patient, lower stone location in 59.4% of cases, single kidney (in 14% of cases) and obesity (BMI > 30 in 80% of cases), computation density well > 1000UH (in 53.62% of cases). The FLUR-Lis as effective and safe in the treatment of renal and ureteral stones. It is better the achievement of good results and low morbidity motivates to expand its indications in first intentionwhen the calculus meet the criteria of choice.

Keywords: Stone, Upper urinary tract, Laser lithotripsy, Retrograde intra-renal techniques, Flexible Ureteroscopy-Laser

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Introduction

FLUR-L an effective and safe method in the treatmentof UUT stones because off the emergence of second generation uretero-scopes and the evolution of the surgical technique. These are depending on several parameters like associated comorbidity conditions, signs and symptoms, location, size, biochemical nature of the stones. FLUR-L notice to be the appropriate treatment for lower calyceal stones inferior to two cm because of the low success rate of the extracorporeal lithotripsy (ECL) [1]. After ECL failure or the persistence of residual fragments after percutaneous nephrolithotomy, the FLUR-L stand out as a saving technique. Its low morbidity urges some urologists to prefer several sessions of USSR-L to an NLPC when the size of the calculus exceeds 20 mm [2]. The disadvantages are high cost and the fragility of the material, and low accessibility. In this study evaluated the experience on indications the findings and complications of the USSR-L in the treatment of HAU stones.

Methods

A retrospective concerning 50 patients (19 men and 31 women) over a period of one year (February 2022 to March 2023). The intervention involved 75 kidney stones. For all our patients, a CT urography or/and abdomino-pelvic CT scan was performed to determine the characters of the calculus (size, seat, density and number). A sterile cyto-bacteriological examination of urine was mandatory. The PUSEN disposable flexible ureteroscope was used. Interventions were done under GA. Administration of prophylactic anti-biotic with cephalothin. The laser machine used was CALCULASE II SCB KARL STORZ. 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. Statistical analysis was done by SPSS-v-20 software (significant difference when $p \leq 0.01$).

Results

The main age was 52.54 years; 31 females and 19 males. The etiology of the stones was mostly indeterminate. Indications for the FLUR-L were first-line (68%) of cases followed by failure of renal surgery (28%) and failures of ECL (4%). The criteria for the first-line indication were: patients with blood-clotting disorder/anticoagulant therapy in one patient, lower stone location in 59.4% of cases, single kidney (in 14% of cases) and obesity (BMI > 30 in 80% of cases), computation density well > 1000UH (in 53.62% of cases). The size of stones 13.4 mm (Table 1).

We had no perioperative incidents requiring the intervention to be stopped. Of the 53 FLUR-Ls performed, post-operative drainage via 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 >15 mm. In the end, despite these variations, no

Table 1: Characteristics of patients and stones.

Characteristics of patients	No.	%
Age	Average: 52.54 years	
Characteristics of stones		
Laterality		
Right	21	42
Left	29	58
Location of stones		
Upper	3	4.4
Middle	8	11.6
Lower	41	59.4
Reno-pelvis	17	24.6
Density of stones (UH)		
D ≤ 500 UH	5	7.3
500 < D < 1000	27	39.1
D ≥ 1000	37	53.6
Size of stone (mm)		
≤ 10	17	24.6
10 - 15	25	36.2
> 15	27	39.1

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 and the other 10 days after the intervention. Among the other complications, 3 cases of lumbar pain had evolved well under symptomatic treatment (Table 2).

Discussion

The FLUR-L is a modern approach to the treatment of kidneyand ureter stones, its endoscopic nature and because lithotripsy take place by contact LASER holmium vaporization, itresponds to the treatment of all types of calculus with no stone laser resistant [3, 4]. Fall et al. [5] was the first-intention indications accounted for 62.3%. Several authors have reported through their experiments the effectiveness of the FLUR-L inthe treatment of stones. Lechevallier et al. [6] collaborators report an overall success rate for kidney stones between 65 and 85% [6]. In the study of Fais et al. [7] the success rate for the upper calyx andpelvis are 60 - 100%, and 60 - 80% for the lower calices [7]. As for Saddik et al. [2] who were interestedin calculus of 2 to 3 cm, their overall success rate was 63.1, 89.3 and 97.1% respectively after one, two and three sessions USSR laser. Fall et al. [5] reported in their series an overall success rate of 71.7% [2]. 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 32 mm.

In the Fall et al. [5] study the surgeon's experience was the parameter that significantly modified the results of the intervention [5]. Saddik et al. et al. [2] reported a significant difference related to the size ofthe stone but for calculus of 20 - 30 mm [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 [8].

The literature reports an overall morbidity of ureteroscopy of 5 - 10% [6]. The risk of major complications 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].

Table 2: Success rate according to the different characteristics of thecalculus.

Characters of calculus	Success rate (%)
Location of calculus	
Renal pelvis	82.4
Upper	100
Middle	75
Lower	95.1
Size of calculus (mm)	
≤ 10 mm	100
10 - 15	96
15	77.8
Density of calculus (UH)	
≤ 500	100
500 - 1000	92.6
1000	86.5

The information in favor of a postoperativedrainage is: an impacted stone, a long duration of intervention, lesions of the ureteral mucosa during the intervention, presence of fragments post the intervention, the appreciation and thetendency of the 'operator.

Conclusion

The FLUR-L is as effective and safe in the treatment of renal and ureteral stones. It is better the achievement of good results and low morbidity motivates to expand its indications in first intentionwhen the calculus meet the criteria of choice.

Acknowledgements

None.

Conflict of Interest

None.

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