

Retrograde intrarenal surgery versus percutaneous nephrolithotomy in the treatment of lower caliceal urolithiasis

Introduction

The management of kidney stones depends on many parameters (associated comorbidity factors, symptoms, location, size, biochemical nature of the stones).^{1,2} Percutaneous nephrolithotomy (PCNL), Retrograde intrarenal surgery (RIRS) and extracorporeal shockwave lithotripsy (ESL) remain the standard treatments in the management of renal stones.^{2,3} Currently, recommendations are in favor of proposing ESL, followed by URS or PCNL as the first-line treatment for inferior pyelo-calicular stones.^{1,2,3} The European Association of Urology (EAU) and the Lithiasis Committee of the French Association of Urology (AFU) recommend treatment with percutaneous nephrolithotomy (PCNL) or flexible laser ureteroscopy (fURS) for caliceal kidney stones larger than 20 mm and for stones in the lower caliceal group from 10 to 20 mm (with unfavorable factors for the ESL).^{1,2,7} The three techniques are also complementary and their use must be adapted, or even combined on a case-by-case basis, taking into account the particularities of stones and patients.³ But the low morbidity leads some urologists to prefer several sessions of USSR-L to a PCNL when the size of the stones exceeds 20mm (3). A success rate of these different treatments remains reported to be 60 to 80% for URS and 86 to 100% for PCNL (1). The main objective of our study was to compare the rate of patient without residual stone (without residual fragment [SFR]) and the complication rate for the treatment of inferior caliceal stones according to the size treated by PCNL or USSR.

Materials and methods

This is a retrospective study analyzing 81 patients who benefited from PCNL (n=45) and URS (n=36) for lower calico stones between July 2012 and June 2015 in the urology department of the Mohamed V military hospital in rabat. The general characteristics of the patients were comparable in the two groups (Age, Gender, BMI). The mode of revelation was often nephretic colic in the PCNL group than in the URS group, in a small number the stone was discovered incidentally. Clinical success was defined by stone-free status or the presence of an asymptomatic residual fragment less than 3 mm. The chi2 test is used to compare the success rate, postoperative complications and transfusion rate, the t test and the witney test were used to compare the quantitative variables. The results are defined as significant for a p<0.05, the statistical analysis is performed using the SPSS software. The majority of patients had a double J catheter 3 to 4 weeks before the URS for passive dilation of the ureter. In the lithotomy position, cetherization of the ureter by a ureteral probe, a safety guide is left in place, an access sheath (45cm for women and 55cm for men) is slipped over the guide under fluoroscopic control (Figure 1).

The Wolf 8 ureteroscope (Figure 2), is introduced through the sheath. The fragmentation of the calculus is carried out with the fiber 260 of 0.2mm in diameter (Figure 3), then extraction of the calculi using the N gage pliers (Figure 4). A double J probe is left in place for 31 patients, the radiographic control is carried out by an unprepared abdomen or a CT scan 4 weeks after the operation. Patients who

Volume 9 Issue 1 - 2021

Kogui Douro Akim,¹ Khalid Lmezguidi,^{2,3} Ngoma Solobinda Natacha,³ Jendouzi omar,¹ Abdelatif Janane,¹ Mohamed Alami,¹ Ahmed Ameur¹

¹Urology Department, military teaching Hospital Rabat, Morocco

²Urological and general surgery Department, 3d military Hospital, Laâyoune, Morocco

³Mohamed V University Rabat, Morocco

Correspondence: khalid Lmezguidi, Urology & General Surgery Department, military teaching Hospital Rabat, Morocco, Email Lmezguidikhalid@gmail.com

Received: December 31, 2020 | **Published:** January 13, 2021

underwent PCNL were placed in a modified lateral position (Figure 5). The lower caliceal group was under fibroscopic control and the introduction of the hydrophilic guide using the Amplatz Ch 26 sheath for all patients. The procedure is performed using the Wolf CH24 Nephroscope (Figure 6). Fragmentation of the stones using a combination of pneumatic and ultrasonic energy, then extraction of the stones with biopsy forceps. A Ch 18 Fr nephrostomy is left in place for 48 to 72 hours, the ureteral catheter and the bladder catheter withdrawn in the following days. An X-ray check is performed on an unprepared abdomen 4 weeks after the operation.

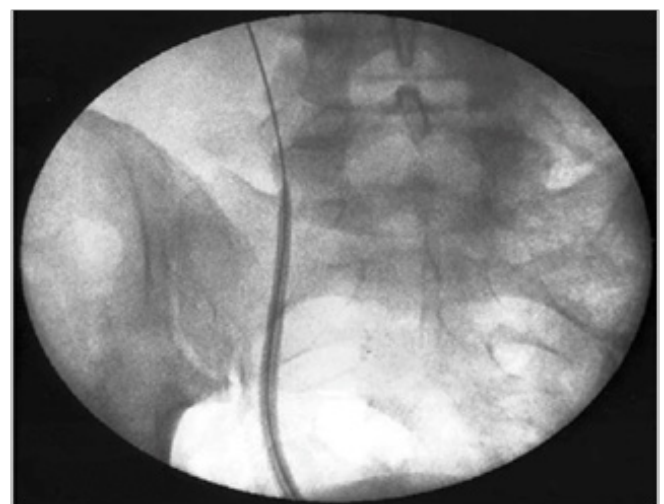


Figure 1 Access sheath Fluoroscopic image.



Figure 2 Checking materials: Furs (A) Ngage basket (B), Laser machine (C).



Figure 3 Calculus disintegration using a 0.2 mm diameter 200 micro Holmium laser.

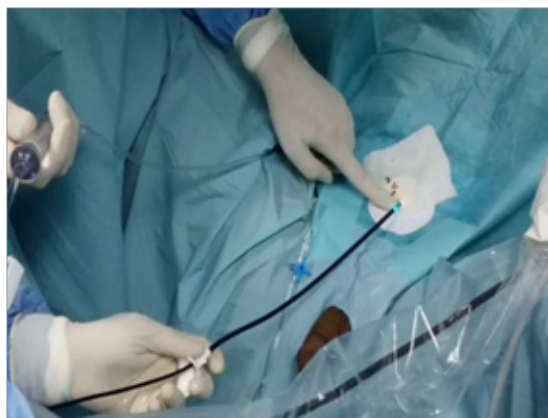


Figure 4 Fragments basketing using Ngage Grasper.

Results

We included 45 procedures from PCNL and 36 from the USSR in our study. Patient and stone characteristics are listed in (Table 1). The general characteristics of the patients were comparable in the two groups (age, sex, and comorbidities). (Table 1) The method of revelation of the lithiasis disease was more often renal colic in the PCNL group than in the USSR group, very few were accidentally discovered. The size of the stones varied between 19.31 mm +/- 2.81 for the NLPC group and 17.47 mm +/- 2.18 for the URS group, ie a

p of 0.006. (Table 2). The size distribution was different in the two groups. In our study, the duration of hospitalization in the PCNL group is 3.2 +/- 2.6 days compared to 1.2 +/- 0.5 days for the URS group for a p=0.0045. In other series, the length of hospital stay was greater in the PCNL group with an average of 8.0 +/- 4.6 days compared to 3.3 +/- 1.7 days in the USSR group (p<0.0001) (Table 3). We had minor Clavian I and II complications in both groups with a p=0.088 and a Clavian III complication mainly in the PCNL group, we had no Clavian IV complications. We had recourse to blood transfusion in 4 patients in the PCNL group, i.e. 8.9.



Figure 5 Performing PCNL in supine modified lithotomy position.



Figure 6 PCNL using 24 Fr Richard Wolf nephroscope.

Table 1 Demographic information

Variable	NLPC Group	URS Group	P
Number of Patients(n)	45	36	
Age(ET) Years	51+-9,20	45+- 6,10	0,11
Sex(%)			0,81
-Man	26(57,8)	21(58,3)	
-Women	19(42,2)	15(41,7)	
Comorbidities			
-Diabetes	4	3	0,95
-HTA	5	4	0,88
-IRC	2	1	1,00

Table 2 Stone and disease Character

Variable	NLPC Group	URS Group	P
Number of patients (n)	45	36	
Size of calculations (moy+- ET) in mm	19,31+-2,87	17,47+-2,18	0,066
Kidney operated (%) :			0,54
-Right kidney	24(53.3)	22(61,1)	
-Left kidney	21(46,7)	14(38,9)	
HU (moy+-ET)	1205+-230	1150+-150	0,23

Table 3 complication of each technique

Variable	NLPC Group	URS Group	P
Duration of hospital. (jr)	3,2±2,6	1,2±0,5	0,0045
Minor complications (Clavien 1,2)(%)	9(20%)	5(13,9%)	0,088
Major complications (Clavien 3) (%)	A. 1(2,2%)	-	
Double J post-op	4(8,8)	31(86,11%)	0,0002
Post-opératoire transfusion	4(8,9%)	-	
Stone rate – free (%)	43(95,6%)	33(91,7%)	0,044

Discussion

The endourological treatment of kidney stones, regardless of the technique used, is currently recommended in view of its excellent results and acceptable morbidity.^{1,2,3,5} The surgical indication for inferior pyelo-calical stones depends on their size, and their symptomatology, flexible laser ureteroscopy and PCNL are indicated.^{1,2,6} The USSR is associated with lower rates of SFR, especially for stones larger than 1 cm but with less frequent and less severe morbidity than PCNL.² Percutaneous nephrolithotomy is, in most comparative studies and meta-analyses in the literature, the most effective technique with 90 to 97% efficiency, while that of the USSR varies from 70 to 95% for stones, more than 10 mm.^{1,2} Our study showed that percutaneous nephrolithotomy provides very good results with SFR levels varying from 95.6% for PCNL versus 91.7% for URS. However, the choice between the two difficult remains, but the use of the active 270 ° deflection, allowed an exploration of all the renal cavities, allowing the widening of the indications.³ Furthermore, the URS is fully indicated in patients with crase disorder, patients on anticoagulation, inferior calicel locations, renal malformations or in the case of a single kidney.^{3,9,10}

URS-SL is a modern approach, in the series by B. Fall et al; indications for first-line URS represented 62.3% (3.7), unlike in our series where PCNL is more indicated, this can be explained by the high cost of this therapeutic modality and the fragility of the equipment. In our series, the operating time is longer because the lower caliceal stones are more difficult to treat by URS estimated at 90 min compared to other studies which report a duration of 58.6 min,² and 73 + / - 25 minutes,³ on the other hand Pearle et al reported in their series a duration of 90.4 minutes. (1) On the other hand in PCNL the lithiasis residues were less numerous and more easily eliminated; the operating time was 55 min compared to 48 min and 58.6 MIN reported in other series with a p=0.05; (2.6). Postoperative drainage, longer in the URS group by 13.8 days with a direct impact on the length of hospitalization which was longer for patients operated on

by PCNL with 4.1 days versus 1.5 days for the URS (p<0.0001) (3.8); in our series, this postoperative management had direct consequences on the length of hospitalization, which in the PCNL group was 3.2 +/- 2.6 days. Postoperatively, elimination was facilitated by the irrigation system left in place with nephrostomy and ureteral probes.^{1,2,3} The per postoperative morbidity of URS and PCNL are rare and comparable.²

These data were found in the literature because Pearle et al only identified two ureteral perforations.² Due to the location of the stones in the lower calyx or their number which increases the amount of lithiasis residue thus prolonging the operating time and increasing the risk of renal colic and urinary tract infections.² Postoperative complications more found in the URS group estimated at 11.6%^{1,2} against 6 to 13% of complications in the PCNL group, and are represented in 10.5% of cases by postoperative sepsis and in 8 % of cases due to hemorrhagic accidents, serious complications (III and IV) were mainly found in the PCNL group but remained rare.² In our series, the postoperative complications in the minor PCNL group were 20% against 13.9% in the URS group with a p=0.088 and the major complications essentially found in the NLPC group were 2.2% Table 2. We had no grade V clavian complications.

Conclusion

The two end urological surgical techniques are to date the two main techniques able to effectively treat intrarenal stones larger than 10 mm. Even if the USSR is more and more proposed for increasingly large stones with less morbidity, the PCNL remains a very effective technique at the cost of certain morbidity.

Acknowledgments

None.

Conflicts of interest

The author declares there is no conflict of interest.

References

1. V Ferroud, O Lapouge, A Dousseau, et al. Flexible ureteroscopy and percutaneous mini nephrolithotomy in the treatment of pyelo-calicular stones less than or equal to 2 cm. *Progress in urology*. 2011;21:79–84.
2. X Palmeroa, L Balsaa, S Bernardini, et al. A Retrospective study comparing percutaneous nephrolithotomy and flexible ureterorenoscopy for the treatment of intrarenal stones. *Progress in Urology*. 2016;500–506.
3. Essodina Padja, Wenceslas Amboulou Ibarra, Khalid Lmezguidi, et al. Flexible laser ureteroscopy in the treatment of stones of the upper urinary tract: results about 166 interventions. *Panafrikan medical journal*. 2015;22:13.
4. F Ramón de Fataa, K Haunerb, G Andrésa, et al. Miniperc and retrograde intrarenal surgery: When and how?. *Actas Urol Esp*. 2015;33(12).
5. Michael Grasso, Michael Ficazzola. Retrograde Ureteropyeloscopy for lower pole caliceal calculi. *Othe journal of urology*. 1999;5347(05):680652.
6. Stephen V, Jackman to Steven G, Docimo I € rey A, et al. The ``mini-perc`` technique: a less invasive alternative to percutaneous nephrolithotomy. *World J Urol*. 1998;16(6):371–374.
7. Cesare M Scoffone, Cecilia M Cracco, Marco Cossu, et al. Endoscopic Combined Intrarenal Surgery in Galdakao-Modified Supine Valdivia Position: A New Standard for Percutaneous Nephrolithotomy ?. *European urology*. 2008;54:1393–1403.

8. Ardeshir R Rastinehad, Sero Andonian, Arthur D Smith, et al. Management of Hemorrhagic Complications Associated with Percutaneous Nephrolithotomy. *Journal Of Endourology*. 2009;23(10):1763–1767.
9. Ehab R Tawfik, Demetrius H Bagley. Management of upper urinary tract calculi with ureteroscopic techniques. *Adult urology*. 1999;53(1):53–63.
10. Osama M Elashry, Abdhamid M Elbahnasy, Ganes S Rao. Flexible Ureteroscopy: Washington University Experience with the 9.3F and 7.5F Flexible ureteroscopes. *The Urology Journal*. 1997;167:2074–2080.