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Research Article

Safety and Efficacy of Retrograde Intra Renal Surgery in Renal Stones Larger than 2 cm

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Abstract

Materials and Methods: A total of 94 patients who underwent RIRS for solitary lower pole stone between April 2012 and December 2014 were retrospectively analyzed. The selection criteria for this intervention were patient's preference, and Stone more than 2.0cm. Patients decided the surgery type by themselves after being explained about the need for staging the procedure and residual fragments without being under any influences and written informed consent was obtained from all patients prior to the surgery. All patients were evaluated with Serum biochemistry, Urinanalysis, urine culture, plain radiography of kidney-ureter-bladder (KUB), IVU, renal USG and/or CT. Success rate was defined as patients who were stone-free or only had residual fragment of less than 4mm.

Results: A total of 94 patients were included. Mean age was 36.7±16.8 yrs. There were 50 males and 44 females. Mean stone size was 2.3±0.2mm. Stone-free rate was 85.1 (80/94) at the first procedure and 97.87% after the additional procedure (ureteroscopy). Twelve patients (12.7%) needed an additional procedure because significant residual fragments, at the first month. In eight patients (8.5%), minor complications were observed, whereas no major complications were noted.

Conclusion: RIRS and laser lithotripsy can be performed safely and effectively in patients with renal stones more than 2 cm. Further prospective randomised trials are needed for this subset of patients. Safety and efficacy of Retrograde intra renal surgery in renal stones larger than 2 cm.

INTRODUCTION

Kidney stones greater than 2 cm have long been treated with percutaneous nephrolithotomy (PNL) [1,2]. PNL is also recommended as a primary treatment in the management of renal stones ≥2 cm by European Association of Urology (EAU) guidelines [3]. The limitation of PNL has forced urologists to spend more attention on non-invasive procedures like retrograde intrarenal surgery (RIRS) in the management of large lower pole stones. Today, in the management of renal stones, RIRS provides an alternative way to PNL by minimizing the risks related to PNL. Recent studies reported stone-free rates from 77% to >90% for RIRS of renal stones and 62% to 85% for the management of lower pole stones [2,4-6]. RIRS has become popular in the last decade with the technical advancements in endourologic equipments and increased surgeon experience [7]. The complication rates of RIRS are lower and the only disadvantage of this technique is the possible need for staging the procedure. We assessed the safety and efficacy of RIRS in lower pole stone of more than 2 cm.

MATERIALS AND METHODS

A total of 94 patients who underwent RIRS for solitary lower pole stone between April 2012 and December 2014 were retrospectively analyzed. Data were obtained from the patients' files which were recorded with electronic data management system. Patient assessment included detailed medical history, physical examination and laboratory tests including urinalysis, urine culture, complete blood count, and serum biochemistry. Lower pole stone was diagnosed with computed tomography (CT) (including axial, sagittal and transverse sections) or Combination of X Ray KUB and Ultrasonography. Stone size was assessed as the longest axis of the stone. Patients decided the surgery type by themselves after being explained about the need for staging the procedure and residual fragments without being under any influences and written informed consent was obtained from all patients prior to the surgery. Patients with abnormal renal anatomy were excluded. All patients were evaluated with serum biochemistry and blood count at the day after surgery. In addition, all patients underwent CT or combination of X-ray KUB and Ultrasonography for the stone clearance, at the first postoperative month. Treatment success was defined as stone-free status or clinically insignificant residual fragments ≤4 mm. Patients were followed up every

3 months with urinalysis, urine culture and Ultrasonography. Stone-free status, postoperative complications, operative time and hospitalization time were assessed.

RIRS Technique

All procedures were performed by 7.5-Fr (Karl Storz, FLEX-X2, Tuttlingen, Germany) flexible ureteroscope or Olympus p6R 7.9 Fr Flexible ureteroscope. All patients received prophylactic antibiotics at the induction of anaesthesia. Under general anaesthesia, patients were placed in the lithotomy position on a fluoro-endoscopic table. Hydrophilic guide wire is passed into the renal pelvis and balloon dilatation of ureteric orifice was done. After passing a 0.035-inch safety guide wire into the renal pelvis, a ureteral access sheath (9.5/11.5 or 12/14Fr) was placed to allow for optimal visualization, to maintain low intrarenal pressure, and to facilitate extraction of stone fragments. For the cases in which the 12/14Fr ureteral access sheath could not progress regularly under the fluoroscopic control, 9.5/11.5Fr sheath was used. If it was not possible to place access sheath double J Stent was placed and patient posted for 2nd stage. The stones were fragmented by a holmium: YAG laser (Lumenis) (200µ caliber fiber) until they were deemed small enough to pass spontaneously. At the beginning of the laser lithotripsy, the laser functioning parameters were 0.8Joule/15 Hertz and when the stone sizes decreased to 10 mm the parameters were changed to 0.6 J/10 H in order to avoid the pneumatic effect of the laser, which could migrate the stone to other poles. Basket extraction of residual fragments was performed as necessary by tipless nitinol basket. At the end of the procedure, a double-J stent was placed routinely in all patients. JJ stents of the patients were removed at the postoperative first month.

RESULTS

Stone characteristics and demographic data of the patients are presented in Table 1. Mean age of the patient was 36.7±16.8 yrs. There were 50 males and 44 females. Mean stone size was 2.3±0.2mm.Right Side was involved in 49 patients.

Stone-free rate was 85.1 (80/94) at the first procedure and 97.87% after the additional procedure (ureteroscopy). Twelve patients (12.7%) needed an additional procedure because significant residual fragments, at the first month. These patients underwent RIRS at the time of stent removal. Two patients had steinstrasse and underwent Rigid URS for stone clearance. None of these patients needed restenting. In Two Patients even on 2nd stage of procedure stone could not be cleared due to difficult access with flexible ureteroscope. One patient had a residual of 8 mm and other had a residual of 12mm. Both patients underwent PCNL and had uneventful outcome. One patient had high grade fever. He was managed conservatively with culture specific antibiotics and discharged on day 3. Eight patients (8.5 %) with lumbar pain and persistent hematuria (Clavien grade I) were managed conservatively and discharged at the postoperative 2nd day. Rest of the patients (85/94, 90.4%) in RIRS group were discharged at the postoperative 1st day. The mean operative time was 68.40 ±20.4 minutes. The operative time was recorded from start to end of laser lithotripsy to end Mean haemoglobin drop was 0.18±0.18 g/dL (range 0 to 0.8 g/dL) and mean hospital stay was 1.08±0.27 days. No intra operative complications such as Ureteral perforation and no Ureteral stricture at follow up period were observed. Stone analysis revealed calcium oxalate dehydrate in 70 patients (74.4%), mixed in21 (22.3%) and uric acid in 3 (3.1%).

Table 1: Stone characteristics and demographic data of the patients.

Mean Age	36.7±16.8 yrs
Sex	Males 50 Females 44
Stone size	2.3±0.2 MM
Side	Right -49 Left 45
Stone free rate	80/94(85.1%)- After 1st Procedure 92/94(97.87%)-After 2nd Procedure
Mean operative time	68.40 ±20.4 minutes
Complications	Minor (Clavien gr 1)-8/94 (8.5%) Major -0

DISCUSSION

Because of the advances in endoscopic technology, retrograde flexible ureteroscopy (URS) is being increasingly applied to larger renal stone burdens. For stones greater than 2.0 cm, percutaneous nephrolithotomy has long been considered the standard of care [15]. Although the stone-free rate (SFR) of such a procedure is high (up to 95%), the complications related mainly to the renal access are sometimes a concern. Additionally, in patients with significant co morbidities such as morbid obesity and bleeding diathesis, PNL is contraindicated due to the higher incidence of complications. Finally, placement of the patient in a prone position increases the aesthetic risk because of the contractions of extremities and difficult airway [10]. Because of the evolution in technology, it is nowadays possible to treat intra renal stones with retrograde intra renal surgery. Large renal calculi can be safely and effectively treated with a retrograde endoscopic technique that seems to compete well with the more invasive Percutaneous or open surgical manoeuvres [13]. It remains unclear whether or not retrograde intra renal surgery (RIRS) may be effective also for the treatment of larger stones (>2cm) [9]. Kursad Zengin et al concluded that RIRS affords a comparable success rate, causes fewer complications than PNL, and seems to be a promising alternative to PNL when larger stones are to be treated [8] Current guideline recommendations suggest ESWL, as the therapy of first choice for all intrarenal calculi with sizes < 20 mm, while larger stones should be treated by PNL. However, as the results for lower pole stones are poor, primary PNL might be justified for smaller calculi starting from >15 mm in this location. To date, flexible URS has not been mentioned by most guidelines. It may offer an alternative to ESWL or PNL. Unfortunately, only little comparative data is available on the use of flexible URS for renal calculi. New-generation ureterenoscopes allow access to almost all calices and, together with laser lithotripsy, Ureteral access sheaths and nitinol retrieval tools, allows the removal of most calculi. Reported stone-free rates for calculi<1.5 cm are from 50-80%, while larger stones can also be treated successfully [11]. Furthermore, the association of longer operative time and endoscopic management of large renal stones were emphasized in the literature. However, recent reports demonstrated a rational operative time for ureteroscopy. Mariani et al. reported

a mean operative time of 64 minutes (range 30 to 240 min) for the RIRS of renal stones between 2 and 4 cm [12]. In Our study the Operative time was 68.40 ±20.4 minutes.

RIRS is known to have less complication compared to PNL. Major complications secondary to RIRS are less common and further decrease as the experience increases [13]. Today, with the decreasing size of instruments, significant complications such as Ureteral avulsion are extremely rare. In addition, RIRS has been provided safe in patients with high risk and co-morbidities such as pregnant woman, morbid obesity, bleeding diathesis and in whom PNL may be contraindicated [14]. In Our study also there were no major complications and Clavien grade 1 complications were noted in only 8.5% of patients.

The limitations of our study are its retrospective nature, small number of patients included, being a single-center study, and a short follow-up time.

CONCLUSION

RIRS and laser lithotripsy can be performed safely and effectively in patients with renal stones more than 2 cm which were previously managed by other more invasive techniques. Further prospective randomised trials are needed for this subset of patients.

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