

One-Stage Ureteroscopy for Bilateral Ureteric Stones: Outcomes From a Tertiary Referral Center

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ABSTRACT

INTRODUCTION: The purpose of the study was to determine the safety and efficacy of one-stage ureteroscopy for treatment of bilateral ureteric stones.

METHODS: Retrospective data were obtained from the patient database in the Department of Urology at Minia University Hospital between March 2008 and November 2010. There were 34 patients (20 men and 14 women) with a mean age of 38.4 years (SD = 13.6; range, 16-82 years). All patients underwent one-stage ureteroscopy for bilateral ureteric stones using an 8 Fr semirigid ureteroscope. A 0.038 inch floppy-tipped guidewire was passed through the selected ureteric orifice, advanced under direct vision, and monitored fluoroscopically. Balloon dilation of the intramural ureter was completed in most cases. Stone treatment was chosen according to its size and occurred by direct extraction or lithotripsy using the pneumatic lithoclast. Postoperatively, unilateral or bilateral ureteral stenting was done for 2 days to 6 weeks. Patients were followed for a minimum of 3 months.

RESULTS: Sixty four ureteroscopic procedures were successfully completed to treat 32 of the 34 patients. Mean stone size was 8.3 mm (range, 3-20 mm). The stones were radio-opaque in 28 patients and dense in 4 patients. A single stone was found in 30 patients (93.75%); 2 patients had multiple stones. Calculi were retrieved intact using baskets for 18 patients; lithotripsy was required for 14. The mean operative time was 85 minutes (range, 35-150 minutes). Intraoperatively, 25 of 32 patients (78.2%) were stone-free bilaterally and another 7 patients (21.8%) were stone-free unilaterally. Thirty patients (93.7%) were stone free 1-month after 1 endoscopic procedure; 2 patients were clear after 2 procedures. Early postoperative complications were rare and included fever in 4 patients; no long-term complications were observed.

CONCLUSION: One-stage ureteroscopy for bilateral ureteric stones is a safe and effective procedure that can achieve stone-free and complication rates that are comparable to those of unilateral ureteroscopy.

KEYWORDS: One-stage ureteroscopy; Bilateral ureteric stones

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Abbreviations and Acronyms

IVU, intravenous urogram

KUB, kidney, ureter, bladder

INTRODUCTION

Treatment procedures for urinary stones have changed in the last 10 years to make the options more patient-friendly, although there are a number of factors that could influence the modality of treatment selection [1]. Advances in ureteroscopy have led to the safe performance of complex procedures. The downsizing of ureteroscopes and miniaturization of working instruments

and intracorporeal lithotripsy devices have enabled urologists to perform ureteroscopy more easily than procedures done in the past [2].

One-stage ureteroscopy would potentially reduce costs and the need for a second anesthetic when compared with a staged procedure [3]. The purpose of the present study was to determine the safety and efficacy of one-stage ureteroscopy

for treatment of bilateral ureteric stones.

METHODS

This retrospective study was conducted from the patient database in the Department of Urology at Minia University Hospital, a tertiary referral center. Data were collected from the period between March 2008 and November 2010.

Patient Sample

One-stage ureteroscopy was carried out in 68 renal units from 34 patients. There were 20 men and 14 women. Their mean age was 38.4 years (SD = 13.6; range, 16-82 years). All patients had symptomatic bilateral ureteric stones.

Procedures

All patients underwent plain x-ray of the kidneys, ureters, and bladder (KUB) in addition to another radiographic study from among the following: ultrasound, excretory intravenous urogram (IVU), antegrade nephrostogram, computerized tomography (CT), or magnetic resonance urogram (MRU). Preoperative and postoperative serum creatinine was measured to assess renal function.

Selection of patients for one-stage ureteroscopy was based on our judgment that each side could be safely and effectively treated in the same session. However, if a complication was noted during treatment of the first side, the contralateral procedure was aborted.

A 0.038 inch floppy-tipped guidewire was passed through the selected ureteric orifice, advanced under direct vision, and monitored fluoroscopically. Dilation of the intramural ureter was performed in most of the cases using a 6 mm balloon catheter. Dilation to 12 F was satisfactory in most cases. In all cases, we used an 8 Fr semirigid ureteroscope. Once the stone had been visualized (depending on the approximate size and estimated capability with the ureteral lumen), we made the choice between direct extraction or fragment extraction following use of a pneumatic lithotripter for intracorporeal lithotripsy.

Endoscopic evaluation was done at the end of the procedure to detect any residual fragments or complications. Postoperatively, unilateral or bilateral ureteral stenting (either a double-j or ureteric catheter) was done for 2 days to 6 weeks.

Follow-up Examinations and Data Analysis

Follow-up of the patients was done for a minimum of 3 months. A KUB film was obtained in the immediate postoperative period. One month later, all patients had an abdominal ultrasound.

Three to 6 months after surgery, we obtained an IVU and/or ultrasound.

Intraoperative time and length of hospital stay were determined. The IUV or ultrasound was used to rule out obstruction, evaluate any procedure complications, and assess the stone-free rate. *Intraoperative success* was defined endoscopically as extraction of all stone fragments or lithotripsy of all stones to < 2 mm. Descriptive statistics were used to present these outcome measures.

RESULTS

A total of 64 one-stage ureteroscopic procedures were successfully completed to treat 32 patients. The procedure could not be completed in 2 patients: 1 patient had a migratory stone on 1 side that was treated with shockwave lithotripsy; 1 patient had a bilateral stricture with impacted intramural stones and was treated with open ureterolithotomy with ureterovesical reimplantation.

Stones were located at various levels of the lower ureter. The stone size was calculated by measuring the length of the maximum stone diameter. In patients with multiple stones, the length of the maximum diameter of each stone was added to calculate the size. The mean stone size was 8.3 mm (range, 3-20 mm). The stones were radio-opaque in 28 patients (87.5%) and poor dense in 4 patients (12.5%). A single stone was found in 30 patients (93.75%); 2 patients (6.25%) had multiple stones.

Bilateral ureteric stones was the indication for ureteroscopy in all cases. However, 9 patients had ipsilateral ureteral stricture that was treated with balloon dilation or meatotomy. Associated treatment procedures for urethral strictures that were identified during urethroscopy were visual internal urethrotomy (n = 3) and bladder stone crushing (n = 2). A double-j stent, open-end ureteral catheter, or nonstenting technique was done according to surgeon preference in 20 (62.5%), 7 (21.8%), and 5 (15.6%) patients, respectively.

Calculi were retrieved intact using baskets for 18 patients (56.25%); lithotripsy was required for 14 patients (43.75%). The only method of lithotripsy used in this study was the pneumatic lithoclast, which was successful in fragmenting the stones in 93.7% of the patients and followed by retrieval of large fragments.

Intraoperative time was calculated, starting after the patient was positioned and ending with fixation of the urethral catheter. The mean operative time was 85 minutes (range, 35-150 minutes). The mean length of hospital stay was 2.7 days

(range, 1-6 days).

Intraoperative success. Intraoperative success was determined bilaterally in 25 of 32 (78.2%) patients and unilaterally in 7 patients (21.8%), with residual stone burden in the contralateral renal unit. Thirty patients (93.7%) were totally cleared of stones 1-month postoperatively after 1 endoscopic procedure; 2 patients were cleared after 2 procedures. Of the 30 patients cleared of stones during follow up, 27 patients were improved with evidence of radiological patency and reduction or disappearance of perioperative dilatation; 2 patients had nearly the same degree of dilatation and 1 patient showed deterioration.

Intraoperative and postoperative complications. There were no significant intraoperative complications. Minimal bleeding and tearing of the ureteral mucosa were found in some cases. Our patients encountered pain secondary to the presence of the urethral catheter and ureteric stents or passage of gravels. Other postoperative complications were rare and included fever in 4 (12.5%) patients; 3 of these patients had documented urinary tract infections. None of the patients had any long-term complications.

DISCUSSION

The development of small-caliber, semirigid ureteroscopes and ancillary instruments has made retrograde access and manipulation of the upper urinary tract a feasible option for endourologists. However, a complicated endourologic case can challenge even the most skilled urologist.

Indications for one-stage bilateral ureteroscopy are similar to those of unilateral cases. A one-stage procedure can be used for several diagnostic and therapeutic measures with low complication rate [4]. This procedure obviates the need for a second anesthesia and can decrease the length of the hospital stay [5]. Concern about intraoperative complications may make the urologist avoid one-stage ureteroscopy for bilateral pathologies. However, with appropriate patient selection, ample experience and proper instrumentation, complications can be minimized and the patient can experience treatment success [6]. Patients with bilateral lower ureteric stones are the best candidates for one-stage ureteroscopy.

Initial opposition to the one-stage bilateral ureteroscopy arose from concerns that each renal unit could be compromised simultaneously. In fact, acute renal failure was reported in one patient after one-stage bilateral ureteroscopy [7] and other complications do occur. However, serious intraoperative complications have greatly decreased over the years as a

result of careful instrument selection and improved surgical techniques [8].

Success and complication rates for one-stage ureteroscopy are available in several studies. Darabi and Keshvari [9] used 8 Fr and 10.5 Fr ureteroscopes for bilateral same-session ureteroscopy with 23 patients. Their success rate was 87%. Minor complications occurred in 26% of the patients and included infection and hematuria in 2 and 4 patients, respectively.

Two research groups compared bilateral same-session ureteroscopy with staged bilateral ureteroscopy and unilateral ureteroscopy. El-Hefnawy et al [10] compared data from 105 patients receiving unilateral ureteroscopy for the treatment of multiple ureteral calculi with data from 89 patients (178 renal units) receiving bilateral same-session ureteroscopy during the same period. Intraoperative complications were recorded in 11 bilateral procedures (6.2%); 3 patients had ureteral perforation and 8 patients had mucosal injury. After bilateral same-session ureteroscopy, 153 renal units were stone free (86%). A successful outcome (defined as having both ureters free of stones without intraoperative complications) was observed in 62 patients (70%). When unilateral and bilateral ureteroscopy results were compared, no significant differences were found in complication rate (6.7%; $P = 0.5$) or stone-free rate (80%; $P = 0.2$). Similarly, Grossi et al [3] compared 18 patients with same-session bilateral ureteroscopy with 15 patients receiving unilateral ureteroscopy. As in the study by El-Hefnawy et al [10], there were no statistically significant differences in the stone-free rates between the groups. Minor complications were seen in 17% of the patients in the same-session ureteroscopy group, including 2 patients with fever and 1 patient with pain; however, this complication rate was not significantly different from that of the other 2 groups.

In the present study, we described results from 32 patients undergoing one-stage ureteroscopy for bilateral ureteric stones with a semirigid ureteroscope. Our bilateral stone-free rates of 78.2% intraoperatively and 93.7% at 1 month seem comparable to those from other series. Hollenbeck et al [11] reported a 50% to 100% stone-free rate, depending on the stone site. Andankar et al [12] showed that ureteroscopy achieved complete stone clearance in 1 session in 95% of patients; ureteroscopy failed initially in 6 patients but was later accomplished in second session, improving the success rate to 98.7%. Anderson et al [13] conducted ureteroscopy to treat patients with distal ureteral stones with an average size of 7 mm. They reported a success rate of 100%. The mean stone size in our study was 8.3 mm and 9 patients had associated ureteral stricture, which may explain

the difference in success rates. Finally, our 12.5% complication rate (4 of 32 cases) was lower than that reported in earlier studies. It is not evident that these complications could have been avoided with a staged procedure.

The present study has some limitations. The selective use of stents according to surgeon preference made it challenging to determine their role in one-stage ureteroscopy. Also, as a tertiary referral center, many patients are referred to our institution for treatment of complex conditions. A randomized, prospective study of staged bilateral ureteroscopy versus one-stage ureteroscopy, including the influence of postoperative stents, is planned for the future.

CONCLUSIONS

One-stage ureteroscopy for bilateral ureteric stones is a safe and effective procedure that can achieve stone-free and complication rates that are comparable to those of unilateral ureteroscopy. The one-stage procedure reduces anesthesia exposure and potentially lowers costs.

Conflict of Interest: none declared.

REFERENCES

- Segura JW, Preminger GM, Assimos DG, et al. Ureteral Stones Clinical Guidelines Panel summary report on the management of ureteral calculi. The American Urological Association. *J Urol*. 1997;158(5):1915-1921.
- Young KH, Dong SP. Ureteroscopic lithotripsy using Swiss lithoclast for treatment of ureteral calculi: 12-years experience. *J Korean Med Sci*. 2009;24(4):690-694.
- Grossi FS, Barnaba D, Raguso M, et al. Bilateral same session ureteroscopy: safety and efficacy. *Arch Ital Urol Androl*. 2007;79(1):20-22.
- Stackl W, Marberger M. Late sequelae of the management of ureteral calculi with the ureterorenoscope. *J Urol*. 1986;136(2):386-389.
- Camilleri JC, Schwalb DM, Eshghi M. Bilateral same session ureteroscopy. *J Urol*. 1994;152(1):49-52.
- Deliveliotis C, Picramenos D, Alexopoulou K, Christofis I, Kostakopoulos A, Dimopoulos C. One-session bilateral ureteroscopy: is it safe in selected patients? *Int Urol Nephrol*. 1996;28(4):481-484.
- Bandi G, Vicentini FC, Triest JA. Anuric renal failure after same-session bilateral atraumatic flexible ureteroscopy. *Int Braz J Urol*. 2007;33(2):193-194.
- Johnson DB, Pearle MS. Complications of ureteroscopy. *Urol Clin North Am*. 2004;31(1):157-171.
- Darabi M, Keshvari M. Bilateral same-session ureteroscopy: its efficacy and safety for diagnosis and treatment. *Urol J*. 2005;2(1):8-12.
- El-Hefnawy AS, El-Nahas AR, El-Tabey NA, et al. Bilateral same-session ureteroscopy for treatment of ureteral calculi: Critical analysis of risk factors. *Scand J Urol Nephrol*. 2011;45(2):97-101.
- Hollenbeck BK, Schuster TG, Faerber GJ, Wolf JS Jr. Safety and efficacy of same-session bilateral ureteroscopy. *J Endourol*. 2003;17(10):881-885.
- Andankar MG, Maheshwari PN, Saple AL, Mehta V, Varshney A, Bansal B. Symptomatic small non-obstructing lower ureteric calculi: comparison of ureteroscopy and extra corporeal shock wave lithotripsy. *J Postgrad Med*. 2001;47(3):177-180.
- Anderson KR, Keetch DW, Albala DM, Chandhoke PS, McClennan BL, Clayman RV. Optimal therapy for the distal ureteral stone: extracorporeal shock wave lithotripsy versus ureteroscopy. *J Urol*. 1994;152(1):62-65.