Outcome of bilateral ureteroscopic retrieval of stones in a single session

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Aim: Evaluation of bilateral ureteroscopic retrieval of stones as a single-stage procedure in terms of clearance of the stones, complications of the procedure and duration of hospital stay. A successful outcome was considered when both ureters were free of stones without any major complications.

Materials and Methods: A total of 60 patients with bilateral ureteric stones were treated ureteroscopically from March 2006 to September 2009 in the department of Surgery (Urology unit). Majority of the patients were in their third and fourth decade of life with 38 males and 22 females. A single session bilateral ureteroscopic retrieval of stones was done using a 7.8 Fr semirigid ureteroscope. A 0.038-inch guide wire was used and advanced under direct vision, and monitored by C-arm X-ray image intensifier. Balloon dilatation of the intramural ureters was required in 82 renal units. The stones were either extracted directly or disintegrated into small pieces by lithotripsy (pneumatic) before extraction. Ureteric stenting was required in 39 patients. Patients were followed for a period of 3-12 months.

Results: A total of 60 patients (120 renal units) with bilateral ureteric stones were treated ureteroscopically. The stone size in the treated patients was in the range 6-20 mm. The stones were radio-opaque in 47 patients and radiolucent in 13 patients. Single stone was present in all except two patients. Operative time ranged between 40 and 120 minutes. Stones were completely removed in 51 (85%) patients following single-session procedure of which 39 (76.4%) were stonefree intraoperatively and another 12 (23.5%) were cleared of the stones in 4 weeks follow-up. Six patients were stonefree unilaterally. Failed procedures were managed with repeated ureteroscopy, DJ stenting and ESWL or open ureterolithotomy. Intraoperatively false passage or minor ureteric perforations were seen in six patients. Postoperative complications included abdominal pain in 10, persistent fever in 4 and hematuria in 2 patients. No long-term complications were observed. Most of the patients were discharged in 2 days.

Conclusion: Bilateral same-session ureteroscopy is a safe and effective procedure in the management of bilateral ureteral stones. The results are comparable to unilateral or staged bilateral procedures.

Key Words: Bilateral ureteroscopy, bilateral ureteric stones, single session

INTRODUCTION

There are various treatment modalities such as medical expulsive therapy, shock wave lithotripsy (SWL), retrograde ureteroscopy, antegrade ureteroscopy and laparoscopic or open ureterolithotomy for the treatment of ureteral calculi. With the development of smaller caliber semirigid and flexible ureteroscopes and the introduction of improved
instrumentation, and increasing experience worldwide, ureteroscopy has evolved into a safer and more efficacious modality for the treatment of stones in all locations in the ureter[1]

The advantages of same-session bilateral ureteroscopy compared with staged procedures might include a reduction in overall operative time and anesthetic requirements and minimization of the duration of convalescence. Conversely, the technique would expose both ureters to injury that could lead to significant morbidity. Two series were composed largely of patients with small, distal ureteral calculi treated with larger ureteroscopes and were characterized by high rates of intraoperative and postoperative complications.[2,3] We present our experience with bilateral ureteroscopic retrieval of stones as a single-stage procedure in terms of clearance of the stones, complications and duration of hospital stay.

MATERIALS AND METHODS

A total of 60 patients with bilateral ureteric stones (120 renal units) were treated ureteroscopically from March 2006 to September 2009 in the department of surgery (Urology unit). Majority of the patients were in their third and fourth decade of life with 38 males and 22 females. All patients underwent urinalysis, urine culture, X-ray abdomen (KUB), ultrasonography, and intravenous urography before the procedure. A single-session bilateral ureteroscopic retrieval of stones was done using a 7.8 Fr semirigid ureteroscope. A 0.038-inch guide wire was used and advanced under direct vision, and monitored by C-arm X-ray image intensifier. Balloon dilatation of the intramural ureters was done in majority (82 renal units) of patients using 0.5-1.0 ml of saline which was kept in place for 30-60 seconds. The stones were either extracted directly or disintegrated into small pieces by pneumatic lithotripsy (pneumatic) before extraction. Ureteric stenting was done in selected patients at the end of the procedure. The indications for stenting were ureteric edema secondary to an impacted stone, iatrogenic trauma, and residual stone burden. A successful outcome was considered when both ureters were free of stones intraoperatively or within 4 weeks of follow-up, without major complications. Two-way Foleys catheter was placed per urethra to drain the bladder. Any complication (intra or postoperative) was managed accordingly. Foleys catheter was usually removed on 1st postoperative day and a check X-ray (KUB) was done for documentation of the clearance of ureteric stones and position of double J stent on 1, 5 and 28 days after the procedure. The patients were discharged on 1st or 2nd postoperative day and were asked to come for stent removal 1-6 weeks after the procedure. The patients were followed up for a period of 3-12 months.

RESULTS

A total of 60 patients (120 renal units) with bilateral ureteric stones were treated ureteroscopically. Among them 38 (63.3%) were male and 22 (36.6%) were females. Majority of the patients were aged between 21 and 40 years [Table 1]. Most common presenting symptom was abdominal pain, noted in 90% of cases. Single stone was present in all except two renal units (in two different patients) where multiple calculi were seen. Ureteric stones were present in the lower part in 26 (43.3%) patients, midureter in 24 (40%) patients, and upper ureter in 8 (13.3%) patients. Two patients (3.3%) had stones in lower ureter on one side and in the midureter on opposite side [Table 2]. The size of the stone in the treated patients was in the range 6-20 mm [Table 3]. Stones were radiopaque in 47 (78.3%) and radiolucent in 13 (21.6%) patients. Balloon dilatation of the intramural ureters was required in a total of 82 renal units [Table 4].

| Table 1: Age-wise distribution of patients |
|---|---|---|
| Age in years | Number of patients | Percentage |
| 11-20 | 3 | 5 |
| 21-30 | 24 | 40 |
| 31-40 | 20 | 33.3 |
| 41-50 | 8 | 13.3 |
| 51-60 | 5 | 8.3 |
| Total | 60 | 100 |

| Table 2: Site of ureteric calculi |
|---|---|---|
| Site | Number of renal units | Percentage |
| Lower ureter | 54 | 45 |
| Midureter | 50 | 41.6 |
| Upper ureter | 16 | 13.3 |
| Total | 120 | 100 |

| Table 3: Showing size of stones |
|---|---|---|
| Size of ureteric calculi (mm) | Number of stones | Percentage |
| 5-9 | 60 | 48.7 |
| 10-15 | 46 | 37.3 |
| 16-20 | 17 | 13.8 |
| Total | 123 | 100 |

| Table 4: Showing need for balloon dilatation of the intramural ureters before URSL |
|---|---|---|
| Bilateral | 38 | 63.3 |
| Unilateral | 6 | 10 |
| Not required | 16 | 26.6 |
midureter and upper ureter after a single-session bilateral procedure was seen in 24 (92.3%), 20 (83.3%) and 5 (62.5%) patients, respectively. Two patients with stones in lower ureter on one side and in the mid ureter on opposite side were also stone free after the procedure [Table 5].

In our study the procedure was unsuccessful in 9 (15%) patients. Among them one patient presented with anuria in whom only stenting was possible as an initial emergency procedure because of his poor general condition, which was followed by a successful second stage URS. In 6 patients ureteroscopic retrieval of stones failed on one side (six renal units), due to stone migration in three, inability to clast in one and a large residual fragment which could not pass even after 6 weeks of stenting in another two patients. All these failed cases were managed either with repeated ureteroscopic retrieval or DJ stenting and ESWL. Ureteroscopic management of stones failed completely in two patients (4 renal units). Among them one patient had stone migration on one side and an impacted submucosal stone on opposite side. Another bilaterally failed procedure was because ureteroscope could not be entered through the ureteric orifices. These failed procedures were managed with open ureterolithotomy (3 renal units) and antegrade ureteroscopy in one renal unit. The individual failure rate for the stone of the lower ureter, midureter and upper ureter after a single session bilateral procedure was seen in 2 (7.6%), 4 (16.6%) and 3 (37.5%) patients, respectively. Ureteric stenting was required in a total of 39 patients. Operative duration ranged between 40 and 120 minutes.

The intraoperative complications apart from stone migration, residual stones or failure to pass scope were seen in 6 patients. URS went in to false passage with insignificant perforation in 1 (1.6%) patient and laceration or minimal perforation in the ureter with guide wire at the site of impacted ureteral stone in 5 (8.3%) patients. No additional treatment apart from DJ stenting was required. Postoperative complications included abdominal pain requiring analgesics in 10 (16.6%), persistent fever in 4 (6.6%) and hematuria in 2 (3.3%) patients. All patients were receiving routine postoperative i.v. antibiotics. Urine culture in all the 4 patients with fever was sterile. No additional treatment was necessary.

Thirty-six patients were discharged on 1st postoperative day, another 15 on 2nd postoperative day. Patients requiring secondary treatment, repeated ureteroscopy or open ureterolithotomy were discharged on 5th day after appropriate management.

**DISCUSSION**

Over the past 15 years, ureteroscopy has been established as a minimally invasive modality for the treatment of ureteral calculi, and it has proven to be equivalent to ESWL for proximal ureteral stones and superior to ESWL for distal ureteral stones.[1] Recently, advances in endoscopic instruments have enabled retrograde ureteroscopy to become a first-line option for most ureteral stones and even small intrarenal stones. The combination of these instruments allows for an excellent stone-free rate with a low postoperative complication rate in the treatment of urinary calculi.[4]

There are reports regarding bilateral ureteroscopy in a single session for management of ureteric pathology including calculi, polyps and strictures.[2,3,5-9] Opponents of same-session bilateral ureteroscopy cite potential injury to both ureters as a rationale for performing treatment of these calculi in separate sittings. Anecdotal reports of same-session bilateral ureteroscopy utilized larger (10.5F–11F) ureteroscopes[2,5] and were characterized by high ureteral perforation rates (up to 22%) and frequent postoperative fever (4-13%). Most of the calculi treated were located in the distal ureter, and, although no long-term postoperative complications were noted, a greater frequency of significant ureteral perforations and ureteral strictures has been reported in larger series utilizing similar-sized ureteroscopes.[10,11] Given these reports and the documented improvements in stone-free and complication rates of ureteroscopy[12,13] largely attributed to advancements in instrumentation, we sought to study the safety and efficacy of bilateral ureteroscopy in a single session for ureteric calculi in terms of clearance, complications of the procedure and mean hospital stay.

Indications of bilateral same-session ureteroscopy are similar to those of unilateral ureteroscopy. With increasing usage of ureteroscopy, bilateral ureteroscopy has been also used for more cases with bilateral pathologies.[5] In our study, 85% patients were stone-free following single-session bilateral ureteroscopy and these results are almost similar to those by Darabi et al.[5] who reported success in 84.2% patients, although their

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**Table 5: Clearance of stones following single session bilateral ureteroscopy**

| Site of B/L ureteric stones | Number of patients | Success of procedure (number of patients) | Percentage of successful procedure |
|-----------------------------|--------------------|------------------------------------------|----------------------------------|
| Lower ureter                 | 24                 | 24                                       | 92.3                             |
| Middle ureter                | 24                 | 20                                       | 83.3                             |
| Lower ureter                 | 8                  | 5                                        | 62.5                             |
| Lower ureter on one side and midureter on opposite renal unit | 2                  | 2                                        | 100                              |
| Total                        | 60                 | 51                                       | 85                               |
study group consisted of only 19 patients. Although the best candidates for bilateral same-session ureteroscopy are patients with bilateral distal ureteral stone,[2,3] we treated the patients with bilateral ureteric stones at all levels of the ureter and results are in accordance with the clearance rates reported by various authors, whether stones were retrieved as a bilateral same-session ureteroscopic procedure, staged procedures, or unilateral procedures.[5,6,10,12,14]

In our study balloon dilatation of the intramural ureters was required for 82 of 120 renal units and a total of 39 patients were stented either unilaterally or bilaterally. These included all the patients with upper ureteric stones, 20 with midureteric and II with lower ureteric calculi. Stoller et al.[11] concluded in their study that ureteroscopy without routine balloon dilation can be safely done, and Byrne, et al.[15] reported that ureteral stent placement following ureteroscopy may be avoided in selected patients, thereby reducing operative time, surgical costs, and patient morbidity.

In our study the procedure was unsuccessful in 9 patients (12 renal units). The individual failure rate for the stone of the lower ureter, midureter and upper ureter after a single-session bilateral procedure was seen in 7.6%, 16.6% and 37.5% of the patients, respectively. These findings are consistent with those reported in literature.[10,12-14]

Complications of ureteroscopy are perforation, avulsion, stricture, false passage, rupture of balloon dilator, hemorrhage, and sepsis, occurring in 2-20% of cases. With advancements in less invasive therapeutic measures, postoperative morbidity has decreased and treatment success rate has increased.[5]

The main intraoperative complications in our study was minimal perforation in the ureter (9.4%), while postoperative complications included abdominal pain requiring analgesics in 16.6%, persistent fever in 6.6% and hematuria in 3.3% of the patients. At first glance, it seemed that there is added risk of performing same-session bilateral ureteroscopy; however, our combined intra and postoperative complication rate of 36.4% for same-session patients is equivalent to a 18.2% rate in renal units addressed independent of whether they are treated simultaneously or in separate procedures and that by staging the treatment, the risk of developing a complication is only diffused over time rather than being assumed collectively at the time of a same-session bilateral procedure.[5,6]. To reduce complications, we should use safety-guide wire in all of the cases and in those with excessive manipulation, ureteral stents are recommended. Patients with successful ureteroscopy (85 %) were discharged within 48 hours, and only those requiring secondary procedures were discharged on 5th day.

In conclusion, bilateral same-session ureteroscopy is a safe and effective procedure in the management of bilateral ureteral stones which can prevent frequent surgeries, reduce overall hospital stay, and can achieve stone-free and complication rates that are comparable to those of unilateral or staged bilateral procedures.

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