

ORIGINAL ARTICLE

Study to Determine the Requirement of Ureteral Stent after Uncomplicated Ureteroscopy for Ureteric Stones

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ABSTRACT

Aim: The purpose of the study is to determine the necessity of using a ureteral stent later to uncomplicated ureteroscopy in ureteral stones with intracorporeal lithotripsy.

Methods: For ureteric stones 170 cases were planned for ureteroscopic lithotripsy at the Urology Department of Sahiwal Teaching hospital, Sahiwal and Abbasi Shaheed Hospital, Karachi for two-years duration from July 2019 to June 2021. 170 patients were encompassed in the analysis after stones fragmentation. The patients were divided randomly into 2 groups: the 1st group (80 patients with a stent) was inserted postoperatively with ureteral stents, while the second group had no stent (90 patients without a stent). Two weeks apart; stents were removed. Each group patients were evaluated for duration of surgery, success, postoperative pain, voiding irritating symptoms, stricture formation and hematuria.

Results: Both groups of patients were similar in relation of sex, age and mean size of stones. The mean surgery duration was 40 minutes (15-55) in the stent group and 35 mins (20-45) for the stent-less group. Irritation symptoms during urination were observed in 33.7% in the group with stents and 26.7% in the group without the stent. 23(28.7%) patients in the group placed with stents and 13(14.4%) in the stentless group required two or more analgesics per day immediately after surgery. One patient in the stentless group required re-hospitalization for pain control. Hematuria developed in 11 patients (13.7%) and 9 patients (10%) in the stented and non-stented groups, correspondingly. The stricture formation and stone-free rate did not differ amongst the both groups.

Conclusion: Ureteral stenting is not essential after uncomplicated ureteroscopy in the ureteral stone's treatment with intracorporeal shock wave lithotripsy. While placing the stent in the ureter does not provide any additional benefit, it is inconvenient for the patient in terms of cost and subsequent recovery.

Keywords: Ureteral stent, Ureteroscopy, Ureteral calculus.

INTRODUCTION

Ureteral stones are very common in all age groups. Complications of intracorporeal lithotripsy have been reduced by improving the size of the ureteroscope and device for better and less stone fragmentation¹⁻². This procedure is currently the preferred treatment for middle and lower ureter stones³⁻⁴. At most centers, surgeons like to use the DJ stent after this procedure because of the fewer complications such as entrapment and stone constriction⁵. DJ stent placement is also believed to facilitate the transition from passive dilatation to stone fragmentation⁶⁻⁷. However, the DJ stent is not completely harmless, it can cause serious complications. In the literature, complications related with stent placement have been testified in 12% to 85% of patients⁸. These problems comprise signs of irritation of urination, hematuria, infections, pyelonephritis, and stent rupture. Denstedt et al. concluded that significant differences in symptoms were observed in patients without stents, but that no differences were observed in those without stones⁹⁻¹⁰. Patients with a DJ stent require cystoscopic removal of the stent, which certainly increases the total cost of the procedure¹¹. The purpose of this analysis is to evaluate the necessity for routine stenting after stone fragmentation by ureteroscopy without complications related to ureteral stones.

MATERIAL AND METHODS

This prospective randomized controlled trial conducted in Urology Department of Sahiwal Teaching hospital, Sahiwal and Abbasi Shaheed Hospital, Karachi for two-years duration from July 2019 to June 2021. Regardless of the size and location of the stone, a total of 170 patients were registered in this analysis. All patients with bilateral ureteral calculi, renal failure, sole kidney, pregnancy or prior failed ureteroscopy were omitted from the study. Patients with intraoperative mucosal damage or perforation of the ureter were also excluded from the study.

The patients were divided randomly into 2 groups: the 1st group (80 patients with a stent) was inserted postoperatively with ureteral stents, while the second group had no stent (90 patients without a stent). Informed consent was obtained prior to surgery. Then, under general anesthesia, 8.9 Fr rigid intracorporeal ureteroscopic lithotripsy and fragmentation of stones with Swiss lithoclast were performed. A 0.032-inch safety wire was passed through the cystoscope under fluoroscopy guidance. During the procedure, the stones were broken by pneumatic lithotripsy. Continuous irrigation was performed for better visualization. In group A, the 25 cm DJ 6Fr stent was placed through a ureteroscopic surgical channel or under fluoroscopic guidance using cystoscopy. All patients were treated prophylactically during induction with a third-

generation intravenous cephalosporin and continued with oral quinolones for 5 days. At the finish of surgery, patients were taken to the recovery area for discharge and observation when their vital signs were stable, pain control was satisfactory, and they were tolerant to an oral regime. All subjects were assessed by KUB after 2-weeks to confirm stone-free status. It is planned to remove cystoscopy after two weeks under local anesthesia in patients with Double J stent. Controlled IVU was accomplished three months later to surgery to assess the urinary system and identify the presence of ureteral stricture. Outcomes included post-operative pain, signs of urinary tract irritation, number of emergency room visits, hematuria, stone-free status and late complications.

RESULTS

Both groups of patients were similar in relation of sex, age and mean size of stones. Operation time was considered from cystoscopy to concluding endoscope elimination. The mean surgery duration was 40 minutes (15-55) in the stent group and 35 minutes (20-45) for the stent-less group Table 1.

Table 1: Characteristics of patients in the two study groups

Parameters	Stented group (A)	Non stented group (B)
No. of patients	80	90
Average age/ years	38 (range 21-65)	43(range 20-70)
Male/ Female	55.40(1.50:1)	51.86 (1.04:1)
Average Stone size/ mm	08 (range 6-13)	11(range 7-15)
Operative Time/ minutes	40 (range15-55)	35 (range 20-45)

There was no substantial alteration in stone fragmentation and healing time in the postoperative period. Pain was assessed based on oral analgesics requirements and hospitalization requirement for control of pain. Of the non-stented group, 13 (14.4%) subjects needed additional oral analgesic tablet daily, 4 (4.4%) patients of the non-stented group reported renal colic unresponsive to oral analgesics in the emergency room, and 1 (1.1%) patient needed admission in hospital for pain control. In the group with stents placement, 23 (28.7%) patients required analgesics more than once a day and six (7.5%) patients reported to the emergency department with renal colic unresponsive to oral painkillers. Though, no patients in the stent group need admission in hospital Table 2.

Table 2: Post-operative pain, emergency room visit, hospitalization and analgesic requirements for pain control.

Parameters	Stented group (%)	Non stented group
No pain	50(62.5%)	69(76.7%)
Two or more tablet Daily	23(28.7%)	13(14.4%)
No. visits to Emergency	6(7.5%)	4(4.4%)
Hospitalization Due to Pain	0(0%)	1(1.1%)

In 27 (33.7%) patients of the group with stent placement, dysuria, irritation micturition and macroscopic haematuria were more frequent as compared to 24 (26.7%) patients in the non-stented group. At 48 hours after

surgery, severe haematuria occurred in 11 (13.7%) patients in the stent group compared to 9 (10%) patients in the non-stented group. Regarding postoperative complications, sepsis without fever noticed in 10 subjects in the stent group and 11 patients in the non-stented group 24 hours after ureteroscopy, intravenous antibiotic therapy was administered for 3 days and they were discharged without sequelae on oral antibiotics. Another patient (1.25%) was hospitalized with clot retention and had catheterized for 48 hours, then was discharged with regular urine. Table 3.

Table 3: Post-operative complications and symptoms.

Parameters	Stented group	Non stented group
Irritative	27(33.7%)	24(26.7%)
Hematuria	11(13.7%)	9(10%)
Fever	10(12.5%)	11(12.2%)
Clot retention	1(1.25%)	0(0%)

Two weeks after surgery, the percentage of people without stones in both groups was 100%. There was no indication of hydronephrosis or stenosis of ureter in the intravenous pyelogram taken three months after the operation.

DISCUSSION

Urolithiasis is the communal and oldest diseases of the urinary system. Currently, ureteroscopy is one of the most common procedures among various endourological operations and is performed for a variety of indications, including fragmentation and removal of ureteroscopic stones¹²⁻¹³. In 2002, Hoskin et al. determined that routine stenting of ureter is unnecessary after uncomplicated ureteroscopic removal of the distal ureteral stone, and the same observation was observed in our study¹⁴⁻¹⁵. Several randomized controlled studies are newly updated in the literature, all of which presented no change in stone-free status between stented and stent-free groups¹⁶. In our study, 33.7% of subjects in the stent group and 26.7% of subjects in the stent-free group had symptoms of irritation when urinating. These results were comparable to all the studies mentioned above in which removal of the ureteral stents reduced post-operative pain and symptoms of irritated urination¹⁷. Routine ureteral stent placement after ureteroscopy increases the overall procedure cost. In our study, the stentless group was more profitable than the stented group, and Netto et al. reported the same¹⁸⁻¹⁹. They estimated that the cost-effectiveness of ureteroscopy was 30% cheaper in the group without a stent. In addition, the stent removal under local anesthesia is extra disturbing than the first ureteroscopy performed under GA²⁰. In this analysis, postoperative pain was less in the non-stented group than in the stent group. In the stent group, 28.7% of subjects needed two or more pain medications a day to control pain, but no subject needed admission in hospital for chronic pain. The augmented pressure of the renal pelvis explains the frequent occurrence of pain, especially during urination. Ramsay et al. showed that intubation of ureter causes an upsurge in intra-pelvic pressure in the kidneys and causes more pain in patients with stents in the porcine model²¹⁻²². The ureteral stricture development is a known long-term complication after ureteroscopy. Though, in recent years, the frequency of ureteral strictures has

significantly reduced due to the development of endourological technology²³. No stricture formation was found in this study compared to the other studies. Denstedt et al prospective analysis of 59 patients after ureteroscopic lithotripsy for ureteral lower stones showed no stenosis²⁴. Chen et al. showed that stenosis did not occur in patients with and without a stent²⁵. We obtained similar results in our study.

CONCLUSION

There was no difference between the stent and non-stent groups in the development of stone removal and ureteral stenosis after ureteroscopic lithotripsy. However, in the group without stents, we recorded less pain and relatively less distressing urinary symptoms. Additionally, stenting was related with a higher cost. So, we commend that stent placement must not be performed routinely after uncomplicated ureteroscopic lithotripsy for small ureteral stones.

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