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RESEARCH ARTICLE

SHORT-TERM EXTERNAL URETERIC CATHETERISATION VS ROUTINE DOUBLE-J STENTING AFTER URETEROSCOPIC STONE EXTRACTION: A COMPARATIVE STUDY

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ABSTRACT

Background: We compared outcome and complications after ureteroscopic treatment of ureteric calculi with short term external ureteric catheterisation vs routine use of double-j ureteral stenting. **Methods:** Between August 2017 and August 2018, 80 patients were prospectively randomized to double-J stent insertion for 7 days vs ureteric catheterisation for 24 hours after ureteroscopic stone extraction. Exclusion criteria were active UTI, solitary kidney, stone size more than 20 mm or deranged renal function test. Stone characteristics, operative time, postoperative pain, lower urinary tract symptoms (LUTS), analgesia need, rehospitalisation, stone-free rate, and late postoperative complications were all studied. **Results:** There was no significant difference between the two groups regarding hematuria, fever, flank pain, urinary tract infection, and rehospitalisation. At 48 hours and 1 week, frequency/urgency and dysuria were significantly less in group who received short term UC. When comparing two groups, patients with double j stents had statistically significantly more bladder pain (P-0.003), frequency/urgency (P-0.002), dysuria (P-0.001). and need of analgesics (P-0.001). **Conclusion:** Ureteroscopy for ureteral calculi can safely be performed without placement of a double-j ureteral stent. A short-term ureteric catheter insertion for 24 hours following ureteroscopic retrograde stone removal is a safe procedure and superior to double-J stent insertion with regard to urinary symptoms, pain, quality of life, and stent related symptoms. Patients treated with a short-term ureteric catheter recover more quickly, return to work earlier, and need less doctor visit and may prefer this strategy in case of future stone treatment.

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INTRODUCTION

Placement of ureteral stents following ureteroscopic stone extraction has been common since the advent of ureteroscopy (Preminger *et al*., 2007)**.** Routine stenting may promote healing of mucosal injuries, passage of stone fragments. Also routine ureteral stenting following ureteroscopy has been suggested to decrease postoperative pain and late complications such as ureteric stricture formation. However, double-J stent insertion is associated with urinary symptoms, flank, and suprapubic pain as well as UTI. Recent studies have found postoperative pain, narcotic use, and urinary symptoms to be higher in double-j stented groups of patients .The need to place a double-J stent after URS is controversially discussed in literature and depends on the subjective discretion of the treating urologist (Netto *et al*., 2001; Gunlusoy *et al*., 2008; Haleblian *et al*., 2008; Ibrahim *et al*.2008). Recent studies have demonstrated that stents do not need to be routinely inserted following uncomplicated ureteroscopic stone extraction.

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Borboroglu *et al*. demonstrated a comparable stone-free rate when comparing patients undergoing stented vs stentless ureteroscopy for the treatment of distal ureteral stones. Finally, a significant saving in cost is associated with stentless ureteroscopy. In our study we aim to investigate the outcome of a short-term Ureteric Catheterisation in comparison to the routine placement of a double-J stent after ureteroscopic stone removal.

MATERIALS AND METHODS

From August 2017 to august 2018, a total of 80 patients treated with successful ureteroscopy for ureteral stones were prospectively randomized into 2 groups. Group 1 included 42 patients in whom a double- j stent was inserted, and group 2 included 38 patients in whom short term ureteric catheter was inserted after stone removal. Informed consent was obtained from all patients. Exclusion criteria were a single kidney, stone larger than 20 mm, active UTI or deranged renal parameters. The mean age was respectively 44.1 & 43.2 in group 1 and 2. Preoperative imaging consisted of X-ray KUB and renal ultrasonography with NCCT.

Spinal anesthesia was used for ureteroscopic procedure as well as DJ stent/ureteric catheter insertion. Ureteroscopy was done with a 8-9.5 or 6-7.5 Fr semirigid ureteroscope. The pneumatic lithoclast was used to fragment the offending calculus. The stents used in the study were 5Fr or 4 Fr in diameter. The external 4Fr UC was removed without any anesthesia in postoperative day 1. There is no evidence-based recommendation concerning the time period for an external UC placement following URS in the published literature. We believe swelling or clotting might happen more likely in the early hours after surgery. In order to establish an out clinic and safe procedure for the future we decided to place an external ureteric catheter for only 24 hours. In group 1 double-j stent removal was done under local anaesthesia after 7 days.

All patients were closely followed up. Procedures were considered a success if either a solitary calculus was removed in its entirety or all fragments were absent on radiographic follow up by X-ray and renal ultrasound 1 month after the procedure. Our study was designed to compare differences in patient ureteral stent (DJ stent vs Ureteric Catheter) related comfort. Age, gender, stone characteristics, total operating time, the mean operative time, and mean hospital stay were all recorded. For postoperative symptoms and the complications, a special questionnaire and a precise clinical exam were used, looking for flank pain, hematuria, dysuria, urgency, fever, and urinary tract infection. We also studied, the need of analgesics in postoperative time, the rate of rehospitalisation, and the appearence of an ureteral stricture. Patients were followed up postoperatively with a minimum of 3 months Differences in percentages (qualitative variables) were analyzed using Kruskal-Wallis and Mann-Whitney U test. Statistical analyses were performed using the SPSS 15.0. The value < 0.05 was considered statistically significant. All procedures performed in studies were in accordance with the ethical standards of our institute.

RESULTS

The 2 study groups were comparable regarding patients and stone characteristics (Table 1). Overall mean stone size in the study was 8.7 ± 1.3mm. Moreover, the ureteroscopy technique, type of intracorporeal lithotripsy, and method of stone retrieval were not significantly different between the treatment groups. Ureteroscopy was successfully achieved in the two groups and the stone-free rate at 4 weeks was 100% in each group. Mean operative time in group 1 was 36 ± 4 minutes, 34 ± 5 in group 2. Thus, operative time was not significantly longer when a ureteric catheter or double- j stent was placed (Table 2). Shows the mean visual analog pain scores at 48 hours and 1 week after ureteroscopy and other postoperative symptoms and complications in the two groups (Table 3). Showing postoperative symptoms and complications in the two groups. At 48 hours and 1 week, symptoms like frequency/urgency, dysuria were significantly less in the non stented group comparing to other group. When comparing group 1 and group 2, patients with double j stents had statistically significantly more bladder pain (0.003), frequency/urgency (0.002), dysuria (0.001), and need of analgesics (0.001) compared to those who received short term ureteric catheter for 24 hours. There was no significant difference between the two groups regarding hematuria, fever, flank pain, urinary tract infection, and rehospitalisation. When taking into consideration all LUTS and the need of analgesics, they were significantly more important in the first group using a double- j stent (p: 0.001). Readmission to the hospital for unremitting pain was necessary in 1 of 80 patients. No patients in the stented group required postoperative readmission to the hospital. All complications were easily and successfully managed by conservative measures. All patients who underwent imaging postoperatively were without evidence of obstruction or ureteral stricture on follow up imaging.

Table 1. Patient's characteristics and results

	Double- j stent (group 1, 42 patients)	Short term ureteric catheter (group 2, 38 patients)	P Value
Mean patient age (y, range)	44.1 (22–72)	43.2 (20–76)	0.24
Side of stone: R/L	16/26	20/18	0.12
Mean stone size (mm)	10.3 ± 1.1	9.8 ± 1.3	0.18
Mean operative time (min)	36 ± 4	34 ± 5	0.17
Success rate (%)	100	100	0.69

Table 2. Postoperative symptoms and complications

	Double-j stent (group 1; 42 patients)	Short term ureteric catheter (group 2; 38 patients)	P Value
Mean bladder pain score at 48 hours (0–10) ± S.D.	5.3 ± 2.6	2.2 ± 1.4	0.004
Mean bladder pain score on day 7 (0–10) ± S.D.	4.8 ± 2.5	1.9 ± 1.1	0.003
Dysuria (%)	11 (26.1)	5 (13.1)	0.002
Frequency/urgency (%)	17 (40.4)	7 (18.4)	0.001
Need of analgesics in follow-up	11 (26.1)	3 (7.8)	0.001
Limitation of daily life(in days)	7	3	0.0001
Bed rest(in days)	7	1	0.0001

Table 3. Postoperative symptoms and complications

	Double j stent (group 1; 42 patients)	Short term ureteric catheter (group 2; 38 patients) stent	P Value
Mean flank pain score at 48 hours (0–10) ± S.D.	4.3 ± 2.1	4.7 ± 1.9	0.14
Mean flank pain score on day 7 (0–10) ± S.D.	2.6 ± 1.4	2.1 ± 1.4	0.09
Hematuria (%)	3 (7.1)	2 (5.2)	0.67
Fever (%)	3 (7.1)	3 (7.8)	0.5
Urinary tract infection (%)	3 (7.1)	3 (7.8)	0.39
Rehospitalisation (%)	0	1	0.34
Ureteral stricture(%)	0	0	0.70
Mean hospital stay (hours)	26	25	0.48

DISCUSSION

Ureteral stents are commonly placed after ureteroscopic stone extraction. The rationale for the routine use of ureteral stents after ureteroscopy originates from supposition, rather than from evidence-based medicine. However, the placement of a ureteral stent may be associated with significant morbidity. This prospective study shows a significant benefit in favor of a short-term external ureterc catheter compared to the routine double-J stent placement after ureteroscopic stone removal. Ibrahim *et al*. also showed a benefit when omitting double-J stent after distal URS in a study including 220 patients. A reduction in irritant symptoms of micturition, hematuria rate, and dysuria was recorded, but this study was limited due to the retrospective design (Ibrahim *et al*., 2008). In another retrospective study, Merlo *et al*. included 529 patients, but only 129 received a UC after URS. No significant difference was reported concerning pain, fever, or hematuria within the early follow-up. However, at 4 weeks and 3 months the incidence of complications (LUTS, pain, etc) in the ureteric catheter group was significantly lower and no difference with regard to stone-free rate or stricture rate was found (Merlo *et al*., 2011). Joshi *et al*. identified patient morbidity associated with ureteral stents as a significant health problem and investigated it in detail (Joshi *et al*., 2003**).** They found that ureteral stents are associated with significant symptoms, such as pain affecting daily activities (80%), urinary symptoms (73%), and reduced work capacity (58%), which reduce quality of life. During the research, it became clear that stents profoundly affect physical and psychosocial health and have a negative impact on functional capacity and work performance (Joshi *et al*., 2003; Joshi *et al*., 2003). In the past, it could be shown that DJ insertion was associated with increased urinary symptoms, which can only be limited by its removal (Gunlusoy *et al*., 2008). This phenomenon could be confirmed in our trial.

In our present study involving 80 patients, we did not find significant difference between the two groups concerning flank pain, hematuria, fever, and urinary tract infection. In our study both the number of days with limitations in daily life (7.0 to 3.0 days; P = 0.0001), as well as bed rest (1.5 to 0.6 days; P = 0.0001) were significantly reduced by the transient UC. Furthermore, the work index decreased significantly in favor of the UC and group (P < 0.0001). Several trials have demonstrated similar postoperative complication rates among stented and unstented patient populations. In the stented group, a cystoscopy is needed to remove the double-J stent. The additional cystoscopy for stent removal is a cause of discomfort and overall cost. A short-term UC insertion for 6 hours following ureteroscopic stone removal is a safe procedure and superior to a double-j insertion with regard to urinary symptoms, pain, quality of life, and stent related symptoms. Patients treated with a transient ureteric catheter recover more quickly, return to work earlier and need less doctor visits. The vast majority of patients treated with an short term external ureteric catheter would recommend this therapy to others and would prefer this strategy if they would need stone therapy again in the future. Often a surgical dilemma in stenting or omitting a stent following URS remains regardless of different guidelines, different clinical practice or daily routine all around the world, which might be handled by a temporarily stenting as an alternative treatment option. It remains to be investigated if a tubeless strategy after stone removal might replace the ureteric catheter insertion.

Abbreviations

UC: Ureteric catheter

D-j Stent: Double j stent

Conflicts of interest: None declared

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