Comparative study between preoperative stenting versus preoperative Tamsulosin in the ureteroscopic management of upper and middle ureteral stones in adults

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Objective
To compare the safety and efficacy of preoperative stenting versus preoperative Tamsulosin versus direct ureteroscopy (URS) in the ureteroscopic management of upper or middle ureteral calculi.
Patients and methods
This study included 60 patients with upper or middle ureteral calculi less than 20 mm scheduled for semirigid URS and pneumatic lithotripsy at Urology Department, Ain Shams University Hospitals and Dar Alshifa Hospital in Cairo between February 2019 and February 2020. Patients were randomized into three equal groups: A (preoperative stenting), B (preoperative Tamsulosin), and C (direct URS).
Results
The mean operative time was 53.65±9.29 min in group B shorter than group A 54.30 ±8.34 min and group C 62.25±12.05 min (P=0.014). Postoperative colic was 5% in group B less than group A 15% and group C 35% (P=0.044). Stone-free rate was 95% in group A more than group B 85% and group C 60% (P=0.017). Success rate was 95% in group A more than group B 90% and group C 65% (P=0.002). Ureteroscope access was 100% in group A more than group B 90% and group C 35% (P=0.006). Hospitalization time was 1.25±0.34 days in group A shorter than group B 1.55±0.55 days and group C 1.80±0.47 days (P=0.002). Patients needed to do auxiliary Double J stent (DJ), repeat URS, extracorporeal shockwave lithotripsy, or open ureterolithotomy were 0, 0, 5, and 0% in group A, 15, 0, 10%, and 0% in group B, and 40, 20, 10, and 5% in group C (P=0.004, 0.014, 0.804, and 0.362), respectively.
Conclusion
Use of preoperative Tamsulosin or stenting before semirigid URS and pneumatic lithotripsy in the ureteroscopic management of upper or middle ureteral stones in adults is safe and effective more than direct URS. Preoperative Tamsulosin significantly reduced operative time and postoperative colic. While preoperative ureteral stenting significantly improved stone-free rates, success rates, ureteroscopic access and hospitalization time, and need for ureteral dilatation and auxiliary procedures.

Keywords:
pneumatic lithotripsy, Tamsulosin, ureteral stones, ureteric stenting, ureteroscopy

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Introduction

Urolithiasis represents a worldwide disease, and urinary calculi were early present in Egyptian mummies of the pharaohs of ancient Egypt 6000–7000 years ago [1].

Recently, there are many improvements in the urological endoscopic equipment like smaller flexible ureteroscopes and modern effective laser technology [2].

The ureteral stones are commonly found in three anatomic narrow sites of the ureter: at its origin at the ureteropelvic junction, at the pelvic brim when the ureter crosses the external iliac artery, and at the vesicoureteral junction just before its connection to the bladder [3].

Ureteric stone location and size, especially the maximum diameter, are the most significant factors indicating the best method of ureteric stone management [4].

Ureteric stents are most commonly placed before ureteroscopic stone removal when there is an impaired renal function, abnormal ureteric anatomy, or to perform ureteroscopy (URS) in a nonemergent setting to avoid complications [5].

Several studies reported that the routine preoperative stenting before URS for ureteric stones is not needed [6].

While other studies said that preoperative DJ stenting showed efficacy in the ureteroscopic management of ureteral calculi [7].

Alpha blockers, especially Tamsulosin, have shown efficacy in ureteral stone management in several studies, by blocking alpha-1A and alpha-1D receptors, which are distributed in the ureter [8,9].

Patients and methods

This is a prospective, comparative, and randomized cohort, multicenter study. This research was performed at the Department of General Surgery, Ain Shams University Hospitals and Dar Alshifa Hospital, Ethical Committee approval and written, informed consent were obtained from all participants. It was conducted at Urology Department, Ain Shams University Hospitals and Dar Alshifa Hospital in Cairo between February 2019 and February 2020. The study included 60 adult patients with single upper or middle ureteric calculi less than 20 mm in diameter who were scheduled for ureteroscopic management using semirigid URS and pneumatic lithotripsy.

Inclusion criteria were patients aged between 18 and 70 years, patients fit for surgery, patients with unilateral single upper or middle ureteric calculus in which its size is less than 20 mm in diameter, and patients who accepted to sign the informed consent.

The exclusion criteria were patients aged below 18 or above 70 years, patients unfit for surgery, patients with lower ureteric calculi, patients with bilateral or multiple ureteric calculi, patients with upper or middle ureteric calculi in which their size is more than 20 mm in diameter, patients with a past history of extracorporeal shockwave lithotripsy (ESWL), previous URS, or ureteroneocystostomy, patients with anatomical urological anomalies, female patients with pregnancy, and patients who refused to sign the informed consent.

The study included a total of 60 patients who had single upper or middle ureteric calculi less than 20 mm in diameter. All patients were randomized into three equal groups: group A included 20 patients who were treated with preoperative ureteral stenting 2 weeks before URS, while group B included 20 patients who were treated with preoperative Tamsulosin 0.4 mg once daily for 1 week before URS, while group C included 20 patients who were treated with direct URS.

Every patient included in the study was explained about the aim of this study. A specific freely given informed consent concerning participation in this study was signed before enrolling in this study after full explanations of the procedure.

All patients included in the study were well prepared by full history taking, clinical examination, and full investigations. All patients were operated at the Urology Department, Ain Shams University Hospitals and Dar Alshifa Hospital in Cairo. All operations were done using semirigid URS and pneumatic lithotripsy.

Intraoperative follow-up of patients involved in this study included the operative time according to the stone size, experience of the surgeon, and quality of instruments, in addition to the intraoperative complications like ureteric perforation, avulsion, or bleeding if occurred. Also, the need for intraoperative ureteric dilatation and failure rate was evaluated.

Postoperative follow-up was in the form of regular visits of patients in the outpatient clinic with postoperative clinical examination using the routine investigations, in addition to assessment of postoperative complications like hematuria, pain, fever, and urinary-tract infection, in addition to evaluation of stone-free rates, postoperative hospital stays, and further need of auxiliary treatment in patients of study groups.

All the patients were explained about the available procedures of different treatment options like direct URS, preoperative alpha blockers, and preoperative DJ ureteral stenting prior to URS, and they were informed with the possible outcome and complications related to the procedure.

A 7.5-Fr semirigid ureteroscope was used in all cases and the ureteric stone was fragmented using a pneumatic lithotripter. At the end of the URS, a 6-Fr ureteral catheter was fixed for an average of 1–3 days. In complicated cases, a DJ ureteral stent was placed instead. All steps were done under fluoroscopic guidance.

The patients were followed up at 2 weeks, 1 month, and 2 months following URS to assess postoperative

parameters. Follow-up investigations included urinalysis, serum creatinine level, PUT, and abdominal ultrasound. Noncontrast computed tomography urinary tract was done routinely at 1 and 2 months of follow-up after URS.

The demographics of patients, stone characteristics, operative parameters, intraoperative complications, postoperative complications, auxiliary procedures, stone-free rates at 1 month, and stone-free rates at 2 months of follow-up were evaluated and recorded. Treatment failure was described as a failure to access or a residual stone fragment more than 2 mm. Treatment success was described when the patient became free of stones or when the residual stone fragment was less than or equal to 2 mm in diameter.

Statistical analysis

Analysis of data was done through the Statistical Package for Social Science (Statistical analysis was done using IBM SPSS statistics for windows, Version 23.0. Armonk, NY: IBM Corp), version 23. Quantitative data were described as mean, SDs, and ranges when their distribution found parametric. Qualitative variables were described as number and percentages. Comparison between groups with qualitative data was done by using χ^2 test. Comparison between more than two independent groups with quantitative data and parametric distribution was done by using one-way analysis of variance. Confidence interval was set to 95% and margin of error was set to 5%. *P* value was considered significant as *P* value more than 0.05: nonsignificant, *P* value less than 0.05: significant, and *P* value less than 0.01: highly significant.

Results

Table 1 shows that there were no statistically significant differences between the three groups regarding the age, sex, stone laterality, stone site, stone size, stone impaction, and radio-opacity.

Table 2 shows a statistically significant difference between the three groups regarding URS success rate. URS was successfully done for 19 (95%) patients in group A (preoperative stenting), 18 (90%) patients in group B (preoperative Tamsulosin), and only 13 (65%) patients in group C (direct URS) (*P*=0.002).

In addition, there was a statistically significant difference between the three groups regarding the operative time. The mean operative time was 54.30 ±8.34 min in group A, 53.65±9.29 min in group B, and 62.25±12.05 min in group C (*P*=0.014).

Table 1 Demographics of patients and stone characteristics

Demographics of patients	Group A (*N*=20) Preoperative stenting [*n* (%)]	Group B (*N*=20) Preoperative Tamsulosin [*n* (%)]	Group C (*N*=20) Direct ureteroscopy [*n* (%)]	Test value	*P* value	Significance
Age						
Mean±SD	41.10±14.51	42.05±14.87	40.55±13.36	0.057[a]	0.945	NS
Range	18–64	20–69	19–67			
Sex						
Female	7 (35.0)	9 (45.0)	8 (40.0)	0.417*	0.812	NS
Male	13 (65.0)	11 (55.0)	12 (60.0)			
Stone side						
Right ureter	12 (60.0)	10 (50.0)	13 (65.0)	0.960*	0.619	NS
Left ureter	8 (40.0)	10 (50.0)	7 (35.0)			
Stone site						
Upper	10 (50.0)	9 (45.0)	8 (40.0)	0.404*	0.817	NS
Middle	10 (50.0)	11 (55.0)	12 (60.0)			
Stone size (mm)						
Mean±SD	9.95±3.61	10.10±3.88	9.50±3.82	0.137[a]	0.872	NS
Range	5–19	5–18	5–19			
Stone impaction						
No	20 (100.0)	18 (90.0)	17 (85.0)	3.055*	0.217	NS
Yes	0	2 (10.0)	3 (15.0)			
Radio-opacity						
Radio-opaque	14 (70.0)	12 (60.0)	13 (65.0)	0.440*	0.803	NS
Radio-lucent	6 (30.0)	8 (40.0)	7 (35.0)			

*χ^2 test. [a]One way analysis of variance test. *P* value more than 0.05: nonsignificant (NS); *P* value less than 0.05: significant; *P* value less than 0.01: highly significant (HS).

Table 2 Operative parameters of ureteroscopy

Operative parameters	Group A (*N*=20) Preoperative stenting [*n* (%)]	Group B (*N*=20) Preoperative Tamsulosin [*n* (%)]	Group C (*N*=20) Direct ureteroscopy [*n* (%)]	Test value	*P* value	Significance
Operation success rate						
Success	19 (95.0)	18 (90.0)	13 (65.0)	7.440*	0.024	S
Failure	1 (5.0)	2 (10.0)	7 (35.0)			
Operative time (min)						
Mean±SD	54.30±8.34	53.65±9.29	62.25±12.05	4.568[a]	0.014	S
Range	41–73	39–71	45–83			
Length of hospital stay (days)						
Mean±SD	1.25±0.34	1.55±0.55	1.80±0.47	6.972[a]	0.002	HS
Range	1–2	1–3	1–3			
URS access to stone						
Not accessible	0	2 (10.0)	7 (35.0)	10.196*	0.006	HS
Accessible	20 (100.0)	18 (90.0)	13 (65.0)			

URS, ureteroscopy. *χ^2 test. [a]One way analysis of variance test. *P* value more than 0.05: nonsignificant (NS); *P* value less than 0.05: significant; *P* value less than 0.01: highly significant (HS).

Table 3 Intraoperative complications of ureteroscopy

Intraoperative complications	Group A (*N*=20) Preoperative stenting [*n* (%)]	Group B (*N*=20) Preoperative Tamsulosin [*n* (%)]	Group C (*N*=20) Direct ureteroscopy [*n* (%)]	Test value*	*P* value	Significance
Failure to identify the ureteric orifice						
No	20 (100.0)	20 (100.0)	19 (95.0)	2.034	0.362	NS
Yes	0	0	1 (5.0)			
Failure to pass the guide wire						
No	20 (100.0)	20 (100.0)	18 (90.0)	4.138	0.126	NS
Yes	0	0	2 (10.0)			
Failure to advance the ureteroscope						
No	20 (100.0)	20 (100.0)	18 (90.0)	4.138	0.126	NS
Yes	0	0	2 (10.0)			
Stone migration						
No	19 (95.0)	18 (90.0)	18 (90.0)	0.436	0.804	NS
Yes	1 (5.0)	2 (10.0)	2 (10.0)			
Ureteral mucosal laceration						
No	19 (95.0)	18 (90.0)	16 (80.0)	2.264	0.322	NS
Yes	1 (5.0)	2 (10.0)	4 (20.0)			
Ureteral dilatation						
No	20 (100.0)	18 (90.0)	14 (70.0)	8.077	0.018	S
Yes	0	2 (10.0)	6 (30.0)			
Ureteral perforation						
No	20 (100.0)	20 (100.0)	18 (90.0)	4.138	0.126	NS
Yes	0	0	2 (10.0)			
Ureteral avulsion						
No	20 (100.0)	20 (100.0)	19 (95.0)	2.034	0.362	NS
Yes	0	0	1 (5.0)			

*χ^2 test. *P* value more than 0.05: nonsignificant (NS); *P* value less than 0.05: significant; *P* value less than 0.01: highly significant (HS).

There was a statistically high significant difference between the three groups regarding the hospitalization time. The mean hospitalization time was 1.25±0.34 days in group A, 1.55±0.55 days in group B, and 1.80±0.47 days in group C (*P*=0.002) (Table 2).

There was a statistically high significant difference between the three groups regarding the ureteroscope access to stone rate. Ureteroscope access to stone could be done in all 20 (100%) patients in group A, 18 (90%) patients in group B, and only 13 (65%) patients in group C (*P*=0.006) (Table 2).

Table 3 shows that there was no statistical significance between the three groups regarding the intraoperative failure to identify the ureteric orifice, failure to pass the guide wire, failure to advance the ureteroscope, stone

Table 4 Postoperative complications in the study groups

Postoperative complications	Group A (*N*=20) Preoperative stenting [*n* (%)]	Group B (*N*=20) Preoperative Tamsulosin [*n* (%)]	Group C (*N*=20) Direct ureteroscopy	Test value*	*P* value	Significance
Hematuria						
No	19 (95.0)	18 (90.0)	17 (85.0)	1.111	0.574	NS
Yes	1 (5.0)	2 (10.0)	3 (15.0)			
Fever						
No	19 (95.0)	19 (95.0)	18 (90.0)	0.536	0.765	NS
Yes	1 (5.0)	1 (5.0)	2 (10.0)			
UTI						
No	20 (100.0)	19 (95.0)	17 (85.0)	3.750	0.153	NS
Yes	0	1 (5.0)	3 (15.0)			
Postoperative colic						
No	17 (85.0)	19 (95.0)	13 (65.0)	6.234	0.044	S
Yes	3 (15.0)	1 (5.0)	7 (35.0)			

UTI, urinary tract infection. *χ^2 test. *P* value more than 0.05: nonsignificant (NS); *P* value less than 0.05: significant; *P* value less than 0.01: highly significant (HS).

Table 5 Auxiliary procedures and stone free rates in the study groups

Auxiliary procedures	Group A (*N*=20) Preoperative stenting [*n* (%)]	Group B (*N*=20) Preoperative Tamsulosin [*n* (%)]	Group C (*N*=20) Direct ureteroscopy [*n* (%)]	Test value*	*P* value	Significance
Auxiliary DJ stenting after URS						
No	20 (100.0)	17 (85.0)	12 (60.0)	10.909	0.004	HS
Yes	0	3 (15.0)	8 (40.0)			
Repeat URS (within 2 months)						
No	20 (100.0)	20 (100.0)	16 (80.0)	8.571	0.014	S
Yes	0	0	4 (20.0)			
ESWL after URS						
No	19 (95.0)	18 (90.0)	18 (90.0)	0.436	0.804	NS
Yes	1 (5.0)	2 (10.0)	2 (10.0)			
Open ureterolithotomy						
No	20 (100.0)	20 (100.0)	19 (95.0)	2.034	0.362	NS
Yes	0	0	1 (5.0)			
Residual stones and SFR						
Residual stones at 1-month follow-up						
Yes	1 (5.0)	3 (15.0)	8 (40.0)	8.125	0.017	S
No	19 (95.0)	18 (85.0)	12 (60.0)			
Residual stones at 2-month follow-up						
Yes	0	1 (5.0)	3 (15.0)	3.750	0.153	NS
No	20 (100.0)	19 (95.0)	17 (85.0)			

ESWL, extracorporeal shockwave lithotripsy; SFR, stone-free rate; URS, ureteroscopy. *χ^2 test. *P* value more than 0.05: nonsignificant (NS); *P* value less than 0.05: significant; *P* value less than 0.01: highly significant (HS).

migration, ureteral mucosal laceration, and ureteral perforation.

Failure to identify the ureteric orifice during URS was found in one (5%) patient in group C (direct URS). Failure to pass the guide wire was found in two (10%) patients in group C. Failure to advance the ureteroscope was found in two (10%) patients in group C. Stone migration during URS was found in one (5%) patient in group A (preoperative stenting), two (10%) patients in group B (preoperative Tamsulosin), and two (10%) patients in group C (direct URS). Ureteral perforation was found in two patients in group C and ureteral avulsion was found in one (5%) patient in group C, who needed to do open ureterolithotomy.

Also, there was a statistically significant difference between the three groups regarding the need for intraoperative ureteral dilatation. It was done to none of the patients (0%) in group A (preoperative stenting), two (10%) patients in group B (preoperative Tamsulosin), and six (30%) patients in group C (direct URS) (*P*=0.018).

Table 4 shows that there was no statistical significance between the three groups regarding postoperative hematuria, fever, and urinary-tract infection.

In addition, there was a statistical significance between the three groups regarding postoperative colic. It was found in three (15%) patients in group A (preoperative stenting), one (5%) patient in group B (preoperative Tamsulosin), and seven (35%) patients in group C (direct URS) (P=0.044).

Table 5 shows that there was a high statistical significance between the three groups regarding the need for auxiliary DJ ureteric stenting after URS, which was done for none of the patients (0%) in group A (preoperative stenting), three (15%) patients in group B (preoperative Tamsulosin), and eight (40%) patients in group C (direct URS) (P=0.004).

Among the three groups, a ureteral catheter was inserted postoperatively in 46 (76.66%) patients for a median duration of 2 days (range, 1–3 days). A DJ internal ureteric stent was placed in 11 (18.33%) patients for a median duration of 14 days (range 12–45 days).

Also, there was a statistical significance between the three groups regarding the need to repeat URS within 2 months after URS, it was done for none of the patients (0%) of both group A (preoperative stenting) and group B (preoperative Tamsulosin), while it was done for four (20%) patients in group C (direct URS) (P=0.014).

In addition, there was no significant difference between the three groups regarding the need for auxiliary ESWL or undergoing open ureterolithotomy, only one patient in group B (preoperative Tamsulosin) and two patients in group C (direct URS) did auxiliary ESWL after URS, and only one patient in group C (direct URS) underwent immediate open ureterolithotomy after intraoperative ureteral avulsion during URS (Table 5).

Also, there was a statistical significance between the three groups regarding the stone-free rate after 1 month. Patients who became stone free 1 month after URS were 19 (95%) in group A (preoperative stenting), 17 (85%) in group B (preoperative Tamsulosin), and 12 (60%) in group C (direct URS) (P=0.017) (Table 5).

Also, there was no statistically significant difference between the three groups regarding the stone-free rate at 2 months of follow-up. Patients who became stone free 2 months after URS and auxiliary procedures were 20 (100%) in group A, 19 (95%) in group B, and 17 (85%) in group C (P=0.153) (Table 5).

Residual stones were found in one patient in group B (preoperative Tamsulosin) and three patients in group C (direct URS) at 2 months of follow-up due to failed ESWL or the second URS failure after URS and they needed to repeat URS, and they became stone free at 4 months of follow-up.

Discussion

The use of alpha-blockers prior to routine URS for ureteral calculi is still controversial. Tamsulosin is a subtype-selective α1A-adrenoceptor and α1D-adrenoceptor antagonist, it has two formulas: Tamsulosin MR and Tamsulosin OCAS [10,11].

Densities of α1-adrenoceptors (α1A and α1D) in the smooth muscle cells of the human ureter are more than other adrenoceptor subtypes [12].

Bayar *et al*. [13] found that Tamsulosin use for 1 week before semirigid URS increases stone access and stone-free rates.

Alsaikhan *et al*. [14] reported that utilization of preoperative alpha-blockers before ureteroscopic management of ureteral stones showed a significant decrease in the need for dilatation of the ureteric orifice, increase in patient stone-free rate, and facilitated the ureteroscopic stone access and decreased the operative time.

Sudeep Raj *et al*. [15] concluded that Tamsulosin decreases ureteric stent-related symptoms and increases quality of life in patients who had ureteric DJ stents.

Rashahmadi *et al*. [16] concluded that administration of preoperative Tamsulosin facilitates URS and improves the success rate of URS.

Aydın *et al*. [17] reported that the use of alpha-blockers for 3 days before URS for management of ureteral calculi increased the rate of access to all ureteric calculi and reduced the complication rate.

Ahmed *et al*. [18] concluded that Tamsulosin therapy before semirigid URS improved ureteroscopic access to proximal ureteral calculi, increased the success rate, and reduced morbidity.

Campschroer *et al*. [19] reported that alpha-blockers may increase the stone-free rate but probably also cause a

slight increase in the risk of the occurrence of major adverse effects.

Nuraj and Hyseni [20] concluded that Tamsulosin is efficient for the treatment of ureteral calculi, as it decreased ureteral colic and increased stone expulsion.

On the other side, Meltzer *et al*. [21] concluded that Tamsulosin did not improve the overall stone-passage rate or improved a significant range of other outcomes.

The use of preoperative DJ ureteric stenting prior to ureteroscopic lithotripsy for upper or middle ureteral stones has been a debate. Assimos *et al*. [22] reported that routine DJ ureteric stenting is not necessary before URS.

Hamamoto *et al*. [23] concluded that DJ ureteric stent fixation decreases stone adhesion and distal ureteric stenosis, and may lead to a safe and effective procedure for ureteroscopic lithotripsy, especially if there were impacted ureteral stones.

Also, Navetta *et al*. [24] concluded that preoperative stenting before undergoing URS had few operative advantages and did not positively affect returns to the emergency department and readmissions to the hospital within 3 months after URS.

Yang *et al*. [25] reported that preoperative ureteric stent fixation significantly improved stone-free rates in patients undergoing ureteroscopic lithotripsy.

Assimos *et al*. [22] demonstrated that fixation of a preoperative ureteric stent increases stone-free rates and decreases complications in patients with renal calculi, but not in patients with ureteric calculi after URS.

Both ESWL and URS are treatment options for proximal ureteral stones. Lotan and colleagues reported that URS is cost-effective more than ESWL, when URS is used as an initial management procedure due to limitations of ESWL like bony prominences, positioning, and need for multiple sessions to achieve complete stone clearance [26,27].

Flexible URS is safer than semirigid URS, and it is the gold standard in the management of proximal ureteric calculi to avoid injury of the iliac vessels, but it has disadvantages like high cost and needs a good experience [28].

Our study concluded that administration of Tamsulosin 0.4 mg once daily for 1 week before ureteroscopic management of adult patients with upper or middle ureteral stones is effective more than direct URS, it significantly reduced the operative time and decreased postoperative colic and so decreased the need for excessive analgesics, and also, it had an accepted complication rate and minor drug- related side effects. Also, it slightly increased the stone-free rates and success more than treatment of upper or middle ureteric stones with direct URS, but less than preoperative ureteric stenting prior to URS.

Our study also concluded that use of preoperative DJ ureteric stenting for 2 weeks before ureteroscopic management of patients with upper or middle ureteral stones is effective more than direct URS, it significantly improved the stone-free rates, URS success rates, ureteroscopic access to stone rates, and also significantly reduced the hospitalization time, the need for ureteric dilatation at the time of URS, and the need for auxiliary procedures. Also, postoperative pain and mean operative time were decreased but less than preoperative Tamsulosin use before URS.

The mean operative time among the study groups was better in group B (preoperative Tamsulosin) 53.65 ±9.29 min slightly more than group A (preoperative stenting) 54.30±8.34 min and more than group C (direct URS) 62.25±12.05 min.

None of the patients in group A needed intraoperative ureteral dilatation, while ureteral dilatation was done for two (10%) patients in group B and six (30%) patients in group C.

Ureteral access to stone without the need of ureteral dilatation was done in all cases of group A, while the ureteroscope failed to access the stone in two (10%) cases in group B and seven (35%) cases in group C. Postoperative colic was less in group B, which had only one case, unlike group A, which had three (15%) cases and group C, which had seven (35%) cases.

Auxiliary procedures were less in group A, which had none of the patients who needed auxiliary DJ or repeat URS and only one patient needed to do ESWL after URS due to sizable residual stone, while group B had two patients who were sent for ESWL and three patients underwent auxiliary DJ after URS, while group C had eight patients who needed auxiliary DJ

stenting, two patients were sent for ESWL after URS, four patients needed to repeat URS due to residual stones or failed ESWL, and one patient needed open ureterolithotomy after intraoperative ureteric avulsion during URS. Stone-free rate at 1 month of follow-up was better in group A (95%) more than group B (85%) and group C (60%). Stone-free rate at 2 months of follow-up improved to 100% in group A, 95% in group B, and 85% in group C.

Limitations of the study

The study was limited by the small number of patients, and the URS procedures were performed at two different institutions by different urologists. Although all were well trained, it cannot be excluded that the experience level may have affected the results. Also, flexible URS and laser lithotripsy were not included in the study as a standard method for comparison. However, our aim was not to determine the optimal treatment of upper or middle ureteral stones, but our aim was to evaluate the safety and efficacy of preoperative Tamsulosin or preoperative DJ ureteric stenting on the outcome of semirigid URS and ureteroscopic lithotripsy using pneumatic lithotripsy as treatment options.

Further research should be conducted on a larger scale to evaluate the safety and outcome of preoperative DJ ureteric stenting versus preoperative Tamsulosin in order to support the results and confirm the conclusion.

Conclusion

Preoperative stenting and preoperative Tamsulosin use before semirigid URS and ureteroscopic lithotripsy using pneumatic lithotripsy for the management of upper or middle ureteric stones in adults is safe and effective with better outcome more than direct URS. Preoperative Tamsulosin significantly reduced operative time and postoperative colic, while preoperative DJ ureteric stenting significantly improved stone-free rates, success rates, ureteroscopic access, and operative time, and significantly reduced hospitalization time, need for intraoperative ureteral dilatation, and need for auxiliary procedures.

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Conflicts of interest

There are no conflicts of interest.

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