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Tamsulosin therapy improved the outcome of ureterorenoscopy for lower ureteral stones: A prospective, randomised, controlled, clinical trial

A.S. Abdelaziz[a,b,*], **A.M. Kidder**[b,c]

[a] *Faculty of Medicine, Al-Azhar University, Damietta, Cairo, Egypt*
[b] *KSA, Al-Rafie Hospital, El-Siteen Street, P.O. Box 483, Makkah 21955, Saudi Arabia*
[c] *Faculty of Medicine, Zagazig University, Egypt*

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Abstract
Introduction: Tamsulosin is an α-1A-specific blocker inducing selective relaxation of ureteral smooth muscle and inhibition of ureteral spasms leading to ureteral dilatation that can facilitates retrograde ureterorenoscopy (URS).
Objective: To assess the efficacy of tamsulosin in improving the outcome of URS management of lower ureteral stones.
Patients and methods: This prospective, randomised, controlled, clinical trial was carried out between June 2011 and December 2014. It included 98 patients with lower ureteral stones scheduled for treatment with URS. Before URS, patients were randomly divided into 2 groups; study group including 51 patients, in which pre-URS daily oral dose of tamsulosin 0.4 mg tab, for 1 week, was given and control group including 47 patients who received no additional therapy rather than standard analgesic on demand. The URS outcomes were evaluated and compared between both groups.
Results: The demographic and stone characteristics were comparable between both groups. The mean URS time was significantly shorter in study group than in control group (52.0 ± 14.9 min vs. 71.0 ± 17.3 min; $p = 0.039$). Of the 98 patients, 89 (90.81%) had a successful URS procedures. The success rate was

* Corresponding author at: KSA, Al-Rafie Hospital, El-Siteen Street, P.O. Box 483, Makkah 21955, Saudi Arabia.
E-mail addresses: sayedaboyousef@ymail.com, sayedaboyousef4374@yahoo.com (A.S. Abdelaziz), drahmedkhder@gmail.com (A.M. Kidder).
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94.1% (98/51) in study group compared 89.2% (58/65) in the control group, with statistically significant difference ($p = 0.045$). The major complications occurred in 4.25% of patients in control group but in only 1.96% of those received tamsulosin ($p = 0.034$).

Conclusion: Post-tamsulosin ureteroscopy was easier and safer; leading to significantly increased stone-free rates and fewer complications.

Introduction

Ureterorenoscopy (URS) is one of the most common procedures performed for upper and lower ureteral disorders. However, URS is associated with potential risks and complications [1]. A percentage (5–10%) of patients undergoing URS requires a second procedure for definitive management as the result of failure to access the ureter. The treatment of patients who have undergone a failed URS procedure or who experience complications may be complex [2,3].

Substantial advances in URS have resulted in the procedure being incorporated into routine urological practice in many centres worldwide. An abundance of clinical data and technological progression has enabled the development of novel solutions, which have increased the efficacy of URS and reduced associated morbidity and costs [4].

Ureteroscopic complications are well known, but the predictive factors remain unclear. Careful attention to the selection of instruments and techniques is important to reducing complications related to URS procedures [1].

To facilitate ureteral stone expulsion and decrease post-operative complications, recent studies have recommended a medical expelling therapy (MET) with calcium antagonists, nifedipine, corticosteroids and α-1 blockers [5–7]. Different subtypes of adrenergic receptors, such as α1a, α1b and α1d, have been identified in the distal ureter, with a higher density of α1d compared to the others. Several studies have demonstrated increased stone expulsion rates for distal ureteral calculi using tamsulosin as a highly selective α1d adrenoceptor antagonist, which inhibits contraction of ureteral musculature, reduces basal tone, decreases peristaltic frequency and amplitude and decreases intraluminal pressure [5–8]. Based on these observations, we hypothesised that MET with α-1d blocker before endoscopic treatment of ureteral stones may increase the success rate of the procedure and decrease operative complications. The present study aimed to evaluate the efficacy of tamsulosin therapy on the feasibility and success rate of URS management for lower ureteral stones.

Patients and methods

After receiving local institutional review board approval, this prospective, randomised, controlled clinical trial was performed from June 2011 to December 2014. The study protocol was explained to all participants, and they provided written informed consent prior to inclusion.

All patients ≥18 years old with a single, radio opaque, lower ureteral stone, 5–10 mm in maximum diameter were included in the study. Patients were evaluated via medical histories, physical examinations and laboratory investigations in the form of complete urine analysis, urine culture, blood urea and serum creatinine, complete blood cell count, liver function tests and coagulation profile. In addition, abdominal X-rays for kidneys, ureters and urinary bladder (KUB), urinary ultrasonography and intravenous urography (IVU) and/or abdominal computed tomography (CT) were performed in all patients. Pregnant women and patients with a history of endoscopic or open ureteral surgery, persistent renal pain, urinary tract infection (UTI), renal impairment, solitary kidney, bilateral ureteral stones, high-grade hydronephrosis and those on or with hypersensitivity to α-blockers were excluded from the study.

Patients were randomised into two equal groups using a coin toss. In the study group, patients received a daily oral dose of tamsulosin (0.4 mg) for one week before URS, whereas no active treatment was given to members of the control group. All patients were asked to take analgesics (NSAIDs) for moderate and severe pain.

Operative technique

Under spinal or general anaesthesia, cystoscopy was initially carried out to identify the ureteral orifice. A floppy-tipped guidewire (0.038 in.) was inserted into the ureter. After the guidewire was placed, URS was performed using a 7.5 F semi-rigid ureterorenoscope (Karl Storz, Tuttlingen, Germany). Ureteral dilatation was not routinely performed during ureteroscopy except when the truly stenotic ureteric orifice was encountered. Ureteral dilatation was done by balloon dilation systems, which were introduced into the ureter over a guidewire. Disintegration using the Swiss pneumatic lithoclast was performed, and the stone gravel was retrieved using a Dormia basket and/or grasper forceps to ensure removal of all sizable gravel. A ureteric stent was inserted at the end of the procedure for a period of 1–2 days. Internal stents (JJ) were placed for 4–6 weeks in cases with intra-operative complications (e.g. ureteral perforation, false passage) and in solitary kidney patients. The procedure site was covered with perioperative antibiotics and analgesics.

Follow-up and outcome measurements

All patients were evaluated with X-ray KUB and urinary ultrasonography 24 h and 2 weeks after URS. The primary endpoint was URS success, which was defined as no evidence of residual stones >2 mm in diameter and no or minimal complications. The operative time, fluoroscopy time, peri-operative complications, stone-free rate, use of ureteral stents and hospital stay were recorded. The URS complications were reported according to the modified Clavien grading system. Grade I (events without adverse consequences for the patient), grade II (complications comprising blood transfusions or urinary tract infection), grade IIIa (complications requiring intervention under local anaesthesia), grade IIIb (complications requiring intervention under general anaesthesia), grade IVb (single organ