



Original Article

Comparing The Efficacy of Tamsulosin and Silodosin in the Medical Expulsion Therapy for Ureteral Calculi in the Population of District Dera Ismail Khan

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Abstract: Background: Urolithiasis is very important public health issue and affects people worldwide. As it causes a significant financial burden on our society, therefore, developing more affordable and simple methods to treat this condition becomes even more crucial. In recent years, several medications have been developed and effectively used in medical expulsion therapy for small, simple ureteral calculi. Each medication claims to be more effective than the others. Our study is to compare the effectiveness of silodosin and tamsulosin in medical expulsion therapy for ureteral calculi. **Objective:** To evaluate the effectiveness of silodosin (8 mg) and tamsulosin (0.4 mg) in terms of the rate of stone expulsion. **Settings and Design:** A retrospective cross-sectional study was carried out at Urology Department in DHQ-MTI-Teaching Hospital, Dera Ismail Khan. **Material and Methods:** A total of 120 patients aged 18 to 55 years with unilateral, uncomplicated middle or lower ureteral stones were included in the study and divided into Group 1 and Group 2. Group 1 was given tamsulosin (0.4 mg) daily, while Group 2 was given silodosin (8 mg) every day for a maximum of 4 weeks. Imaging studies were performed on the patients weekly. The rate of stone expulsion was the main outcome, and the duration of stone expulsion, and the side effects were the secondary outcomes. **Results:** The spontaneous stone expulsion was more in Group 2 (83.33%) as compared Group 1 (68.33%) and the result was statistically significant. Regarding the average stone expulsion time, there was a variation between the groups as well. A lower analgesic use was also found in Group 2. **Conclusion:** According to our research, silodosin outperformed tamsulosin clinically in terms of the rate of stone expulsion.

Keywords: Ureteral Calculi, Tamsulosin, Silodosin.

INTRODUCTION

Since ancient times, stone disease has been documented as one of the most prevalent ailments in contemporary society. However, as a result of the globalization of society, the location of stone formation has moved from the lower urinary tract to the upper one. Urolithiasis is considered a chronic disease with significant economic consequences and public health importance, as it has been estimated that 50% of patients will experience a recurrence of colic within five years of their initial episodes.^{1,2}

The management of ureteral calculi has undergone a paradigm shift in the last ten years due to the introduction of newer medications and less invasive

techniques. Alpha1-blockers, which were initially created as anti-hypertensive medications, now successfully used to treat benign prostatic hyperplasia because of their ability to relax the urinary tract. According to recent research, alpha1 blockers used in medical expulsion therapy for distal ureteral calculi have shown excellent results. The idea behind their application in the management of distal ureteral stones was that they might cause the ureteral smooth muscle to selectively relax, preventing ureteral spasms and causing the ureteral lumen to dilate. An extensive amount of published data has demonstrated the effectiveness of this type of therapy in both speeding

up and shortening the time it takes for the stones to be expelled.³⁻⁹ Their use has therefore become a well-established practice. Tamsulosin is alpha-1-adrenoceptor antagonist, one of the most widely used and effective medicines used in expulsion therapy. Silodosin, recently introduced selective antagonist of the alpha (1A) adrenoceptors, has shown promising results with fewer adverse reactions and improved efficacy.

Objective: The objective of this study was to compare the efficacy of silodosin (8 mg) vs tamsulosin (0.4 mg), once daily in terms of the stone expulsion rate.

MATERIAL AND METHODS

We collected our data retrospectively starting from July 2024 to Dec 2024, a total of 120 patients (M=58; F=62) who were between age group of 18–55 years, who had unilateral, non-impacted, uncomplicated middle or lower ureteral stones which were less than 1cm. The calculated sample size was 112 cases and is calculated by online calculator i.e <https://www.openepi.com/SampleSize/SSCohort.htm> with 5% level of significance, 80% power of test. When required, unenhanced computed tomography (CT) scans, ultrasonography, and plain X-rays were used to evaluate the patients. A digital ruler was used to determine the stone's size on the first plain X-ray or CT scan, and the largest dimension of the stone was used as the measurement. Every patient gave their

written consent after being fully informed about the study in which they would be participating. We divided them into Group 1 and Group 2. Group 1 was given tamsulosin daily, while Group 2 was given silodosin, for a maximum of four weeks, Group 1 was given tamsulosin (0.4 mg) daily, while Group 2 was given silodosin (8 mg) daily. For pain relief, a 50 mg diclofenac tablet was prescribed to each patient on demand. The patients were instructed to notify us right away if they experienced an excruciating episode of ureteric colic. Weekly ultrasound and abdominal and pelvic X-rays were performed on the patients. The time and date of the stone passage were to be noted by the patients. The follow-up lasted for a maximum of four weeks, or until the patient confirmed that they were stone-free due to intervention or spontaneous stone expulsion. Unbearable ureteric colic, side effects, the rate of interventions like ureterolithotripsy, extracorporeal shock wave lithotripsy, or ureteral stenting, and the rate of stone expulsion were the secondary endpoints. The primary endpoint was the rate of stone expulsion. The number of days between the random allocation and the stone expulsion was known as the expulsion time.

We have compared the rate of stone passage in both the groups by McNemar chi-square test by a statistical calculator, i.e. GraphPad (available online).²¹ A p-value of less than 0.05 was considered statistically significant.

RESULTS

All the patients in the Groups 1 and 2 completed the study. There was no significant difference between the groups with respect to the patients' ages, gender, the stone sizes and their locations.

A spontaneous stone expulsion was observed in 41 of the 60 patients (68.33%) in Group 1 and in 50 of the 60 patients (83.33%) in group 2. The stone expulsion rate was significantly higher in Group 2 than in Group 1 ($p = 0.0001$).²¹ The mean expulsion time was 19.5 +/- 7.5 days in Group 1 vs. 17.5 +/- 6.5 days in Group 2. Two of the male patients who took silodosin experienced a retrograde ejaculation but had a lower incidence of the postural hypotension which were related to the peripheral vasodilatation as compared to the patients who took tamsulosin. However, those patients who experienced a retrograde ejaculation were followed-up after the completion of the study and they were found to have been relieved of this problem. No side effects that required cessation of the treatment were encountered. A lower analgesic use was also found in Group 2.

Stone passed In the control group	Stone passed in the experimental group			Total	Chi square value	Degree of freedom	p-value
		Yes	No				
	Yes	40	19	35	14.450	1	0.0001
	No	1	6	20	Yates correction for the continuity done		Null hypothesi s rejected
	Total	45	10	55			

DISCUSSION

One to two percent of hospital emergency admissions are for ureteral colic, which is primarily caused by ureterolithiasis. With the advent of efficient medical therapeutic drugs on the market, the medical therapy of ureteral calculi has significantly improved. A number of variables, such as the size of the stone, its

position, and the ureteral characteristics, affect the chance of a ureteral stone transit. According to studies, the passing rates of distal ureteral stones that are less than 5 mm range from 71 to 98%, whereas those that are between 5 and 10 mm range from 25 to 53%.¹⁰

The role of adrenergic receptors in the human ureter

was first described in 1970. 11 It was shown later, that the alpha adrenergic receptors were classified into three different subtypes of $\alpha 1A$, $\alpha 1B$ and $\alpha 1D$, of which the distribution in the human ureter was $\alpha 1D > \alpha 1A > \alpha 1B$.¹² The ureteral smooth muscle was also demonstrated to be stimulated by alpha-adrenergic receptor agonists while being inhibited by beta-adrenergic receptor agonists.¹³ They preserve ureteral peristalsis, which may help a stone pass spontaneously, while preventing the uncoordinated muscular activity associated with renal colic.¹⁴

By decreasing the tone of the ureteric smooth muscle instead of totally stopping its action, alpha blockers primarily cause the distal ureter to relax. The clinical benefit of alpha blockers in patients with distal ureteral calculi has been backed by two meta-analyses, which showed that patients who received alpha blockers had 52% and 44% higher odds of stone passage than those who did not receive such treatment.^{1,15} As stone sizes shrank, the treatment's impact on the expulsion rate was somewhat diminished due to the little stones' high spontaneous expulsion rate.³ The effectiveness of various alpha blockers, including doxazosin, terazosin, alfuzosin, and naftopidil, was also demonstrated, despite the fact that the majority of the studies employed tamsulosin, a selective $\alpha 1A/\alpha 1D$ adrenergic receptor antagonist.¹⁶⁻¹⁸ In October 2008, the US Food and Drug Administration authorized silodosin for the treatment of BPH. Our study is arguably the first of its sort to assess the effectiveness of tamsulosin with silodosin, and the results are really promising. Numerous urologists agree that the occurrence of retrograde ejaculation should be viewed as an indication of therapy effectiveness rather than a side effect.

It seems that silodosin relaxes lower urinary tract smooth muscles sufficiently to cause retrograde ejaculation. This was demonstrated by the discovery that patients who experienced the most alleviation of lower urinary tract symptoms were more likely to ejaculate retrogradely. This finding implies that the relaxation of the smooth muscle brought on by silodosin is really indicated indirectly by retrograde ejaculation. This was demonstrated in our investigation, when both patients who underwent retrograde ejaculation were able to pass the stones. Given the significant dangers associated with surgical intervention, the benefit of medicinal extrusive therapy is significant.¹⁹ According to studies, ureteroscopic lithotripsies have an overall complication rate of 10–20%, with significant problems such ureteral strictures, avulsions, and perforations occurring in 3–5% of cases.¹⁹ Urinomas and sub capsular bleeds have been reported in 15–32% of the patients who are treated with shock wave lithotripsy.²⁰

The medical expulsive therapy should be offered as a cost-effective treatment for the patients with distal

ureteral calculi, who are amenable to a waiting management.

CONCLUSION

This case reports a rare and complex presentation of a neonate with a giant congenital melanocytic nevus in bathing-trunk distribution coexisting with a large pedunculated low-flow vascular malformation. Despite normal antenatal scans, the postnatal emergence and progressive enlargement of the mass required timely diagnostic evaluation and multidisciplinary care. Imaging with Doppler ultrasound and MRI played a pivotal role by confirming the superficial nature of the lesion and excluding deeper structural involvement, thereby enabling safe surgical excision. Early surgery prevented potential complications such as ulceration, infection, or haemorrhage and resulted in an excellent short-term outcome. Given the lifelong risk of melanoma and the psychosocial impact associated with GCMN, long-term dermatological and neurological follow-up is essential. This case underscores the need for vigilance in examining newborns, even after normal antenatal imaging, and highlights the importance of coordinated management in rare congenital presentations.

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