

Is Silodosin a Better Alternative to Tamsulosin as a Part of Medical Expulsion Therapy in Patients with Lower Uretic Calculi?

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ABSTRACT

Background: Urinary stones are one of the most common illness of the urinary tract. Medical expulsion therapy (MET) is the non-invasive surgery option for patients with small urinary stones. Tamsulosin is a selective alpha-1A adrenergic receptor blocker. Silodosin is lately investigated as an alpha-1A adrenoceptor blocker.

Study design: It is a randomized controlled study conducted at Department of Urology, Civil Hospital, Mirpur Khas and Sir Ganga Ram Hospital, Lahore for the duration of six months from July 2022 to December 2022.

Material and Methods: The data was taken from 85 patients who were suffering from lower uretic calculi with 45 patients who received prescription of silodosin (8mg) and 40 patients who were given daily dose of tamsulosin (0.4mg) for treatment. The dose was given to patients over duration of 28 days.

Results: The mean BMI of patients was 25.5 kg/m² for group A patients and 27.5 kg/m² for group B patients. Average Hounsfield unit was 57.9±2.1 and 58.6±1.3 (HU/mm) for group A and B respectively. Most of the patients (n=62) had stone size greater than 5mm. The expulsion rate in patients with stone size greater than 5mm was found as 82.1% and 65.2% in group A and B respectively.

Conclusion: The study concludes that there is a better and more significant control of pain shown by silodosin as it increases the rate of expulsion more significantly as compared to tamsulosin. The requirement of analgesics by silodosin group patients was also less and therefore it can be a better alternative to tamsulosin for the treatment of lower uretic calculi.

Keywords: Tamsulosin, silodosin and medical expulsion therapy.

INTRODUCTION

Urinary stones are one of the most common illness of the urinary tract. It affect about 5-10% of the people world widely. It accounts for about 20% of the urinary tract stones and about 70% in the lower third of the ureter. Medical expulsion therapy (MET) is the non-invasive surgery option for patients with small urinary stones. The factors that are affecting the passage of the ureteric stones are size, stone location, ureteric spasm, ureteric anatomy, and mucosal inflammation. Stones can cause the severe pain to the patients¹⁻³. The most frequent drugs which are used in MET are alpha blockers such as tamsulosin and silodosin. These drugs help in the relaxation of smooth muscle of the ureter and move the stone along. A lot of α₁-adrenergic receptors are present in the lateral third of the smooth muscle of the ureter. When these receptors are blocked it hamper the tone of basal smooth muscle and prevalence of hyper peristaltic shambling, although support the cordial propulsive shrinkage. Ureteric spasms because of stones intrude with the calculi expulsion. Tamsulosin is a selective alpha-1A adrenergic receptor blocker. It cause the relaxation of muscle of the ureter also with the management of the ordinary antegrade peristaltic activity.^{4,5} Intracellular cyclic nucleotide is managed by the phosphodiesterases (PDE). Tamsulosin is superior to a placebo or no treatment in increasing the stone compliance rate and decreasing the time to stone expulsion, according to a number of randomized controlled trials. Dizziness, headaches, and nasal congestion are the most commonly reported adverse activities, and its long - term safety is generally good. Silodosin is lately investigated as an alpha-1A adrenoceptor blocker. Many recent studies⁶⁻⁷ founded that the silodosin is superior to the tamsulosin for the expulsion of the stones of the ureter. The use of silodosin is justified by the drug's higher selectivity for the alpha-1A receptor subtype, which dominates in the human ureter. Additionally, as compared to tamsulosin, silodosin has a higher binding affinity and a longer half-life, which could lead to a more prolonged relaxation of the smooth muscle of the ureter⁸⁻⁹. Tadalafil, which is the PDE-5 inhibitor used singly or in combination with the tamsulosin is clear, effective and admissible for ureteric stone treatment. Tamsulosin or silodosin should be chosen as part of MET for lower ureteric calculi after carefully weighing their relative efficacy, safety, and cost as well as

the unique patient characteristics and preferences¹⁰. Silodosin may be a better option in some situations, such as those with larger stones or more severe symptoms, where its higher selectivity for the alpha-1A receptor may confer a clinical advantage. Both medications seem to be effective at facilitating stone expulsion.

MATERIAL AND METHODS

The data was taken from 85 patients who were suffering from lower uretic calculi with 45 patients who received prescription of silodosin (8mg) and 40 patients who were given daily dose of tamsulosin (0.4mg) for treatment. The dose was given to patients over duration of 28 days. The study's sample size was chosen at random and was not based on statistical calculations. When necessary, the patients underwent plain X-ray KUB, non-contrast computed tomography (NCCT) scans for evaluation and ultrasonography. Using a digital ruler and the stone's highest dimension as a reference, the stone size was calculated on the first plain NCCT KUB or X-ray KUB. Each patient gave written consent after receiving full information about the study they would be participating in. The main performance indicator was the stone expulsion rate, followed by the stone expulsion time, rates of interventions like lithotripsy of ureter, extracorporeal shock wave lithotripsy, and excruciating ureteric colic. The expulsion time was calculated as the many days between the randomized date and the expulsion date for the stones.

RESULTS

Then the results were compiled for comparison. All patients were suggested to drink minimum of 2L water daily and the injection of diclofenac 75mg was advised to them if they needed. For studying the effects of silodosin and tamsulosin as a part of medical expulsion therapy in patients with lower uretic calculi the demographic features were examined and listed in table no.1. The mean age of patients was 51.2 years for group A (silodosin) and 54.3 years for group B (tamsulosin).

The mean BMI of patients was 25.5 kg/m² for group A patients and 27.5 kg/m² for group B patients. Average Hounsfield unit was 57.9±2.1 and 58.6±1.3 (HU/mm) for group A and B respectively. Most of the patients (n=62) had stone size greater than 5mm.

Table 1: Demographic features of patients with lower uretic calculi

Features	Group A (silodosin) (n=45)	Group B (tamsulosin) (n=40)	P-value
Mean age ± SD (years)	51.2 ± 4.6	54.3±3.5	0.005
Gender (male/female) n	(32/13)	(23/17)	
BMI (kg/m ²)	25.6±3.3	27.5±4.3	0.003
Average size of stone ± SD (mm)	6.9±3.2	7.2±2.3	0.005
Patients with stone size between 5-6mm	11	12	
Patients with stone size between 7-10mm	34	28	
Average Hounsfield unit (HU/mm)	57.9±2.1	58.6±1.3	0.001
Stone side			
Left (n)	25	19	
Right (n)	20	21	

Table 2: The comparison of side effects between Group A (silodosin) and Group B (tamsulosin).

Parameters	Group A (silodosin) (n=45)	Group B (tamsulosin) (n=40)	P-value
Side effects			
Abnormal ejaculation (n)	12	15	0.001
Dizziness (n)	2	1	0.000
Headache (n)	8	10	0.004
Postural hypotension (n)	1	4	0.005

The side effects after using both drugs were examined and listed in table no.2. It was observed that abnormal ejaculation was found to be more frequently reported by group B patients.

Table 3: The comparison of results between two groups as per stone size

	Group A (silodosin) (n=45)	Group B (tamsulosin) (n=40)	P value
Expulsion rate in stone of ≤5mm size	82.1	65.2	0.004
Expulsion rate in stone of >5mm size	83.4	67.5	0.04
Pain episodes mean ± SD	1.5±2.1	2.1±2.3	0.005
Use of pain killers mean ±SD (mg)	109±11.2	123±9.5	0.005

Table no.3 states the comparison of results between two groups. The expulsion rate in patients with stone size greater than 5mm was found as 82.1% and 65.2% in group A and B respectively. The episodes of pain were reported by group B patients more than group A patient, the use of pain killers was also high in case of group B patients who used tamsulosin as treatment.

DISCUSSION

Advance research in endourology has made it possible for surgeons to opt methods other than open surgery to treat ureteric stones. Minimal invasive methods such as lithotripsy and ureterorenoscopy are in use to treat kidney stones as these are risk free procedures¹¹. As per recent studies MET is being used to treat patients with small size of distal ureteric stones¹². The frequency of ureteric peristalsis is enhanced by stimulation of alpha 1 AR precisely in the ureter. Tamsulosin has been in use for the treatment of lower uretic calculi for patients that have stones less than 10mm in size¹³⁻¹⁴. Previous studies have shown that it improves the rate of stones explosion, and the rate is increased with less pain and less need of analgesics¹⁵. However, as per reports the side effects caused by tamsulosin includes dizziness, headache and postural hypotension. Recently, silodosin is also being used which is an alpha 1 AR antagonist for the treatment and management of lower uretic calculi¹⁶.

In this study the comparison is done to find either silodosin is better than tamsulosin as a part of medical expulsion therapy in

patients with lower uretic calculi. The data was taken from 85 patients suffering from lower uretic calculi with 45 patients that received prescription of silodosin (8mg) and 40 that were given daily dose of tamsulosin (0.4mg) for treatment. In another study the silodosin 7mg and tamsulosin 0.4mg were given to patients for the treatment of lower uretic stones. The dose was given to patients over a duration of 28 days. Then the results were compiled for comparison. All patients were suggested to drink minimum of 2L water daily and the injection of diclofenac 75mg was advised to them if they needed. For studying the effects of silodosin and tamsulosin as a part of medical expulsion therapy in patients with lower uretic calculi the demographic features were examined and listed in table no.1. The mean age of patients was 51.2 years for group A (silodosin) and 54.3 years for group B (tamsulosin). The side effects after using both drugs were examined and listed in table no.2. It was observed that abnormal ejaculation was found to be more frequently reported by group B patients. Table no.3 states the comparison of results between two groups. The expulsion rate in patients with stone size greater than 5mm was found as 82.1% and 65.2% in group A and B respectively. The episodes of pain were reported by group B patients more than group A patient, the use of pain killers was also high in case of group B patients who used tamsulosin as treatment. As per studies tamsulosin has a better expulsion rate as compared to other drugs and it is an effective alternative for a non-invasive and cost effective procedure¹⁷⁻¹⁸.

In our study it was found that the expulsion rate was greater in case of silodosin patients with a value of 82.1% as compared to tamsulosin group where 65.2% expulsion rate was found. The expulsion rate in our study was greater in case of stones greater than 5mm. The pain episodes were more frequently observed among tamsulosin patients while the usage of pain killers was also less in case of patients that took silodosin as drug. The side effects were more commonly found among group B members; abnormal ejaculation was found to be more frequently reported by group B patients as shown in table no.2. In our study we found that there is a significantly higher expulsion rate in silodosin group patients as compared to tamsulosin group and our studies are in accordance with the previous studies where 83% expulsion rate was found for patients that took silodosin as drug and 61% for patients in the tamsulosin group¹⁹⁻²⁰. As per studies the efforts are in progress where the combine usage of these two drugs is done so that better expulsion rate with less pain is achieved²¹. In our study the data was also statistically analyzed and results were evaluated, p value was calculated and the results were statistically significant. In our study the data was taken from single health care center, if taken from more hospitals more precise results could be made.

CONCLUSION

The study concludes that there is a better and more significant control of pain shown by silodosin as it increases the rate of expulsion more significantly as compared to tamsulosin. The requirement of analgesics by silodosin group patients was also less and therefore it can be a better alternative to tamsulosin for the treatment of lower uretic calculi.

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