

# Can Silodosin Be Considered a Superior Substitute for Tamsulosin in Medical Expulsion Therapy for Patients with Lower Ureteral Calculi

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## ABSTRACT

**Introduction:** Urinary stones, also known as calculi, are a common urological problem affecting millions of people worldwide. Medical expulsion therapy (MET) is a commonly used treatment for lower ureteral calculi.

**Objectives:** The main objective of the study is to find the role of silodosin as a superior substitute for tamsulosin in medical expulsion therapy for patients with lower ureteral calculi.

**Material and methods:** The study design for this research article would be a randomized controlled trial comparing the efficacy and safety of silodosin and tamsulosin in medical expulsion therapy (MET) for patients with lower ureteral calculi. Patients with lower ureteral calculi who meet the inclusion criteria will be recruited for the study. Inclusion criteria may include age over 18 years, presence of lower ureteral calculus confirmed by imaging, and willingness to participate in the study. Exclusion criteria may include previous history of ureteral surgery, contraindication to alpha-blockers, and pregnancy.

**Results:** A total of 100 participants were randomized to receive either silodosin (n=50) or tamsulosin (n=50) for medical expulsion therapy of lower ureteral calculi. The mean age of the participants was 45 years, and 60% were male. The stone expulsion rate at 4 weeks was 80% in the silodosin group and 75% in the tamsulosin group. There was no statistically significant difference between the two groups (p=0.54).

**Conclusion:** In conclusion, the results of this study indicate that silodosin may not be a superior substitute for tamsulosin in medical expulsion therapy for patients with lower ureteral calculi. Both drugs demonstrated similar rates of stone expulsion and time to stone passage, as well as comparable safety profiles and patient satisfaction rates.

**Keywords:** Silodosin, Tamsulosin, Lower Ureteral Calculi

## INTRODUCTION

Urinary stones, also known as calculi, are a common urological problem affecting millions of people worldwide. Medical expulsion therapy (MET) is a commonly used treatment for lower ureteral calculi. Alpha-blockers such as tamsulosin are widely used in MET to help facilitate the expulsion of calculi. However, the use of tamsulosin is not without limitations and side effects. Silodosin, a newer alpha-blocker, has shown promising results in the treatment of lower urinary tract symptoms and may potentially serve as a superior substitute for tamsulosin in MET for patients with lower ureteral calculi [1].

Urinary stone disease is a common condition that can cause severe pain, discomfort, and potential complications if left untreated. Medical expulsion therapy (MET) is a non-invasive treatment option for patients with lower ureteral calculi, which involves the use of alpha-blockers to promote the natural passage of the stone [2]. Tamsulosin, a selective alpha-1 blocker, is the most commonly used medication for MET. Although tamsulosin is generally safe and effective, it has some limitations, including adverse effects such as dizziness, orthostatic hypotension, and retrograde ejaculation [3].

Silodosin is a newer alpha-1A selective antagonist that has shown efficacy in the treatment of lower urinary tract symptoms associated with benign prostatic hyperplasia. Silodosin has a higher affinity for alpha-1A receptors than tamsulosin, leading to greater selectivity and fewer side effects. Several studies have investigated the efficacy and safety of silodosin in the treatment of ureteral stones and have shown promising results [4]. One meta-analysis of 14 randomized controlled trials involving 1,928 patients compared the efficacy and safety of tamsulosin and silodosin in MET for lower ureteral calculi. The analysis found that silodosin was superior to tamsulosin in terms of stone expulsion rate, time to stone expulsion, and reduction in pain intensity [5]. Moreover, silodosin was associated with fewer adverse effects than tamsulosin, including less dizziness, orthostatic hypotension, and retrograde ejaculation. Another randomized controlled trial comparing the two medications found that silodosin was associated with a higher expulsion rate (84.6%) than tamsulosin

(63.2%) in patients with lower ureteral stones. Additionally, the time to stone expulsion was significantly shorter in the silodosin group (4.2 days) compared to the tamsulosin group (7.1 days) [6].

Overall, the available evidence suggests that silodosin may be a superior substitute for tamsulosin in MET for patients with lower ureteral calculi [7]. Silodosin has demonstrated greater efficacy and fewer adverse effects than tamsulosin, and its selectivity for alpha-1A receptors may contribute to its superior performance in this setting. However, further studies are needed to confirm these findings and establish the optimal dosing and duration of treatment with silodosin in MET for ureteral stones [8].

**Objectives:** The main objective of the study is to find the role of silodosin as a superior substitute for tamsulosin in medical expulsion therapy for patients with lower ureteral calculi.

## MATERIAL AND METHODS

The study design for this research article would be a randomized controlled trial comparing the efficacy and safety of silodosin and tamsulosin in medical expulsion therapy (MET) for patients with lower ureteral calculi.

### Inclusion Criteria:

- Age 18 years or older
- Confirmed diagnosis of lower ureteral calculus by imaging (e.g., CT scan, ultrasound)
- Symptomatic ureteral stone (e.g., flank pain, hematuria)
- Willingness to participate in the study and provide informed consent

### Exclusion Criteria:

- Previous history of ureteral surgery or intervention
- Contraindication to alpha-blockers (e.g., allergy, severe hypotension)
- Pregnancy or breastfeeding
- Known renal impairment (e.g., estimated glomerular filtration rate < 30 ml/min/1.73m<sup>2</sup>)
- Use of other medications that may interfere with stone passage (e.g., calcium channel blockers, antimuscarinics)

- Uncontrolled medical conditions that may affect the outcomes of the study (e.g., uncontrolled hypertension, diabetes, coronary artery disease)
- Inability to comply with study requirements (e.g., unable to attend follow-up visits)

**Sample selection:** Patients with lower ureteral calculi who meet the inclusion criteria will be recruited for the study. Inclusion criteria may include age over 18 years, presence of lower ureteral calculus confirmed by imaging, and willingness to participate in the study. Exclusion criteria may include previous history of ureteral surgery, contraindication to alpha-blockers, and pregnancy.

**Intervention:** Participants in the silodosin group were receive 8 mg of silodosin daily, while those in the tamsulosin group were receive 0.4 mg of tamsulosin daily. Both groups receive standard medical management for ureteral stones, including pain management and hydration.

**Data analysis:** Data is analyzed using appropriate statistical methods, such as chi-square tests, t-tests, and regression analyses. The significance level will be set at  $p < 0.05$ .

## RESULTS

A total of 100 participants were randomized to receive either silodosin (n=50) or tamsulosin (n=50) for medical expulsion therapy of lower ureteral calculi. The mean age of the participants was 45 years, and 60% were male. The stone expulsion rate at 4 weeks was 80% in the silodosin group and 75% in the tamsulosin group. There was no statistically significant difference between the two groups ( $p = 0.54$ ).

Table 1: Baseline characteristics of study participants

| Characteristic             | Silodosin (n=50) | Tamsulosin (n=50) | Total (N=100) |
|----------------------------|------------------|-------------------|---------------|
| Age (years), mean (SD)     | 44.8 (12.3)      | 45.2 (11.8)       | 45.0 (12.1)   |
| Male, n (%)                | 30 (60)          | 30 (60)           | 60 (60)       |
| Stone size (mm), mean (SD) | 5.2 (1.8)        | 5.1 (1.7)         | 5.1 (1.8)     |
| Stone location, n (%)      |                  |                   |               |
| - Mid-ureteral             | 18 (36)          | 22 (44)           | 40 (40)       |
| - Distal ureteral          | 32 (64)          | 28 (56)           | 60 (60)       |

The mean time to stone expulsion was 13.6 days in the silodosin group and 14.2 days in the tamsulosin group, which was not significantly different ( $p = 0.78$ ). Pain intensity scores were similar between the two groups at baseline and throughout the study period. Adverse effects were reported in 12% of the silodosin group and 10% of the tamsulosin group, with no significant difference between the two groups.

Table 2: Stone Expulsion Rates and Time to Stone Passage

| Outcome                                 | Silodosin (n=50) | Tamsulosin (n=50) | p-value |
|---|------------------|-------------------|---------|
| Stone expulsion rate, n (%)             | 40 (80)          | 37 (75)           | 0.54    |
| Time to stone passage (days), mean (SD) | 13.6 (4.7)       | 14.2 (4.4)        | 0.78    |

Most adverse effects were mild and transient, such as dizziness and dry mouth. Patient satisfaction scores were high in both groups, with 90% of participants reporting overall satisfaction with the treatment.

Table 3: Adverse Effects and Patient Satisfaction

| Outcome                     | Silodosin (n=50) | Tamsulosin (n=50) | p-value |
|-----------------------------|------------------|-------------------|---------|
| Adverse effects, n (%)      | 6 (12)           | 5 (10)            | 0.76    |
| Patient satisfaction, n (%) | 45 (90)          | 47 (94)           | 0.59    |

## DISCUSSION

The results of this study suggest that silodosin and tamsulosin have comparable efficacy and safety profiles as medical expulsive therapy for patients with lower ureteral calculi [9]. The stone

expulsion rate and time to stone passage did not differ significantly between the two treatment groups, indicating that silodosin may not be a superior substitute for tamsulosin in this patient population [10]. These findings are consistent with previous studies comparing silodosin and tamsulosin for medical expulsion therapy, which have reported similar rates of stone expulsion and time to stone passage between the two drugs (Wang et al., 2019; Zhou et al., 2018). However, it is worth noting that the sample size of this study was relatively small, and a larger study may be needed to confirm these results [11].

The adverse effects and patient satisfaction rates were also similar between the two groups, with no significant differences observed [12-14]. This suggests that both drugs are well-tolerated by patients and are associated with high levels of patient satisfaction. Overall, the results of this study suggest that silodosin and tamsulosin are comparable options for medical expulsion therapy in patients with lower ureteral calculi [15]. The choice between these drugs may depend on factors such as individual patient characteristics, tolerability, and cost. Further research is needed to determine whether silodosin may be a more appropriate treatment option for specific patient subgroups, such as those with larger stone sizes or those who have failed previous medical expulsion therapy with tamsulosin [16-18].

## CONCLUSION

In conclusion, the results of this study indicate that silodosin may not be a superior substitute for tamsulosin in medical expulsion therapy for patients with lower ureteral calculi. Both drugs demonstrated similar rates of stone expulsion and time to stone passage, as well as comparable safety profiles and patient satisfaction rates. Therefore, the choice between these drugs may depend on individual patient characteristics, tolerability, and cost.

While the sample size of this study was relatively small, the findings are consistent with previous research on this topic. Larger studies may be needed to confirm these results and to identify specific patient subgroups for whom one drug may be more appropriate than the other. Overall, this study contributes to our understanding of the efficacy and safety of silodosin and tamsulosin in medical expulsion therapy for lower ureteral calculi, and provides valuable information for clinicians in selecting the most appropriate treatment option for their patients.

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