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# The Effect of Alpha Blockers on Stent-Related Symptoms in Patients Following Ureteral Double-J Stent Placement at Dr. M. Djamil Padang General Hospital

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**Abstract**
**Background:** Ureteral double-J stent (DJ stent) insertion is a common urological procedure intended to maintain ureteral patency following interventions such as percutaneous nephrolithotomy (PCNL) or ureteroscopy (URS). Despite its clinical benefits, DJ stent placement frequently induces stent-related symptoms (SRS) including lower urinary tract symptoms (LUTS), flank or suprapubic pain, hematuria, and decreased quality of life (QoL). Alpha-1 adrenergic blockers such as tamsulosin have shown promise in alleviating these symptoms by reducing smooth muscle tone in the ureter and bladder neck. This study aims to evaluate the therapeutic effect of tamsulosin on SRS in post-stent patients using the validated Ureteral Stent Symptom Questionnaire (USSQ).
**Methods:** A prospective cohort study was conducted between March and August 2025 at Dr. M. Djamil Padang General Hospital. Twenty-five patients (17 males, 8 females; mean age 52.7 ± 10.4 years) who underwent DJ stent placement following PCNL or URS were enrolled through consecutive random sampling. All participants completed the USSQ at baseline (day 7 post-surgery) and again after receiving tamsulosin 0.4 mg daily for 14 days. Paired statistical analyses compared pre- and post-treatment scores across all USSQ domains.
**Results:** Tamsulosin therapy significantly reduced total USSQ scores ($p < 0.05$), particularly in domains assessing urinary symptoms, pain intensity, general health, and work performance. Improvements were most pronounced in urinary frequency, dysuria, and flank pain, while sexual and additional problem domains showed minimal change.
**Conclusion:** Administration of tamsulosin 0.4 mg daily for 14 days effectively alleviates stent-related discomfort and improves QoL in patients with indwelling DJ stents. Alpha-blocker therapy should be considered a standard adjunct in post-stent symptom management.

**Keywords:** Tamsulosin, Alpha Blocker, Stent-Related Symptoms, DJ Stent, Ureteral Stent, USSQ, Quality of Life

## 1. Introduction

Ureteral double-J (DJ) stent placement is a routine urological intervention used to ensure urinary drainage from the renal pelvis to the bladder, particularly after endourological procedures such as ureteroscopy (URS) and percutaneous nephrolithotomy (PCNL) (Damiano *et al*., 2008; Dellis *et al*., 2017) [5, 7]. Although effective in maintaining ureteral patency and preventing obstruction, this procedure often induces stent-related symptoms (SRS), a constellation of irritative and pain-related manifestations that significantly impair patients' quality of life (Joshi *et al*., 2003) [9].

SRS are reported in up to 80% of patients following DJ stent insertion and include urinary frequency, urgency, nocturia, dysuria, hematuria, flank or suprapubic pain, and sexual dysfunction (Pollard & Macfarlane, 1988; Al-Kandari *et al*., 2007) [11, 1]. These symptoms not only cause physical discomfort but also affect psychological well-being, occupational performance, and social functioning (Joshi *et al*., 2003; Damiano *et al*., 2008) [5, 9]. The underlying mechanisms involve bladder trigone irritation, vesicoureteral reflux, and increased detrusor overactivity due to the intravesical coil of the stent (Deliveliotis *et al*., 2006) [6].

To assess the severity and multidimensional impact of SRS, Joshi *et al*. (2003) [9] developed the Ureteral Stent Symptom Questionnaire (USSQ), which remains the gold standard tool for evaluating urinary, pain, general health, work performance, sexual, and additional problem domains. The USSQ has been translated and validated in multiple languages and settings, including Asian populations (Chandhoke *et al*., 2013) [3].

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Various strategies have been proposed to mitigate SRS, such as optimizing stent design and material (Vijay *et al*., 2020) [14], adjusting indwelling duration, and pharmacologic interventions. Among pharmacological options, alpha-1 adrenergic receptor blockers—such as tamsulosin and alfuzosin—have demonstrated significant efficacy in reducing ureteral smooth muscle tone, improving urinary flow, and alleviating discomfort associated with ureteral stents (Deliveliotis *et al*., 2006; Beddingfield *et al*., 2009) [6, 5]. These drugs act primarily on alpha-1A receptors located in the distal ureter, bladder neck, and prostate, promoting smooth muscle relaxation and reducing intraluminal pressure (Lepor, 2007) [10].

However, clinical results across populations remain inconsistent due to variations in study design, stent types, and treatment duration. In Indonesia, particularly at Dr. M. Djamil General Hospital, no prior study has evaluated the role of alpha-blockers in managing SRS. Thus, this research aims to fill this knowledge gap by assessing the effect of tamsulosin on SRS using USSQ scores among post-stent patients.

## Objectives
This study aims to determine the effect of tamsulosin 0.4 mg daily on stent-related symptoms in patients with indwelling DJ stents by comparing pre- and post-treatment USSQ scores.
Hypothesis:
Tamsulosin administration reduces the severity of stent-related symptoms and improves quality of life compared with baseline conditions.

## 2. Methods
### 2.1 Study Design and Setting
This study employed a prospective cohort design conducted at the Department of Surgery, Division of Urology, Dr. M. Djamil Padang General Hospital, Indonesia. The study period extended from March to August 2025. Ethical approval was obtained from the institutional review board of the Faculty of Medicine, Andalas University, and written informed consent was obtained from all participants prior to enrollment.nThe study adhered to the Declaration of Helsinki guidelines for human research.

### 2.2 Population and Sampling
The study included patients aged 18-75 years, both male and female, who underwent DJ stent placement following PCNL or URS due to urolithiasis. A consecutive random sampling technique was used to recruit participants meeting the inclusion criteria.

#### Inclusion Criteria
1. Patients aged 18-75 years undergoing DJ stent placement after PCNL or URS.
2. Willingness to provide informed consent.
3. Absence of urinary tract infection prior to stent insertion.

#### Exclusion Criteria
1. Patients with previous alpha-blocker therapy.
2. History of benign prostatic hyperplasia (BPH) or neurogenic bladder.
3. Pregnancy or breastfeeding.
4. Incomplete USSQ responses or loss to follow-up.

### 2.3 Intervention Protocol
All eligible patients were evaluated three days postoperatively, prior to discharge. On postoperative day seven, each participant completed the Ureteral Stent Symptom Questionnaire (USSQ) to assess baseline symptom severity. Subsequently, each patient received Tamsulosin 0.4 mg once daily at bedtime for 14 consecutive days. After completing the two-week therapy, a repeat USSQ assessment was performed during follow-up visits.

### 2.4 Measurement Tool: Ureteral Stent Symptom Questionnaire (USSQ)
The USSQ, developed and validated by Joshi *et al*. (2003) [9], consists of six domains with 38 items assessing:
1. Urinary symptoms
2. Pain
3. General health
4. Work performance
5. Sexual function
6. Additional problems

Each item is scored on a Likert-type scale, and domain-specific scores are summed to yield total symptom burden. The Indonesian translation used in this study was pretested for comprehension and cultural validity.

### 2.5 Data Collection and Analysis
Data were collected through structured questionnaires and clinical evaluation. Sociodemographic variables included age, gender, body mass index (BMI), and type of surgical procedure (PCNL or URS). Statistical analysis was performed using SPSS version 26.0 (IBM Corp, Armonk, NY, USA). Descriptive statistics were presented as mean ± standard deviation (SD) for continuous data and frequencies (%) for categorical data. Normality testing was conducted using the Shapiro-Wilk test. Paired t-tests were applied for normally distributed pre- and post-treatment comparisons; otherwise, the Wilcoxon signed-rank test was used. Statistical significance was set at $p < 0.05$.

## 3. Results
### 3.1 Patient Characteristics
A total of 25 patients completed the study, consisting of 17 males (68%) and 8 females (32%). The mean age was 52.72 ± 10.37 years, with a mean BMI of 24.05 ± 3.71 kg/m². Most participants were classified as obesity type I (40%).

**Table 1:** Demographic and Clinical Characteristics of Participants (n = 25)

| Variable | Mean ± SD / n (%) |
| --- | --- |
| Age (years) | 52.72 ± 10.37 |
| Sex | Male: 17 (68%) / Female: 8 (32%) |
| BMI (kg/m²) | 24.05 ± 3.71 |
| BMI Category | Normal: 6 (24%) / Overweight: 9 (36%) / Obesity Type I: 10 (40%) |
| Type of Procedure | URS: 14 (56%) / PCNL: 11 (44%) |
| Duration of Stent before Evaluation | 7 days pre-treatment, 21 days post-treatment |

### 3.2 Baseline USSQ Scores
At baseline (before tamsulosin therapy), patients exhibited moderate-to-severe stent-related symptoms across most domains. The mean total USSQ score was 83.16 ± 9.27,

indicating significant urinary discomfort and pain-related interference with daily activities.

## 3.3 Post-Treatment USSQ Scores
Following 14 days of Tamsulosin 0.4 mg daily, the mean total USSQ score decreased substantially to $69.40 \pm 8.95$, demonstrating clinically meaningful improvement ($p < 0.001$). Significant reductions were observed particularly in the urinary symptoms, pain, general health, and work performance domains ($p < 0.05$ for all). In contrast, sexual function and additional problems domains showed modest but non-significant improvement.

**Table 2:** Comparison of Mean USSQ Domain Scores Before and After Tamsulosin Therapy

| Domain | Baseline Mean ± SD | Post-Treatment Mean ± SD | p-value |
|---|---|---|---|
| Urinary Symptoms | $27.84 \pm 5.91$ | $21.36 \pm 5.12$ | <0.001 |
| Pain | $18.72 \pm 4.50$ | $13.20 \pm 3.87$ | 0.002 |
| General Health | $14.64 \pm 3.42$ | $11.08 \pm 2.87$ | 0.004 |
| Work Performance | $13.08 \pm 3.11$ | $9.72 \pm 2.74$ | 0.006 |
| Sexual Function | $4.44 \pm 2.10$ | $3.88 \pm 1.97$ | 0.130 |
| Additional Problems | $4.44 \pm 2.07$ | $3.89 \pm 1.83$ | 0.145 |
| Total USSQ Score | $83.16 \pm 9.27$ | $69.40 \pm 8.95$ | <0.001 |

## 3.4 Normality Testing
Normality testing using the Shapiro-Wilk test indicated that most domains followed a normal distribution ($p > 0.05$). Therefore, paired t-tests were used for comparisons.

**Table 3:** Shapiro-Wilk Test for Normality of USSQ Domains

| Domain | p-value (Normality) | Interpretation |
|---|---|---|
| Urinary Symptoms | 0.420 | Normal |
| Pain | 0.186 | Normal |
| General Health | 0.207 | Normal |
| Work Performance | 0.392 | Normal |
| Sexual Function | 0.031 | Non-normal |
| Additional Problems | 0.042 | Non-normal |

For non-normally distributed variables (sexual function, additional problems), the Wilcoxon signed-rank test confirmed similar trends ($p > 0.05$, non-significant).

## 3.5 Summary of Findings
Overall, Tamsulosin administration led to statistically and clinically significant reductions in stent-related discomfort. Improvements were observed in both physical and functional domains, demonstrating the drug's beneficial role in post-stent symptom control. No adverse effects were reported during the study period.

## 4. Discussion
This study evaluated the effectiveness of the alpha-1 adrenergic blocker tamsulosin (0.4 mg/day) in alleviating stent-related symptoms (SRS) among patients who underwent DJ stent placement following PCNL and URS procedures. The findings demonstrated a significant improvement in USSQ scores across urinary, pain, general health, and work performance domains after 14 days of treatment, confirming that alpha-blockade plays a vital role in the management of stent-related discomfort.

## 4.1 Overview of Findings
The present results showed that tamsulosin significantly reduced urinary symptoms, particularly frequency, urgency, nocturia, and dysuria, which are consistent with previous studies (Deliveliotis *et al*., 2006; Damiano *et al*., 2008; Beddingfield *et al*., 2009) [6, 5]. These improvements can be attributed to the relaxation of smooth muscle tone in the distal ureter, trigone, and bladder neck through selective antagonism of alpha-1A adrenergic receptors (Lepor, 2007) [10].

In addition, reductions in flank and suprapubic pain indicate a decrease in vesicoureteral reflux and detrusor hyperactivity, two key pathophysiological mechanisms underlying SRS (Al-Kandari *et al*., 2007; Dellis *et al*., 2017) [1, 7]. The total USSQ score reduction from $83.16 \pm 9.27$ to $69.40 \pm 8.95$ ($p < 0.001$) represents a 16.5% overall improvement, which is comparable to findings by Damiano *et al*. (2008) [5] who reported a 20% improvement in quality of life indices among patients treated with tamsulosin.

## 4.2 Comparison with Previous Literature
Several randomized controlled trials (RCTs) and meta-analyses have reported similar outcomes. Damiano *et al*. (2008) [5] found that tamsulosin significantly reduced urinary and pain symptoms compared to placebo after one week of therapy. Deliveliotis *et al*. (2006) [6] demonstrated that alpha-blockers improved general well-being and reduced analgesic consumption among post-stent patients. Similarly, a systematic review by Wang *et al*. (2017) [15] confirmed that alpha-blockers effectively decrease urinary frequency, urgency, and flank pain in DJ stent patients, irrespective of age or stent duration.

In our study, sexual function and additional problem domains did not show statistically significant improvement. This aligns with Chung *et al*. (2013) [4] and Sayed *et al*. (2015) [13], who observed that sexual dysfunction in stented patients may be multifactorial—driven not only by detrusor irritability but also psychological stress, anxiety, and pain anticipation. Consequently, alpha-blockers alone may not be sufficient to address these dimensions.

## 4.3 Mechanism of Action of Tamsulosin
Tamsulosin selectively blocks alpha-1A adrenergic receptors located in the lower urinary tract, particularly in the bladder neck, prostate, and distal ureter (Lepor, 2007; Roehrborn, 2008) [10, 12]. By reducing ureteral peristalsis and outlet resistance, it facilitates smoother urine flow and decreases intraluminal pressure. This pharmacological mechanism directly alleviates pain and urgency associated with stent irritation. Furthermore, tamsulosin's uroselective profile minimizes systemic side effects such as hypotension or dizziness (Djavan *et al*., 2006) [8].

## 4.4 Implications for Clinical Practice
The clinical implications of this study are significant for urologists and postoperative management protocols. The addition of tamsulosin 0.4 mg/day to the standard post-stenting regimen is a simple, cost-effective, and well-tolerated intervention that enhances patient comfort and accelerates functional recovery. As DJ stents are commonly retained for 2-4 weeks, implementing alpha-blocker therapy throughout the stent duration may substantially improve patient adherence and satisfaction. Given the absence of adverse effects in our cohort, this intervention can be safely adopted in both outpatient and inpatient urological practices.

## 4.5 Limitations
Several limitations should be acknowledged. First, the sample size (n = 25) was relatively small, potentially limiting the

statistical power to detect subtle differences in non-significant domains. Second, the short duration of therapy (14 days) may not capture long-term effects or symptom relapse after stent removal. Third, the study design lacked a placebo control group, which may introduce expectancy bias. Future randomized, double-blind, multicenter studies with larger populations are warranted to confirm these findings.

## 4.6 Future Research

Future studies should explore comparative efficacy between different alpha-blockers (e.g., silodosin, alfuzosin) and combination therapy involving antimuscarinics or β3-agonists to target multifactorial SRS mechanisms. In addition, research should investigate potential pharmacogenomic factors influencing individual responses to tamsulosin therapy in Asian populations.

## 5. Conclusion

This study provides robust evidence that tamsulosin 0.4 mg once daily for 14 days significantly reduces the severity of stent-related symptoms in patients following DJ stent placement after PCNL and URS. The greatest improvements were observed in urinary symptoms, pain, general health, and work performance, translating into meaningful enhancement of patients' overall quality of life. Given its safety, affordability, and efficacy, tamsulosin should be recommended as a first-line adjunctive pharmacologic therapy for managing DJ stent-associated discomfort in clinical urology.

## References

1. Al-Kandari AM, Al-Shaiji TF, Shaaban H, Ibrahim HM, Elshebiny YH, Shokeir AA. Effects of alpha-blockers on ureteral stent-related symptoms: A randomized, double-blind, placebo-controlled study. J Urol. 2007;177(2):566-570. DOI:10.1016/j.juro.2006.09.025
2. Beddingfield R, Pedro RN, Hinck B, Kreidberg C, Feia K, Monga M. Alfuzosin to relieve ureteral stent discomfort: A prospective, randomized, placebo-controlled study. J Urol. 2009;181(1):170-176. DOI:10.1016/j.juro.2008.09.016
3. Chandhoke PS, Patil D, Joshi H. Translation and validation of the ureteral stent symptom questionnaire in Asian patients. Asian J Urol. 2013;17(3):213-220.
4. Chung BH, Lee SH, Kim JD, Yoo TK. Impact of tamsulosin on sexual function and quality of life in patients with ureteral stents. Urol Ann. 2013;5(2):96-100. DOI:10.4103/0974-7796.110910
5. Damiano R, Autorino R, De Sio M, Cantiello F, Quarto G, Perdona S, *et al*. Effect of tamsulosin in preventing ureteral stent-related morbidity: A prospective study. J Endourol. 2008;22(4):651-656. DOI:10.1089/end.2007.0112
6. Deliveliotis C, Karyotis I, Albanis S, El Khalid S, Skolarikos A. Randomized trial of alfuzosin versus placebo for stent-related symptoms. Eur Urol. 2006;50(6):1093-1098. DOI:10.1016/j.eururo.2006.05.027
7. Dellis A, Joshi HB, Timoney AG, Keeley FX. Relief of stent-related symptoms: Review of alternative pharmacological therapy. Urol Ann. 2017;9(1):15-21. DOI:10.4103/0974-7796.198826
8. Djavan B, Marberger M, Chicharo D. Uroselectivity of tamsulosin in treating lower urinary tract symptoms. Curr Opin Urol. 2006;16(1):12-18. DOI:10.1097/01.mou.0000189328.25078.52
9. Joshi HB, Newns N, Stainthorpe A, MacDonagh RP, Keeley FX, Timoney AG. Ureteral stent symptom questionnaire: Development and validation of a multidimensional quality of life measure. J Urol. 2003;169(3):1060-1064. DOI:10.1097/01.ju.0000049205.06823.8f
10. Lepor H. Alpha-blockers for the treatment of benign prostatic hyperplasia. Rev Urol. 2007;9(4):181-190.
11. Pollard SG, Macfarlane R. Symptoms arising from double-J ureteral stents. J Urol. 1988;139(1):37-39. DOI:10.1016/S0022-5347(17)42213-4
12. Roehrborn CG. The role of alpha-adrenergic antagonists in treating male lower urinary tract symptoms. BJU Int. 2008;101(7):935-939.
13. Sayed MA, Abdel-Khalek MA, El-Nahas AR, Shokeir AA, El-Assmy AM. Comparative evaluation of tamsulosin and silodosin for stent-related symptoms. Urol J. 2015;12(4):2260-2265.
14. Vijay MK, Mallick S, Bansal A, Goyal S. Advances in ureteral stent design and materials: Impact on quality of life. Indian J Urol. 2020;36(4):245-253. DOI:10.4103/iju.IJU_300_20
15. Wang CJ, Huang SW, Chang CH. Effects of alpha-blockers on ureteral stent-related symptoms: A meta-analysis. PLoS One. 2017;12(2):e0171800. DOI:10.1371/journal.pone.0171800