Biomedical and Biopharmaceutical Research
Abbreviation: Biomed. Biopharm. Res.
Volume: 22: Issue: 02 |Year: 2025
Page Number: 290-295

EFFECTIVENESS OF PROPHYLACTIC USE OF TAMSULOSIN FOR THE PREVENTION OF URINARY RETENTION FOLLOWING SURGERIES UNDER SPINAL ANAESTHESIA

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Received: 03-06-2025

Accepted: 10-07-2025

ABSTRACT

Background: Postoperative urinary retention (POUR) is a common complication following surgeries under spinal anesthesia, leading to patient discomfort, delayed mobilization, and increased risk of catheterization. Tamsulosin, a selective α1A-adrenergic receptor blocker, has been shown to reduce bladder outlet resistance and may help prevent POUR.

Objective: To evaluate the effectiveness of prophylactic tamsulosin in preventing postoperative urinary retention in patients undergoing elective surgeries under spinal anesthesia.

Methods: This prospective, observational, comparative cross-sectional study was conducted at the Department of General Surgery, GIMS, Gadag, over 18 months (August 2023–February 2025). A total of 150 patients aged 18–60 years scheduled for elective surgery under spinal anesthesia were randomly allocated into two groups. Group A received tamsulosin 0.4 mg 14 hours, 2 hours before surgery, and 6 hours postoperatively; Group B received standard preoperative care without tamsulosin. The incidence of POUR was assessed based on suprapubic discomfort, palpable mass, inability to void within 12 hours, and requirement of catheterization.

Results: POUR occurred in only 1 patient (1.33%) in the tamsulosin group compared to 13 patients (17.33%) in the placebo group ($p = 0.0007$). Similarly, catheterization was required in 1.33% of patients in the tamsulosin group versus 17.33% in the placebo group. No statistically significant differences were noted in baseline characteristics such as age, serum creatinine, or prostate volume between the groups.

Conclusion: Prophylactic administration of tamsulosin significantly reduces the incidence of postoperative urinary retention and catheterization in patients undergoing surgeries under spinal anesthesia. Its inclusion in perioperative protocols could enhance postoperative recovery and patient comfort.

Keywords: Tamsulosin, Postoperative urinary retention, Spinal anesthesia, Alpha-blockers, Catheterization, Suprapubic mass, POUR prevention.

INTRODUCTION

Postoperative urinary retention (POUR) is a common complication following surgeries performed under spinal anesthesia, with an incidence ranging from 5% to 70% depending on various patient and procedural factors [1,2]. POUR is characterized by the inability to void despite a full bladder, which may result in patient discomfort, bladder overdistension, and the need for catheterization, increasing the risk of urinary tract infections and prolonging hospital stay [3,4].

The pathophysiology of POUR is multifactorial, involving altered detrusor contractility, increased bladder outlet resistance, pain, immobility, and effects of anesthesia on autonomic innervation [5,6]. Among the pharmacological approaches, α1-adrenergic receptor antagonists, particularly tamsulosin, have shown promise in relaxing smooth muscles of the bladder neck and prostate, thereby facilitating micturition [7].

Tamsulosin is a selective α1A-adrenergic receptor blocker that has been widely used in the treatment of lower urinary tract symptoms (LUTS) associated with benign prostatic hyperplasia (BPH) and has demonstrated efficacy in reducing the incidence of POUR in various surgical settings [8,9]. It is well-tolerated and does not significantly affect systemic blood pressure, making it suitable for perioperative use [10].

Several studies have explored the prophylactic administration of tamsulosin to prevent POUR. A randomized controlled trial by Ali Hamid Madani et al. demonstrated that the incidence of POUR significantly decreased in patients receiving tamsulosin (5.9%) compared to the placebo group (21.1%) [11]. Similar findings have been reported in urological and

orthopedic surgeries, indicating the potential of tamsulosin in enhancing postoperative recovery and minimizing catheterization [12,13].

Despite growing evidence, routine use of tamsulosin for POUR prevention remains underutilized in general surgical practice. This study was undertaken to evaluate the effectiveness of prophylactic tamsulosin administration in preventing urinary retention in patients undergoing elective surgeries under spinal anesthesia at GIMS, Gadag. The goal is to assess its role in reducing POUR incidence and need for catheterization, thereby improving postoperative outcomes.

MATERIALS AND METHODS

This prospective, observational, comparative cross-sectional study was conducted in the Department of General Surgery at Gadag Institute of Medical Sciences (GIMS), Gadag, over a period of 18 months from August 2023 to February 2025. The study aimed to evaluate the effectiveness of tamsulosin in preventing post-operative urinary retention (POUR) in patients undergoing surgery under spinal anesthesia.

Study Population

Patients aged 18 to 60 years, admitted for elective surgeries under spinal anesthesia and willing to give informed consent, were considered for inclusion. A total of 150 patients were selected using a lottery sampling method and allocated into two groups:

- **Group A**: Received 0.4 mg of tamsulosin three times—14 hours, 2 hours (with sips of water) before surgery, and 6 hours after surgery—along with general preoperative medications.
- **Group B**: Received only the general preoperative medications.

Inclusion Criteria

1. Patients aged between 18–60 years.
2. Undergoing elective surgery under spinal anesthesia.
3. Willing to provide informed consent.

Exclusion Criteria

1. Active urinary tract infection.
2. Patients on medications affecting voiding function (e.g., alpha-agonists/antagonists, cholinergic/anticholinergic drugs).
3. History of urinary incontinence.
4. Previous lower urinary tract surgery.
5. History of systemic or neurological disease.
6. Known cases of benign prostatic hyperplasia (BPH) on treatment.
7. Presence of indwelling Foley's catheter.
8. Contraindications to tamsulosin, such as known allergy or orthostatic hypotension.
9. Patients undergoing bowel surgeries.

Ethical Considerations

The study was conducted after obtaining approval from the Institutional Ethics Committee of GIMS, Gadag. Written informed consent was obtained from all participants prior to enrollment.

Sample Size Estimation

Sample size was calculated based on the findings of a previous study by Ali Hamid Madani et al., which reported a significantly lower incidence of POUR in the tamsulosin group (5.9%) compared to the placebo group (21.1%). Using the following formula:

N=(Zα+Zβ)2×[p1(1−p1)+p2(1−p2)](p1−p2)2N = \frac{(Z_\alpha + Z_\beta)^2 \times [p_1(1-p_1) + p_2(1-p_2)]}{(p_1 - p_2)^2}N=(p1−p2)2(Zα+Zβ)2×[p1(1−p1)+p2(1−p2)]

Where:

- p1=0.059p_1 = 0.059p1=0.059,
- p2=0.211p_2 = 0.211p2=0.211,
- Zα=1.96Z_\alpha = 1.96Zα=1.96 (for 95% confidence interval),
- Zβ=0.84Z_\beta = 0.84Zβ=0.84 (for 80% power),

The required sample size per group was estimated to be 75, resulting in a **total sample size of 150 patients**.

Data Collection and Monitoring

Patients were monitored post-operatively for pain and signs of urinary retention for 12 hours following surgery. Analgesia was titrated to maintain a pain score of zero to mild, as measured using the Visual Analogue Scale (VAS). Patients were permitted to void once they reported a sensation of bladder fullness.

Assessment Tools

- **Symptomatic Evaluation**: Discomfort or pain in the suprapubic area.
- **Clinical Examination**: Palpable suprapubic mass indicating bladder fullness.

- **Time Criteria**: Inability to void within 12 hours post-surgery despite adequate pain control and non-invasive methods such as suprapubic warming or ambulation.
- **Pain Measurement**: Assessed using the Visual Analogue Scale (VAS).

RESULT AND OBSERVATIONS;

Table 1: Comparison of Mean Age Between Tamsulosin and Placebo Groups

Age	Mean	S.D.	P-value
Tamsulosin	40.96	16.22	0.0939
Placebo	44.60	17.46	

The mean age of patients in the Tamsulosin group was 40.96 years (SD = 16.22), while in the Placebo group, it was 44.60 years (SD = 17.46). The p-value for the difference in mean age between the two groups was 0.0939, indicating that the difference is not statistically significant. This suggests that age distribution between the two groups was comparable, minimizing the potential for age-related confounding in the study outcomes.

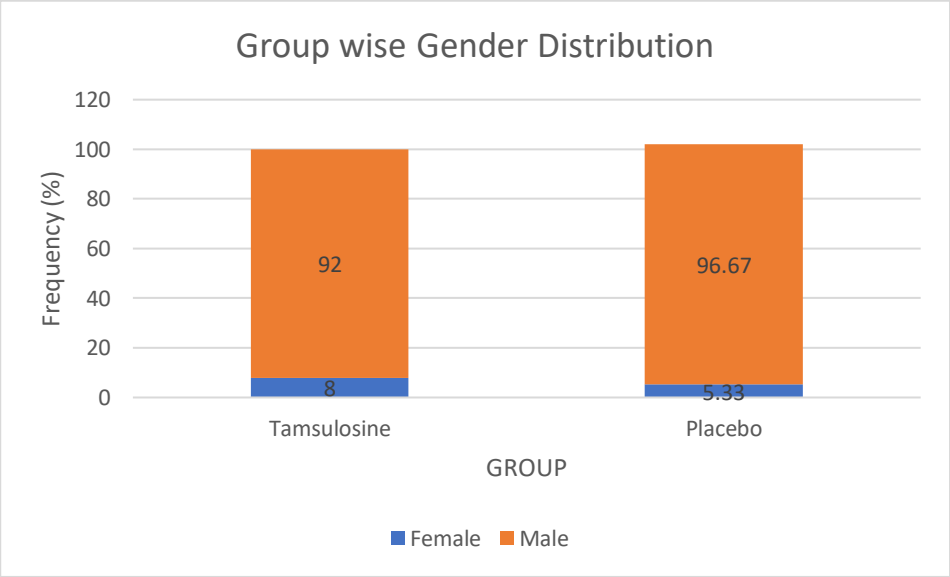

Figure 1: Gender Distribution Between Tamsulosin and Placebo Groups

Table 2: Comparison of Serum Creatinine Levels Between Tamsulosin and Placebo Groups

Serum creatinine	Mean	S.D.	P-value
Tamsulosin	0.87	0.25	0.1308
Placebo	0.84	0.13	

The mean serum creatinine level in the Tamsulosin group was 0.87 mg/dL (SD = 0.25), while in the Placebo group, it was 0.84 mg/dL (SD = 0.13). The p-value for the difference between the two groups was 0.1308, indicating no statistically significant difference. This suggests that baseline renal function was comparable between the two groups, minimizing the potential for confounding effects related to kidney function in the study.

Table 3: Comparison of Prostate Volume Between Tamsulosin and Placebo Groups

Prostate volume	**Mean**	**S.D.**	**P-value**
Tamsulosin	**21.48**	**1.20**	**0.4436**
Placebo	**21.45**	**1.09**	

Table 4: Comparison of Post-Void Residual Urine Volume Between Tamsulosin and Placebo Groups

Post-void residual urine	Mean	S.D.	P-value
Tamsulosin	22.73	1.39	0.4532
Placebo	22.71	1.38	

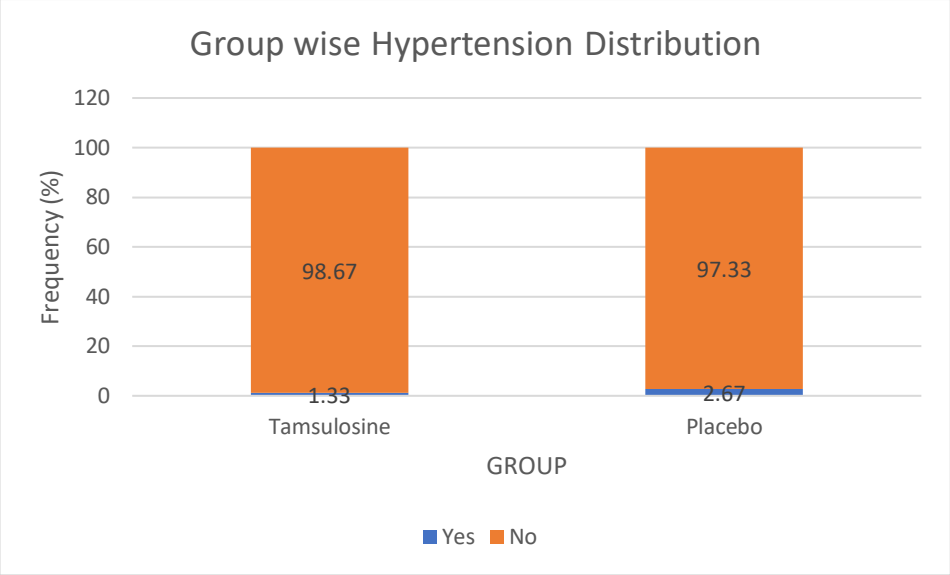

Figure 2: Comparison of Hypertension Status Between Tamsulosin and Placebo Groups

Table 5: Comparison of Post-Analgesic Use Between Tamsulosin and Placebo Groups

Post analgesic	Group n (%)		P-value
	Tamsulosin	Placebo	
Diclofenac	41 (54.67)	38 (50.67)	0.6237
Paracetamol	34 (45.33)	37 (49.33)	
Total	75 (100)	75 (100)	

In the Tamsulosin group, 41 patients (54.67%) received Diclofenac, while 34 patients (45.33%) received Paracetamol. In the Placebo group, 38 patients (50.67%) received Diclofenac, and 37 patients (49.33%) received Paracetamol. The p-value for the difference between the two groups was 0.6237, indicating no statistically significant difference.

Table 6: Comparison of Suprapubic Pain Between Tamsulosin and Placebo Groups

Suprapubic pain	Group n (%)		P-value
	Tamsulosin	Placebo	
Yes	1 (1.33)	14 (18.67)	0.0004
No	74 (98.67)	61 (81.33)	
Total	75 (100)	75 (100)	

Table 7: Comparison of Suprapubic Mass and Catheterization Requirement Between Tamsulosin and Placebo Groups

Parameter	Category	Tamsulosin Group n (%)	Placebo Group n (%)	P-value
Suprapubic Mass	Yes	1 (1.33%)	13 (17.33%)	**0.0007**
	No	74 (98.67%)	62 (82.67%)	
Catheterization	Yes	1 (1.33%)	13 (17.33%)	**0.0007**
	No	74 (98.67%)	62 (82.67%)	
Total Patients		75 (100%)	75 (100%)	

The comparison between the Tamsulosin and Placebo groups revealed a significantly lower incidence of suprapubic mass and catheterization requirement in the Tamsulosin group. Only 1 patient (1.33%) in the Tamsulosin group developed a palpable suprapubic mass compared to 13 patients (17.33%) in the Placebo group. Similarly, catheterization was required in only 1 patient (1.33%) receiving Tamsulosin, whereas 13 patients (17.33%) in the Placebo group required catheterization. Both outcomes showed statistically significant differences with a p-value of 0.0007, indicating the

effectiveness of Tamsulosin in reducing the occurrence of postoperative urinary retention (POUR) and the subsequent need for catheterization.

DISCUSSION

This study evaluated the effectiveness of prophylactic tamsulosin in preventing postoperative urinary retention (POUR) in patients undergoing elective surgeries under spinal anesthesia. The findings demonstrated a statistically significant reduction in the incidence of suprapubic mass and the need for catheterization in the tamsulosin group compared to the placebo group ($p = 0.0007$). These results are consistent with prior research supporting the use of α1-adrenergic blockers in the perioperative setting to reduce POUR.

The pathogenesis of POUR is multifactorial, including detrusor underactivity due to spinal anesthesia, postoperative pain, and increased bladder outlet resistance [1,5,6]. Tamsulosin, as a selective α1A-adrenergic receptor antagonist, acts by relaxing smooth muscle at the bladder neck and prostate, facilitating voiding without affecting detrusor function or systemic blood pressure significantly [7,8].

In our study, only 1.33% of patients in the tamsulosin group developed suprapubic mass or required catheterization, compared to 17.33% in the placebo group. These findings align with the results reported by Madani et al., who found a significant reduction in POUR (5.9% vs 21.1%) with tamsulosin use [11]. Similarly, Neel et al. demonstrated that tamsulosin significantly reduced urinary retention after orthopedic surgeries under spinal anesthesia, recommending its routine use in at-risk patients [9].

Another study by Hansen et al. also highlighted the association between spinal anesthesia and POUR and suggested alpha-blockers as a preventive strategy [13]. Bjerregaard et al. emphasized that minimizing POUR improves early mobilization and reduces hospital stay, especially in enhanced recovery after surgery (ERAS) protocols [4]. Our study supports these conclusions by demonstrating a clear clinical benefit of tamsulosin in a general surgical population.

No significant differences were observed in baseline characteristics such as age, serum creatinine, prostate volume, and post-void residual urine between the groups. This confirms that both groups were comparable and that the observed differences in POUR outcomes were likely due to the effect of tamsulosin rather than confounding variables.

Importantly, the study population excluded patients with known risk factors for POUR such as urinary tract infections, neurological disorders, prior lower urinary tract surgeries, and use of medications that interfere with voiding. This strengthens the validity of the findings by focusing on the effect of tamsulosin in a relatively homogeneous surgical population.

While the study provides compelling evidence in favor of prophylactic tamsulosin, some limitations must be acknowledged. First, the study was single-centered, which may limit generalizability. Second, the follow-up period was limited to the immediate postoperative period (12 hours), and long-term urinary outcomes were not assessed. Lastly, although the sample size was adequately powered, multicentric randomized trials with longer follow-up are necessary to further validate these findings.

Overall, our study contributes to the growing body of evidence supporting the use of tamsulosin to reduce POUR in patients undergoing surgery under spinal anesthesia. Considering its safety profile, cost-effectiveness, and ease of administration, prophylactic tamsulosin may be considered a valuable addition to perioperative care protocols, especially in patients at risk for urinary retention.

CONCLUSION

The present study demonstrates that prophylactic administration of tamsulosin significantly reduces the incidence of postoperative urinary retention (POUR) and the need for catheterization in patients undergoing elective surgeries under spinal anesthesia. With only 1.33% of patients in the tamsulosin group developing urinary retention compared to 17.33% in the placebo group, the findings highlight the clinical efficacy of tamsulosin in facilitating early voiding and enhancing postoperative comfort. Given its favorable safety profile, ease of administration, and statistically significant impact on POUR prevention, tamsulosin can be considered a valuable addition to perioperative management, particularly in patients at risk for urinary retention. Further multicentric studies with larger sample sizes and extended follow-up are recommended to validate and generalize these findings.

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