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Original Research

Potential Risk Factors and the Effect of Tamsulosin on Postoperative Urinary Retention in Patients Undergoing Anorectal Surgery: A Cross-Sectional Study

Yousef Khani, Ali Baradaran Bagheri, Mhammadreza Maghsoudi, Alireza Shirzadi, Mojtaba Ahmadinejad*

ABSTRACT

Background: Urinary retention is a condition in which patients are unable to completely empty their bladder and is classified into acute and chronic urinary retention. The goal of this study was to determine the incidence of postoperative urinary retention, identify potential factors contributing to its development, and evaluate the preventive role of tamsulosin in preventing this complication in patients undergoing anorectal surgery. **Methods**: We reviewed 600 consecutive surgeries performed under spinal or saddle anesthesia for benign anorectal diseases from May 2016 through June 2022 to identify potential risk factors for postoperative urinary retention (POUR). In addition, we retrospectively investigated the preventive effect of tamsulosin on postoperative urinary retention. **Results**: The results of multiple regression analysis showed that being over the age of 50 years (OR = 1.659, P = 0.039), having diabetes (OR = 6.592, P < 0.001), benign prostatic hyperplasia (OR = 2.680, P = 0.024), and saddle anesthesia (OR = 1.359, P = 0.511) were risk factors for POUR; however, the results for saddle anesthesia were not statistically significant. On the other hand, male gender (OR = 0.931, P = 0.833), type of anorectal disease (P = 0.531), and the use of tamsulosin (OR = 0.176, P < 0.001) were factors that prevent POUR, but these results were only significant for the use of tamsulosin as a preventive drug. According to the ROC curve, the model fit well and could correctly predict the incidence of urinary retention after anorectal surgery in approximately 83% of cases (P < 0.001). **Conclusion**: POUR is a common side effect of anorectal surgeries. Being over the age of 50 years, diabetes, and benign prostatic hyperplasia are risk factors for POUR after anorectal surgeries. Tamsulosin could be used to prevent POUR in candidates for anorectal surgeries.

Key words: Urinary retention, benign prostatic hyperplasia, Anorectal surgery, tamsulosin

Clinical Research Development Unit, Shahid Madani Hospital, Alborz University of Medical Sciences, Karaj, Iran

Correspondence

Mojtaba Ahmadinejad, Clinical Research Development Unit, Shahid Madani Hospital, Alborz University of Medical Sciences, Karaj, Iran

Email: masterofepidemiology@gmail.com

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INTRODUCTION

Urinary retention is a condition in which patients are unable to completely empty their bladders. It is classified into acute and chronic urinary retention. Generally, acute urinary retention is characterized by a painful and palpable bladder. This condition often occurs after prolonged anesthesia in extensive surgery, known as postoperative urinary retention (POUR). The incidence of POUR has been reported to range from 2.1 to 80%, varying based on multiple factors such as age, sex, type of anesthesia, surgical techniques, and underlying diseases [1–6]. POUR can cause many problems for patients, including embarrassment due to intermittent catheterization, catheter-induced infections, complications from bladder dilatation such as acute kidney injury and detrusor muscle injury, prolonged hospitalization, and the need for additional care after hospital discharge, thereby imposing extra costs on the patient [7–11].

As noted, the type of surgery performed is one of the factors affecting POUR. POUR has been reported in 1 to 52% of cases undergoing anorectal surgeries; however, the causes of POUR in such surgeries are not completely understood [7,12–16]. Various methods have been employed to reduce the risk of urinary retention following anorectal surgeries, including the administration of parasympathomimetic agents, the use of alpha-adrenergic blockers or anxiolytic agents, restriction of perioperative fluid intake, avoidance of excessive anal packing, taking sitz baths, implementing local anesthesia techniques or short-acting anesthetics, and managing surgeries on an outpatient basis [13,15–27].

Moreover, the role of tamsulosin in preventing POUR has been highlighted in some studies. The mechanism of action of tamsulosin involves relaxing the detrusor muscles and facilitating bladder emptying [1,2,7,28–33]. Given the significance of POUR and the limited number of studies conducted on patients undergoing anorectal surgeries in Iran, this study investigates the effect of various potential risk factors associated with urinary retention after these surgeries and evaluates

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the efficacy of tamsulosin in preventing this complication.

METHODS

This study is a retrospective review of data from patients who underwent anorectal surgery at Shahid Madani Hospital, Karaj, from May 2016 to June 2022. Urinary retention was diagnosed when a patient failed to pass urine after the operation despite having a sensation of needing to urinate, adequate fluid intake, and unsuccessful conservative management, such as suprapubic warming, warm sitz baths, and encouragement to get out of bed and walk, which necessitated urinary catheterization. The patients selected for this study had undergone surgery for elective benign anorectal diseases, including hemorrhoids, fissures, and fistulas, from May 2015 to June 2021. Exclusion criteria included age over 70, presence of an active urinary infection, neurologic disorders, urologic diseases, and patients taking tamsulosin for benign prostatic hyperplasia. Patients were divided into two groups: those receiving tamsulosin and a control group. In the tamsulosin group, 0.4 mg of tamsulosin was prescribed 6 hours before and 6 to 12 hours after the operation. In the comparison group, no specific medication was prescribed for urinary excretion. The incidence of postoperative urinary retention (POUR) in the tamsulosin and control groups was considered the main outcome of this study. Factors such as age, sex, type of anorectal disease, diabetes, benign prostatic hyperplasia, and anesthesia techniques were also considered as independent predictors of POUR risk. Differences in the incidence of POUR between the two groups were assessed using the Chi-square test. Univariate analysis and multiple logistic regressions were used to determine the risk factors for POUR. The ROC curve was used to evaluate the goodness of fit of the model. A significance level of 0.05 was considered, and all data analyses were performed using SPSS v.22 software.

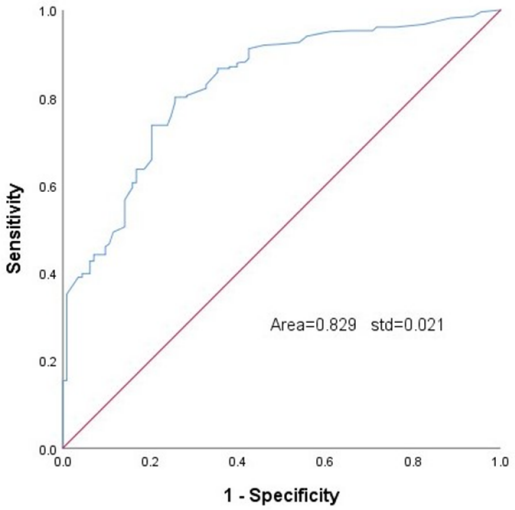

Figure 1: **Receiver Operator Curve for goodness of fit of multiple logistic regression model**.

Table 1: Potential risk factors and tamsulosin effect for postoperative urinary retention in people undergoing anorectal surgery (N=600)

No	Risk Factor		N	Number of Patients with urinary retention	Incidence of urinary retention (%)	Odds Ratio (OR)	P value	Confidence Interval (95%)
1	age	>50	300	66	22	1.51	0.03	1.003-2.297
		<50	300	47	15.66			
2	sex	Male	300	66	22	1.51	0.03	1.003-2.297
		Female	300	47	15.66			
3	DM	Present	168	72	42.85	7.152	0.000	4.589-11.147
		Absent	432	41	9.49			
4	BPH	Present	140	48	34.28	3.171	0.000	2.049-4.906
		Absent	460	65	14.13			
5	Anesthesia	Saddle	373	40	10.72	0.253	0.000	0.165-0.390
		Spinal	227	73	32.15			
6	Anorectal Disease	Hemorrhoid	200	37	18.5	0.937	0.973	0.85-1.10
		Anal fistula	200	39	19.5	1		0.87-1.13
		Anal fissure	200	37	18.5	1.067		0.9-1.16
7	Tamsulosin	Present	300	22	7.33	0.182	0.000	0.110-0.299
		Absent	300	91	30.33			

RESULTS

The results of the data analysis are presented in **Tables 1, 2, 3, 4 and 5** and **Figure 1**. The results of the univariate analysis of the patients who underwent anorectal surgery are presented in **Table 1**. Age above and under 50 years, gender, diabetes, benign prostatic hyperplasia, type of anorectal surgery, anesthesia technique, and tamsulosin administration were considered as potential predictors of POUR. The overall prevalence of POUR in this study was 18.83%. Age over 50 years and male gender were identified as risk factors for POUR (OR = 1.51, P = 0.03). Diabetes (OR = 7.152, P < 0.001) and benign prostatic hyperplasia (OR = 3.171, P < 0.001) were other risk factors for POUR in this study. The prevalence of POUR was 18.5% in patients who underwent surgery for hemorrhoids and anal fissures, and 19.5% in cases who underwent surgery for anal fistulas; however, these differences were not statistically significant (P = 0.973). Also, according to the results, saddle anesthesia (OR = 0.253, P < 0.001) and the administration of tamsulosin (OR = 0.182, P < 0.001) could be considered as preventive factors for POUR.

Table 2 to **Table 4** present the results of univariate analysis for patients who underwent surgery for hemorrhoids, anal fistulas, and fissures. According to Table 2, age over 50 years (OR = 1.915, P = 0.1) and male gender (OR = 2.012, P = 0.07) were risk factors for POUR; however, these results were not statistically significant. Additionally, the role of diabetes (OR = 22.906, P < 0.001) and benign prostatic hyperplasia (OR = 4.479, P < 0.001) as risk factors, as well as saddle anesthesia (OR = 0.146, P < 0.001) and the administration of tamsulosin (OR = 0.142, P < 0.001) (**Table 1**), as effective factors in preventing POUR, was also confirmed in people who underwent surgery to remove hemorrhoids.

The results of **Table 3** show that in cases who underwent surgery to treat fistulas, the age over 50 years (OR = 2.351, P = 0.031) and male gender (OR = 1.568, P = 0.284) were risk factors for POUR; however, these results were not statistically significant in terms of gender. Similarly (**Table 1**), diabetes (OR = 3.517, P < 0.001) and benign prostatic hyperplasia (OR = 3.901, P < 0.001) were risk factors, and saddle anesthesia (OR = 0.327, P = 0.003) and the use of tamsulosin (OR = 0.272, P < 0.001) were effective in preventing POUR in patients who underwent surgery for anal fistulas.

Table 4 indicates the results of patients who underwent anal fissure surgery. The age over 50 years (OR = 0.79, P = 0.587) was a preventive factor, and male gender (OR = 1.122, P = 0.856) and benign prostatic hyperplasia (OR = 1.845, P = 0.141) were risk factors for POUR, which were not statistically significant. However, in general (**Table 1**), diabetes (OR = 4.207, P < 0.001) was a risk factor for POUR and saddle anesthesia (OR = 0.327, P = 0.003) and the use of tamsulosin (OR = 0.142, P < 0.001) were factors associated with preventing POUR.

The results of multiple regression analysis are presented in **Table 5**. The results showed that age over 50 years (OR = 1.659, P = 0.039), diabetes (OR = 6.592, P < 0.001), benign prostatic hyperplasia (OR = 2.680, P = 0.024), and saddle anesthesia (OR = 1.359, P = 0.511) were risk factors for POUR; however, this result was not statistically significant in terms of saddle anesthesia. On the other hand, based on the results, male gender (OR = 0.931, P = 0.833), type of anorectal disease (P = 0.531), and the use of tamsulosin (OR = 0.176, P < 0.001) are factors that prevent POUR, but this issue was only significant in terms of using tamsulosin. The difference between the results of multiple logistic regression and univariate analysis in terms of male gender and saddle anesthesia indicates that their results were distorted by other variables, which could be fixed after being included in the multiple logistic regression model.

Figure 1 shows the ROC curve for the results of the regression model presented in Table 5. According to the results, the good fit of the model was appropriate and the model can correctly predict the incidence of urinary retention after anorectal surgery in approximately 83% of cases (P < 0.001).

DISCUSSION

POUR is one of the most common complications after surgeries [2,10]. Urinary retention after anorectal surgeries is also relatively common, with incidence rates reported between 1% to 52%. The wide variation is due to differences in the definition of POUR, differences in inclusion and exclusion criteria, and its multifactorial nature, including variations in age and gender of the patients, the type of anorectal surgeries, and the type of anesthesia. Although the cause of urinary retention after anorectal surgery is not completely clear, some studies have claimed that it could be related to decreased bladder contraction ability or bladder outlet obstruction [13,23,34]. POUR can lead to several problems for patients, including urinary tract infections due to intermittent catheterization, discomfort and embarrassment due to catheterization, and increased treatment costs due to prolonged hospitalization, treatment of secondary infections, and follow-up [2,10]. Therefore, the prevention of this complication is of great importance. Several factors, such as age, sex, diabetes, benign prostatic hyperplasia, the

Table 2: Potential risk factors and tamsulosin effect for postoperative urinary retention in people undergoing hemorrhoidectomy (N=200)

No	Risk Factor		N	Number of Patients with urinary retention	Incidence of urinary retention (%)	Odds Ratio (OR)	P value	Confidence Interval (95%)
1	age	>50	104	24	23.07	1.915	0.1	0.912-4.021
		<50	96	13	13.54			
2	sex	Male	102	24	23.52	2.012	0.07	0.958-4.224
		Female	98	13	13.26			
3	DM	Present	61	31	50.81	22.906	0.000	8.773-59.807
		Absent	139	6	4.31			
4	BPH	Present	43	17	39.53	4.479	0.000	2.073-9.679
		Absent	157	20	12.73			
5	Anesthesia Technique	Saddle	127	10	7.87	0.146	0.000	0.065-0.325
		Spinal	73	27	36.98			
6	Tamsulosin	Present	100	6	6	0.142	0.000	0.056-0.359
		Absent	100	31	31			

Table 3: Potential risk factors and tamsulosin effect for postoperative urinary retention in people undergoing fistula surgery fistulectomy (N=200)

No	Risk Factor		N	Number of Patients with urinary retention	Incidence of urinary retention (%)	Odds Ratio (OR)	P value	Confidence Interval (95%)
1	age	>50	100	26	26	2.351	0.031	1.128-4.901
		<50	100	13	13			
2	sex	Male	100	23	23	1.568	0.284	0.772-3.187
		Female	100	16	16			
3	DM	Present	46	17	36.95	3.517	0.001	1.662-7.444
		Absent	154	22	14.28			
4	BPH	Present	47	18	38.29	3.901	0.001	1.849-8.234
		Absent	153	21	13.72			
5	Anesthesia	Saddle	126	16	12.69	0.327	0.003	0.157-0.662
		Spinal	74	23	31.08			
6	Tamsulosin	Present	100	10	10	0.272	0.001	0.124-0.595
		Absent	100	29	29			

Table 4: Potential risk factors for postoperative urinary retention in people undergoing fistulectomy (N=200)

No	Risk Factor		N	Number of Patients with urinary retention	Incidence of urinary retention (%)	Odds Ratio (OR)	P value	Confidence Interval (95%)
1	age	>50	96	16	16.66	0.79	0.587	0.385-1.623
		<50	104	21	20.19			
2	sex	Male	98	19	19.38	1.122	0.856	0.550-2.292
		Female	102	18	17.64			
3	DM	Present	61	24	39.34	4.207	0.000	2.917-13.552
		Absent	139	13	9.35			
4	BPH	Present	50	13	26	1.845	0.141	0.856-3.976
		Absent	150	24	16			
5	Anesthesia Technique	Saddle	120	14	11.66	0.327	0.003	0.156-0.685
		Spinal	80	23	28.75			
6	Tamsulosin	Present	100	6	6	0.142	0.000	0.056-0.359
		Absent	100	31	31			

Table 5: Multiple logistic regression model in relation to the incidence of postoperative urinary retention in people who have undergone anorectal surgery

Group Variable		Odds Ratio	95% CI	P value
Age > 50		1.659	1.026-2.684	0.039
Male sex		0.931	0.481-1.803	0.833
DM		6.592	3.229-13.461	0.000
BPH		2.680	1.137-6.321	0.024
Anorectal disease	Hemorrhoid	Ref	Ref	0.531
	Fistulectomy	0.716	0.396-1.294	0.269
	Fistulectomy	0.887	0.493-1.597	0690
Saddle Anesthesia Technique		1.359	0.544-3.395	0.511
Tamsulosin use		0.176	0.102-0.304	0.000

type of anorectal surgery, and the type of anesthesia could be responsible for the incidence of POUR. Numerous studies have also suggested the role of tamsulosin in the prevention of this complication [1,2,7,28–33]. In our study, the incidence of POUR was 18.83%, which was higher than that in similar studies [13,35]. This observation could be due to the higher prevalence of diabetes and benign prostatic hyperplasia in our study, both risk factors for POUR, and the results were also statistically significant. Typically, the incidence of POUR is higher in men, which may be related to an increased rate of prostatomegaly in men with age; however, some studies have reported a higher prevalence in women [10,13,30,35–38]. In our study, univariate analysis showed that POUR is more common in men. However, in multiple logistic regression, although its incidence was higher in men, it was not statistically significant, indicating that in univariate analysis, the role of gender in POUR was distorted; therefore, it is recommended to consider this in future studies. The age of patients is another factor that can affect the incidence of POUR, which has been studied previously in various studies. The risk of POUR increases with age, which may be due to impaired neural pathways involved in micturition. Our results showed that the age of over 50 years was a risk factor for POUR, which is consistent with some studies and contradicts others [7,13,31,32,39–41]. In studies where age was not a risk factor for POUR, the sample size was smaller than in our study, while in another study [13], where similar to our study from the perspective of the sample size, the age of over 50 years was a risk factor for POUR. Therefore, it seems that the small sample size is the reason for no significant effect of age on POUR in some studies. In our study, diabetes was an important risk factor for POUR, which is consistent with other studies [13,42]. Thus, it is recommended to monitor diabetic patients after surgery for retention of urine. Benign prostatic hyperplasia in men can lead to secondary bladder outlet obstruction. Benign prostatic hyperplasia is one of the first and most common causes of bladder outlet obstruction in men and its prevalence increases with age. Treatment failure in benign prostatic hyperplasia can lead to bladder detrusor muscle damage; thus, this condition has been mentioned as one of the risk factors for POUR in various studies [19,43–45] and is also in line with our results. Some surgeries, including anorectal surgery, are associated with a higher risk of POUR [11,17,39]. On the other hand, Toyonaga *et al.* [13] showed that in cases who underwent anorectal surgeries, the risk of POUR was higher in those who underwent hemorrhoid, fissure, and fistula surgeries, but in our study, the results showed no significant difference. In terms of surgical and anesthetic techniques, studies have shown different results, so that in some studies, general anesthesia was associated with a higher risk of POUR than local anesthesia, and vice versa [3,40,46,47]. In our study, only spinal and saddle anesthesia were implemented for surgery. According to the results of univariate analysis, saddle anesthesia was associated with a lower risk of POUR than local anesthesia, while based on multiple regression analysis, the opposite results were obtained, which were not statistically significant, indicating distortion of the results of univariate analysis. The α-adrenergic receptors (α-ARs) located dominantly in the outlet of the bladder and urethra are responsible for the internal sphincter tone, and antagonists of these receptors, including tamsulosin, can reduce the incidence of POUR after colorectal and urological surgeries in men. Tamsulosin mainly acts by alleviating detrusor-sphincter dyssynergia and facilitates bladder emptying, which was confirmed by our results [28–33,37,48–51].

CONCLUSIONS

POUR is common in anorectal surgeries. Being over 50 years old, having diabetes, and suffering from benign prostatic hyperplasia are risk factors for POUR after anorectal surgery. Tamsulosin could be used to prevent POUR in candidates undergoing anorectal surgeries.

ABBREVIATIONS

POUR - Postoperative Urinary Retention, **OR** - Odds Ratio, **ROC** - Receiver Operating Characteristic, **SPSS** - Statistical Package for the Social Sciences

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None.

AUTHOR'S CONTRIBUTIONS

All authors significantly contributed to this work, read and approved the final manuscript.

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AVAILABILITY OF DATA AND MATERIALS

Data and materials used and/or analyzed during the current study are available from the corresponding author on reasonable request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was conducted using the data of patients' files and there was no specific ethical problem that required informed consent.

CONSENT FOR PUBLICATION

Not applicable.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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