



Postoperative Urinary Retention After Lower Abdominal and Anorectal Surgeries.

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Abstract

Background: Postoperative urinary retention (POUR) is a frequent but often under-recognized complication after lower abdominal and anorectal procedures. Pain, pelvic manipulation, spinal anaesthesia, perioperative fluids and opioid analgesia may interfere with bladder sensation and detrusor function, leading to bladder overdistension, catheterization and delayed recovery. The present study is designed to estimate the frequency of POUR after lower abdominal and anorectal surgeries and to identify patient-related, anaesthetic and perioperative factors associated with its occurrence. **Materials and Methods:** Two hundred adult patients who underwent elective or emergency lower abdominal or anorectal surgery were included. POUR was defined as inability to void within 6-8 hours after surgery with suprapubic discomfort or bladder scan/clinical evidence of retention requiring catheterization. Demographic profile, comorbidities, lower urinary tract symptoms, type of surgery, anaesthesia, operative duration, intravenous fluid volume, postoperative pain score, opioid use and early outcomes were recorded. Data were analysed using IBM SPSS Statistics version 28. Categorical variables were compared using the chi-square test and continuous variables using the independent samples t-test. A p value below 0.05 was considered statistically significant. **Results:** POUR developed in 32 of 200 patients, giving an incidence of 16.0%. The incidence was higher after anorectal procedures than lower abdominal procedures (22.5% versus 11.7%, chi-square=4.19, p=0.041). POUR was significantly associated with age above 60 years, male sex, diabetes mellitus, previous lower urinary tract symptoms or benign prostatic hyperplasia, spinal anaesthesia, surgery lasting more than 90 minutes, intravenous fluid volume above 1500 mL, postoperative opioid use, pain score above 6 and delayed mobilization. Patients with POUR had a higher frequency of urinary tract infection and longer hospital stay than those without POUR. **Conclusion:** POUR is a clinically relevant postoperative event after lower abdominal and anorectal surgeries. Older age, male sex, urinary symptoms, spinal anaesthesia, prolonged surgery, higher fluid administration, severe pain and opioid exposure were important associated factors. Structured bladder monitoring in high-risk patients may reduce bladder overdistension, unnecessary discomfort and avoidable delay in discharge.

Keywords: Postoperative urinary retention; POUR; lower abdominal surgery; anorectal surgery; spinal anaesthesia; catheterization; bladder monitoring.



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INTRODUCTION

Postoperative urinary retention is the inability to void adequately after surgery despite a filled bladder. It may present as suprapubic discomfort, restlessness, a palpable bladder, repeated unsuccessful attempts to pass urine or an unexpectedly high post-void residual volume. Although it is usually reversible, it can cause considerable distress and may result in bladder overdistension, urinary tract infection, repeated catheterization and delayed discharge [1-4].

Lower abdominal and anorectal surgeries have a close physiological relationship with bladder function. Pain from the operative site, pelvic floor spasm, reflex inhibition of detrusor contraction, spinal or regional anaesthesia, perioperative opioids and liberal intravenous fluid administration can disturb the normal voiding cycle. In anorectal surgery, pain and fear of straining may further delay micturition. In lower abdominal surgery, manipulation near the pelvis and postoperative immobility can add to the risk [5-12].

The reported incidence of POUR varies widely because studies use different definitions, surgical groups and bladder-volume thresholds. Recent anorectal surgery literature has reported POUR rates near one-fifth of operated patients, while broader surgical literature describes important roles for age, baseline urinary symptoms, anaesthesia, pain, opioids and

duration of surgery. These factors are relevant in routine general-surgery units, particularly where bladder scanning is not uniformly available [6,8-13].

This study was undertaken at Government Medical College, Nalgonda, Telangana, to evaluate POUR after lower abdominal and anorectal procedures. The work focuses on practical risk factors that can be identified before or soon after surgery, so that monitoring and catheterization decisions can be made in a timely and selective manner.

MATERIALS AND METHODS

Study design and setting

This hospital-based observational study was conducted in the Department of General Surgery, Government Medical College, Nalgonda, Telangana, India. Patients undergoing lower abdominal and anorectal procedures were observed during the immediate postoperative period until discharge. The study was planned to reflect routine surgical practice in a tertiary-care government medical college hospital.

Study population

Adult patients aged 18 years and above who underwent lower abdominal or anorectal surgery were considered for inclusion. Both elective and emergency procedures were included. Patients who were catheterized preoperatively for urinary retention, patients with known neurogenic bladder, chronic indwelling catheter, established urethral stricture, end-stage renal disease, major urological surgery during the same admission, or incomplete postoperative voiding records were excluded.

Sample size and sampling method

A total of 200 eligible patients were included by consecutive sampling. The sample size was considered adequate for estimating a POUR frequency of approximately 15% to 20% with acceptable precision in a single-centre observational setting and for examining common perioperative risk factors.

Surgical categories

Lower abdominal procedures included appendicectomy, inguinal hernia repair, lower midline laparotomy, hysterectomy-related general surgical assistance when applicable, stoma-related procedures and other operations involving the lower abdomen. Anorectal procedures included hemorrhoidectomy, fistula surgery, fissure surgery, perianal abscess drainage and other benign anorectal operations.

Definition and assessment of POUR

POUR was defined as failure to pass urine within 6 to 8 hours after surgery, or earlier if the patient developed suprapubic pain or discomfort, with clinical evidence of bladder distension or bladder scan evidence of significant urinary retention, requiring catheterization. In patients without bladder-scan documentation, the diagnosis was made from inability to void, suprapubic fullness and catheter drainage after clinical assessment. Patients who voided spontaneously without catheterization were classified as not having POUR.

Data collection

Demographic details, age, sex, diabetes mellitus, hypertension, previous lower urinary tract symptoms or benign prostatic hyperplasia, type of surgery, urgency of surgery, anaesthesia, operative duration, approximate intraoperative intravenous fluid volume, use of postoperative opioids, postoperative pain score, time to mobilization, need for catheterization, urinary tract infection, length of hospital stay and discharge outcome were recorded in a predesigned proforma.

Outcome measures

The primary outcome was occurrence of POUR. Secondary outcomes included requirement for single or repeated catheterization, temporary indwelling catheter placement, urinary tract infection, delayed mobilization and duration of hospital stay.

Ethical considerations

The study was conducted after obtaining institutional permission. Patient confidentiality was maintained by using coded data, and no personal identifiers were used during analysis or manuscript preparation. The study followed standard ethical principles for observational clinical research.

Statistical analysis

Data were entered into Microsoft Excel and analysed using IBM SPSS Statistics for Windows, version 28. Continuous variables were summarized as mean and standard deviation, while categorical variables were summarized as frequency and percentage. Associations between categorical variables and POUR were tested using the chi-square test. Continuous

variables between POUR and non-POUR groups were compared using the independent samples t-test. A p value less than 0.05 was taken as statistically significant.

RESULTS

Study population

A total of 200 patients were included in the analysis. The mean age of the study population was 48.9 ± 15.2 years, and 112 patients (56.0%) were male. Lower abdominal procedures accounted for 120 cases (60.0%), while anorectal procedures accounted for 80 cases (40.0%). Diabetes mellitus was present in 44 patients (22.0%), and previous lower urinary tract symptoms or benign prostatic hyperplasia were documented in 34 patients (17.0%). Baseline characteristics are shown in Table 1.

Table 1: Baseline characteristics and association with postoperative urinary retention

Variable	Total, n (%)	POUR, n (%)	No POUR, n (%)	Chi-square	p value
Age ≤ 60 years	148 (74.0)	16 (10.8)	132 (89.2)	11.40	0.001
Age > 60 years	52 (26.0)	16 (30.8)	36 (69.2)		
Male sex	112 (56.0)	24 (21.4)	88 (78.6)	5.58	0.018
Female sex	88 (44.0)	8 (9.1)	80 (90.9)		
Diabetes mellitus	44 (22.0)	12 (27.3)	32 (72.7)	5.33	0.021
No diabetes	156 (78.0)	20 (12.8)	136 (87.2)		
Previous LUTS/BPH	34 (17.0)	14 (41.2)	20 (58.8)	19.32	<0.001
No previous LUTS/BPH	166 (83.0)	18 (10.8)	148 (89.2)		
Hypertension	58 (29.0)	12 (20.7)	46 (79.3)	1.16	0.281
No hypertension	142 (71.0)	20 (14.1)	122 (85.9)		

POUR = postoperative urinary retention; LUTS = lower urinary tract symptoms; BPH = benign prostatic hyperplasia. Percentages in POUR and No POUR columns are row percentages

Incidence of postoperative urinary retention

POUR was observed in 32 of 200 patients, giving an overall incidence of 16.0%. The incidence was 11.7% after lower abdominal procedures and 22.5% after anorectal procedures. The difference between surgical categories was statistically significant (chi-square=4.19, $p=0.041$), as shown in Table 2 and Figure 1.

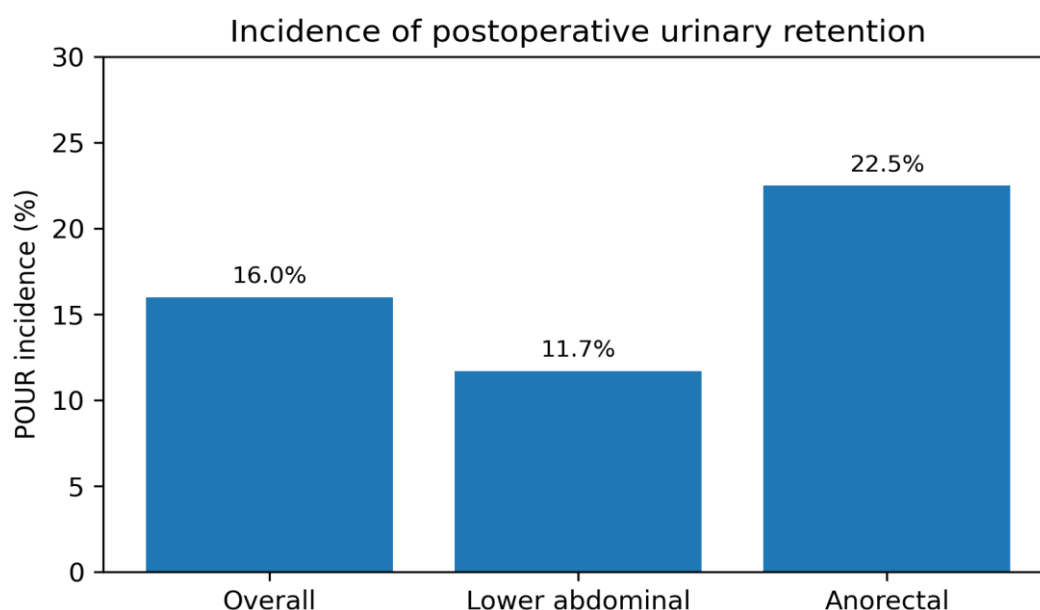


Figure 1: Incidence of postoperative urinary retention in the overall cohort and by surgical category.

Table 2: Surgical profile and association with postoperative urinary retention

Surgical variable	Total, n (%)	POUR, n (%)	No POUR, n (%)	Chi-square	p value
Lower abdominal surgery	120 (60.0)	14 (11.7)	106 (88.3)	4.19	0.041
Anorectal surgery	80 (40.0)	18 (22.5)	62 (77.5)		
Elective surgery	138 (69.0)	18 (13.0)	120 (87.0)	2.67	0.102
Emergency surgery	62 (31.0)	14 (22.6)	48 (77.4)		
Operative duration ≤90 min	130 (65.0)	12 (9.2)	118 (90.8)	12.66	<0.001
Operative duration >90 min	70 (35.0)	20 (28.6)	50 (71.4)		

Footnote: Percentages in POUR and No POUR columns are row percentages. Lower abdominal procedures included appendectomy, hernia repair and lower abdominal laparotomy; anorectal procedures included hemorrhoidectomy, fistula, fissure and abscess surgery.

Anaesthetic and perioperative factors

Perioperative variables showed a clear relationship with POUR. Spinal anaesthesia, intravenous fluid administration above 1500 mL, postoperative opioid use, severe postoperative pain and delayed mobilization were significantly associated with retention.

Patients with a pain score above 6 had the highest subgroup incidence of POUR (33.9%). The distribution of high-risk groups is presented in Table 3 and Figure 2.

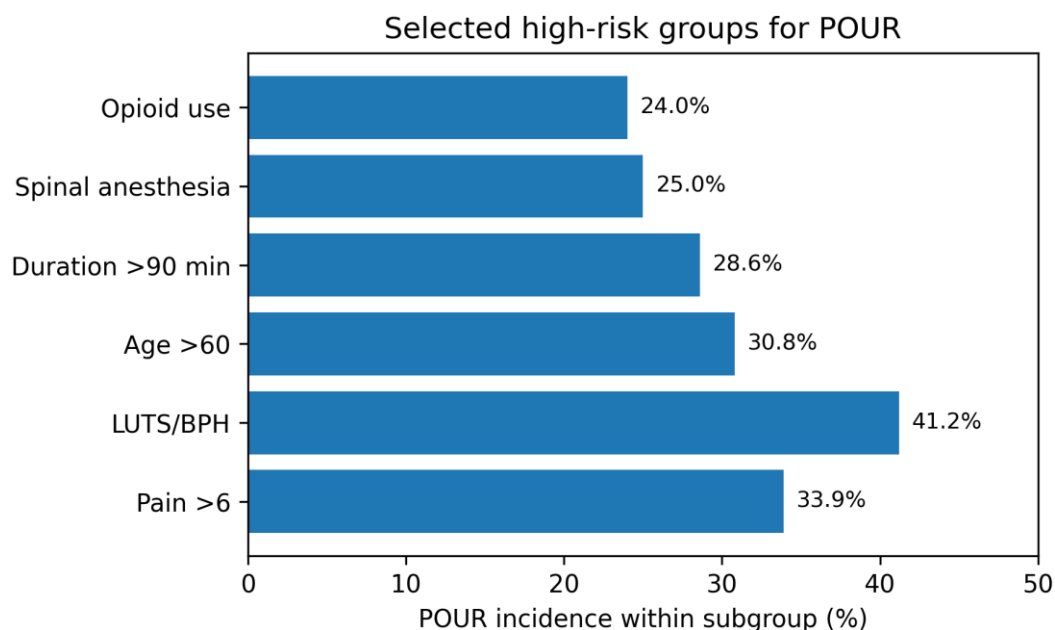


Figure 2: POUR incidence among selected high-risk subgroups.

Table 3: Anaesthetic and perioperative factors associated with postoperative urinary retention

Perioperative variable	Total, n (%)	POUR, n (%)	No POUR, n (%)	Chi-square	p value
General anaesthesia	112 (56.0)	10 (8.9)	102 (91.1)	9.47	0.002
Spinal anaesthesia	88 (44.0)	22 (25.0)	66 (75.0)		
IV fluids ≤1500 mL	138 (69.0)	14 (10.1)	124 (89.9)	11.35	0.001
IV fluids >1500 mL	62 (31.0)	18 (29.0)	44 (71.0)		
Postoperative opioids used	100 (50.0)	24 (24.0)	76 (76.0)	9.52	0.002
No postoperative opioids	100 (50.0)	8 (8.0)	92 (92.0)		
Pain score ≤6	138 (69.0)	11 (8.0)	127 (92.0)	21.35	<0.001
Pain score >6	62 (31.0)	21 (33.9)	41 (66.1)		
Mobilized within 24 hours	145 (72.5)	15 (10.3)	130 (89.7)	12.55	<0.001
Delayed mobilization	55 (27.5)	17 (30.9)	38 (69.1)		

IV = intravenous. Pain score refers to the highest documented postoperative pain score within the early postoperative period

Clinical course and outcomes

Among the 32 patients with POUR, 24 patients improved after single catheterization, six required repeated catheterization and two required a temporary indwelling catheter beyond 24 hours. Compared with patients without retention, the POUR group had a higher frequency of urinary tract infection (15.6% versus 4.8%, chi-square=5.03, $p=0.025$), delayed mobilization (53.1% versus 22.6%, chi-square=12.55, $p<0.001$) and hospital stay longer than four days (46.9% versus 16.7%, chi-square=14.58, $p<0.001$). These outcomes are summarized in Table 4 and Figure 3.

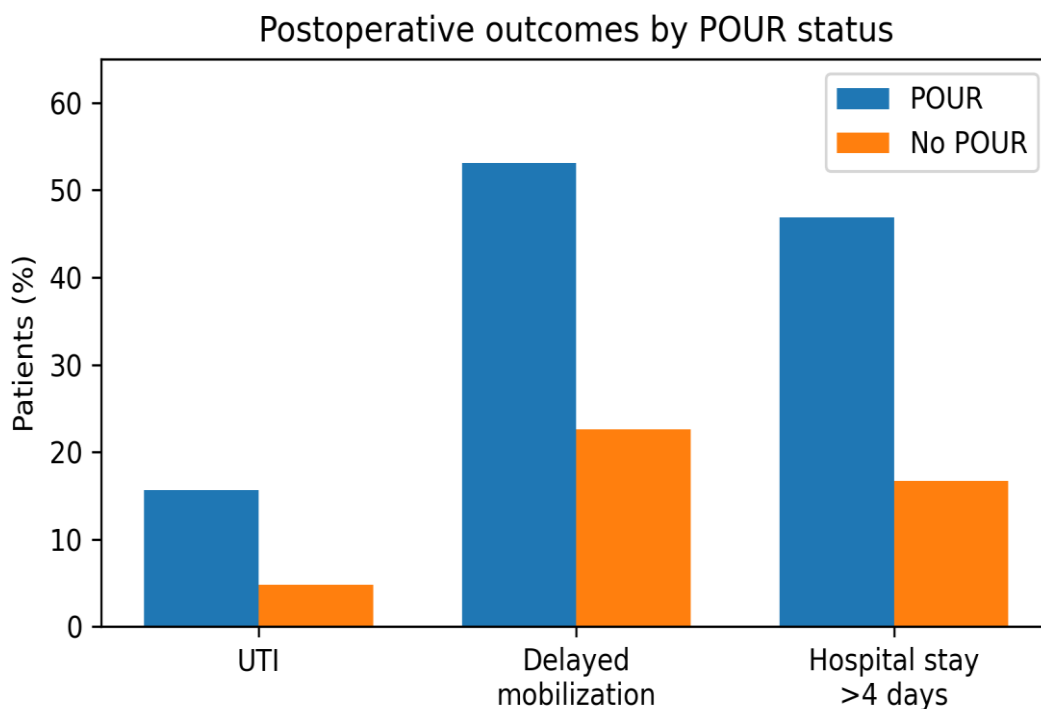


Figure 3: Comparison of early postoperative outcomes between patients with and without POUR

Table 4: Postoperative outcomes according to POUR status

Outcome	Total, n (%)	POUR, n (%)	No POUR, n (%)	Chi-square	p value
Urinary tract infection	13 (6.5)	5 (15.6)	8 (4.8)	5.03	0.025
No urinary tract infection	187 (93.5)	27 (84.4)	160 (95.2)		
Delayed mobilization	55 (27.5)	17 (53.1)	38 (22.6)	12.55	<0.001
Mobilized within 24 hours	145 (72.5)	15 (46.9)	130 (77.4)		
Hospital stay >4 days	43 (21.5)	15 (46.9)	28 (16.7)	14.58	<0.001
Hospital stay ≤4 days	157 (78.5)	17 (53.1)	140 (83.3)		
Readmission within 7 days	5 (2.5)	2 (6.3)	3 (1.8)	2.44	0.118
No readmission	195 (97.5)	30 (93.8)	165 (98.2)		

Percentages are column percentages for POUR and No POUR groups. POUR = postoperative urinary retention.

DISCUSSION

This study found that POUR occurred in 16.0% of patients undergoing lower abdominal and anorectal surgeries at Government Medical College, Nalgonda. The finding confirms that urinary retention is not a rare event in routine general surgical practice. The incidence was higher after anorectal procedures than lower abdominal procedures, which is clinically expected because anorectal pain, pelvic floor spasm and reluctance to strain can delay voluntary voiding [2,4,6,8,13].

Older age, male sex and baseline urinary symptoms showed strong associations with POUR. These factors probably reflect reduced bladder reserve, prostatic obstruction in a proportion of male patients and impaired detrusor response in older individuals. Diabetes mellitus was also significantly associated with retention, possibly due to autonomic neuropathy, impaired bladder sensation or coexisting urinary dysfunction [6,7,14].

Spinal anaesthesia was significantly related to POUR. This association is biologically plausible because neuraxial blockade may transiently inhibit bladder afferent and efferent pathways. In addition, patients who received larger volumes of intravenous fluid had more retention, suggesting that rapid bladder filling during the period of reduced sensation may contribute to overdistension before the patient is able to void [1,5-7,16].

Postoperative pain score above 6 and opioid analgesic use were among the strongest perioperative correlates. Pain increases sympathetic tone and pelvic floor guarding, while opioids may reduce detrusor contractility and alter bladder sensation. These findings support a balanced analgesic approach that limits avoidable opioid exposure while controlling pain adequately. Early mobilization also appeared important, since delayed mobilization was associated with retention and poorer recovery outcomes [7,9,15,18].

Patients with POUR had more urinary tract infections and longer hospital stay. This may reflect both the effect of catheterization and the clinical consequences of retention itself. These findings are relevant in resource-limited settings because selective bladder monitoring can help avoid emergency catheterization, repeated painful attempts at voiding and unnecessary prolongation of admission [3,12,19].

The practical implication is that every patient undergoing lower abdominal or anorectal surgery should not necessarily receive routine catheterization, but high-risk patients should be identified early. Older male patients, those with diabetes or urinary symptoms, patients receiving spinal anaesthesia, patients with prolonged operations, higher fluid administration, severe pain or opioid requirement may benefit from a planned voiding protocol, timely bladder scan where available and early catheterization when clinically indicated [2,6,17-19].

Limitations

This was a single-centre observational study and the findings may reflect the case mix and perioperative practices of GMC Nalgonda. Bladder scan was not available for every patient, so some diagnoses were based on clinical assessment and catheter drainage. Long-term urinary outcomes after discharge were not evaluated. The study also did not perform multivariable regression analysis in this draft version; therefore, the reported associations should not be interpreted as independent predictors until adjusted analysis is completed with the final dataset [5,6].

Recommendations

A simple perioperative risk checklist may be used for patients undergoing lower abdominal and anorectal procedures. Patients with age above 60 years, male sex, diabetes, previous urinary symptoms, spinal anaesthesia, prolonged surgery, high fluid load, severe pain or opioid requirement should undergo planned postoperative voiding assessment. Bladder scan, where available, should be used before catheterization to avoid unnecessary procedures. Multicentre studies with adjusted analysis are recommended to validate these findings and develop a local risk-based bladder-care protocol [6,17-19].

CONCLUSION

Postoperative urinary retention occurred in 16.0% of patients after lower abdominal and anorectal surgeries in this study. The event was more common after anorectal procedures and was associated with older age, male sex, diabetes, previous lower urinary tract symptoms or benign prostatic hyperplasia, spinal anaesthesia, prolonged surgery, higher intravenous fluid volume, postoperative opioids, severe pain and delayed mobilization. POUR was also linked with urinary tract infection and longer hospital stay. A selective, risk-based postoperative bladder monitoring protocol can improve patient comfort and may reduce avoidable catheter-related morbidity and discharge delay [1,2,8-13].

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Conflict of interest: The authors declare no conflict of interest.

Data availability: The data supporting the findings of this study are available from the corresponding author on reasonable request, subject to institutional permission and patient confidentiality requirements.

Author contributions: All authors contributed to the conception of the study, data collection, analysis, manuscript drafting and critical revision. All authors reviewed and approved the final manuscript before submission.

Abbreviations: **BPH:** benign prostatic hyperplasia; **IV:** intravenous; **LUTS:** lower urinary tract symptoms; **POUR:** postoperative urinary retention; **SPSS:** Statistical Package for the Social Sciences; **UTI:** urinary tract infection; **VAS:** visual analogue scale.

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