



# Epidemiology of Postoperative Urinary Retention

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## Abstract

Postoperative urinary retention (POUR) is one of the common postoperative complications which is often underestimated and if missed causes lot of discomfort to the patient. POUR is essentially the inability to void despite a full bladder in the postoperative period. The reported incidence varies for widely from 5% to 70%. Multiple studies done all over the world incriminate certain factors for the occurrence of POUR and these depend on the type of anaesthesia, type and duration of surgery, underlying comorbidities, and drugs used in perioperative period. Untreated POUR can lead to significant morbidities such as prolongation of the hospital stay, urinary tract infection, detrusor muscle dysfunction, delirium, cardiac arrhythmias etc. This has shifted the focus on early detection of POUR. This study estimates the incidence of post operative urinary retention in patients undergoing surgery under spinal anaesthesia and endeavours to discuss preventive measures and treatment.

**Keywords:** Postoperative Urinary Retention, Spinal Anaesthesia. Inability to Void, Full Bladder

## Introduction

The ability to void urine is considered as an important criterion for early discharge after day-case surgery [1]. Postoperative urinary retention (POUR) is one of the commonest complications next to hemodynamic adverse effects following spinal anaesthesia (SA), usually defined as the inability to void 8 hours after end of surgery despite having a full bladder [2-6]. It can be a source of great distress to the patient, or it can go unnoticed. It can be easily reversible with minimal provider interventions, or it can have lasting effects on the patient [7]. Prolonged bladder distention due to POUR can lead to urinary tract infection, detrusor dysfunction, and even damage the surgical repair following pelvic and perineal surgery [8]. Thus, early attainment of bladder function is a major concern for surgeons especially following short surgical procedures. In this study, we endeavoured to estimate the incidence of post operative urinary retention in patients undergoing surgery under Spinal Anaesthesia and measures to prevent and treat POUR.

## Material and Methods

The present study was a retrospective observational study in a zonal hospital in adult patients undergoing elective surgery. Hundred patients aged 18–60 years, with ASA grades I–II, Mallampati grades I and II, who had undergone elective surgery under SA for lower abdominal, perineal, and lower limb surgeries, lasting less than 2 h were included in the study. Patients with a history of allergy to study medications, previous or current psychiatric illness, neurologic or vestibular disease, morbid obesity or any contraindication to SA were excluded from the study.

Patients who were catheterized in the OT were excluded from the study. All patients received SA with 0.3% Bupivacaine (H), 2.7 ml using 27 G spinal needle. Post op pain relief was with Inj PCM 1 g and Inj Tramadol 50 mg IV as per anaesthesia protocol. Patient records maintained in the wards, operation theatre and PAC records were used for gathering the data. Inability to pass urine 6 hours post-surgery along with clinical findings of percussible bladder below the umbilicus was considered as threshold for catheterization.

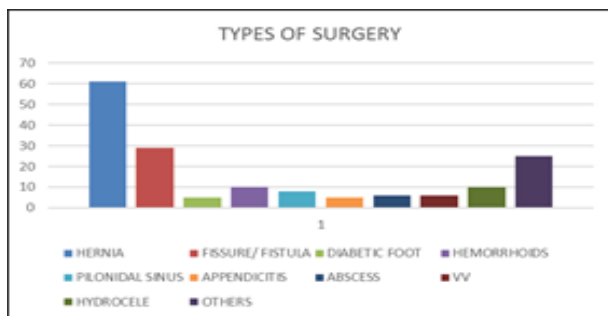
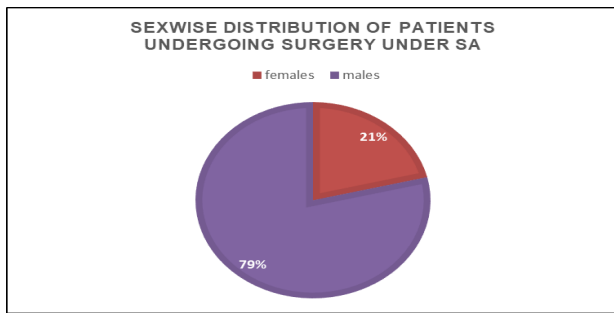
## Results

A total of 165 patients were operated during the period of observation of which 21% were females and rest were males [FIG 1]. The surgical procedures performed included clean to contaminated cases. The most common procedure performed was hernia surgery followed by rectal procedures (FIG 2). Of the total 165 patients operated, 18 patients developed retention of urine as per the criteria adopted for the study. It was observed that none of the female patients developed retention.

## Charts and Diagrams

**Figure 1: Gender wise Distribution of Patients** **Figure 2: Types of Surgery Performed**

## Undergoing Surgery Under SA



Amongst the patients developing retention, age wise distribution revealed increased retention in 50 – 60 years age group followed by patients more than 60 years. Almost all the patients in the above 60 years were on medication for prostatomegaly. It was observed that the incidence was more during January, May/June, and September.

## Discussion

The perioperative period can significantly alter the normal physiology of bladder emptying. The urinary bladder is innervated by parasympathetic, sympathetic, and efferent somatic fibres. The afferent somatic fibres from stretch receptors arise from the bladder wall, storage phase being controlled by sympathetic and voiding by the parasympathetic. The normal capacity of bladder is 400– 600 ml while the first urge to pass urine occurs at 150 ml. The sensation of bladder fullness is at 300 ml.

The post operative period interferes with this normal mechanism due the anaesthesia, surgical procedure performed, intraoperative stressors, pain, anxiety and so on [9]. As per various studies, the incidence of post operative retention of urine is between 5 – 70% [9]. The various factors considered responsible for retention of urine have been extensively studied by different researchers.

In 2019, Agarwal et al published an exhaustive review of literature on the topic [9]. They concluded that post op urinary retention [POUR] is a common but ignored complication caused by various factors like age, type and duration of surgery, type and duration of anaesthesia and intraoperative fluids. They also stated that if not diagnosed and treated in time, POUR can be a cause of much more morbidity and even permanent bladder dysfunction. Another study by Marl et al published in Surgical Clinics of North America also studied in detail various factors

responsible for and the management of POUR [11].

Age greater than 50 is considered a significant risk factor. Sex as a predisposing factor remains debatable [10]. Pre-existing comorbidities like neurological disorders, multiple sclerosis, stroke increase the risk of POUR as also pre-existing urological conditions like BPH [10,11]. Amongst the surgical procedures, surgeries lasting more than 3 hours and rectal surgeries showed increased POUR. SAB had higher propensity for POUR than other techniques. A study by Halim et al showed that SAB with right dose lowered chances of POUR [12]. Due to the morbidity caused by POUR, timely detection and treatment are considered crucial [10, 11]. USG is increasingly being considered for volumetric diagnosis of POUR [10,12].

## Types of Anaesthesia

General, spinal, and regional anesthetics can all lead to POUR by suppressing micturition control and reflexes at both the central nervous system level (pontine micturition center) and the level of the peripheral nervous system by blocking neural transmission in the sacral spinal cord [13]. Spinal and epidural anesthetics impact voiding by effectively interfering with the afferent and efferent nerves and micturition reflex arcs as they enter and exit the spinal cord [13]. The risk of POUR is most significant in spinal anesthetics, followed by epidural anesthetics followed by general anesthetic [14]. Opioids decrease the sensation of bladder distension by inhibiting the parasympathetics of the bladder while also increasing the bladder neck tone through overstimulation of the sympathetic nervous system leading to an increase in outlet obstruction [15]. Surgical pain, via activation of the sympathetic nervous system leads to detrusor relaxation and bladder neck contraction leading to POUR [16].

## Statistics

Different studies have shown that day care general surgical procedures have a POUR rate of 3.8% patients undergoing orthopaedic procedures show a POUR rate of 10-84% colorectal surgeries have been found to have a POUR rate of 1-52% [16] and hernia surgeries show a rate of 5.9-38% [17-19].

## Predisposing Factors

Men are at double the risk of developing POUR as compared to females [17]. Our findings were in accordance with the various studies with incidence being 11 % with 100% male preponderance. Limitation of the study was that being a retrospective study, only the factors noted in the case files could be studied. Increasing age raises the risk of POUR by 2.4 times in patients over 50 years-of-age. Our study also reveals that there is increased retention in 50 – 60 years age group followed by patients more than 60 years. Renal failure, diabetes mellitus, benign prostatic hyperplasia and depression is associated with increased incidence of POUR as per a study done by Wu et al [20]. Patients undergoing knee, hip, or colon surgeries were also at the greatest risk of developing POUR [20]. A study by Clancy et al has demonstrated the benefit of prescribing an alpha-blocker preoperatively and prophylactically in the patients at greatest risk for POUR [21].

### Risk Factors

Operating time greater than 2 hours increases the risk of POUR and the risk of POUR increases 25% for every 15 minutes spent in the operation room as per a study by Tischler et al [22,23]. Intraoperative intravenous fluid volume seems to lead to a higher rate of POUR due to the stretching of a non-drained bladder while the surgery is ongoing [24].

### Prevention

Early ambulation decreased the rates of POUR from 52% to 19% as per a study by Hansen et al [25]. Demonstrated the benefits of hot packs and luke warm water-soaked gauze observing significant reduction in the rate of POUR in his study [26]. Management: Management of POUR is bladder drainage either by per urethral catheter placement which may last for 1 to 3 days or intermittent catheterisation to reduce the risk of bacteriuria.

### Complications

Acute retention can be extremely painful, and associated autonomic response to bladder overdistension can lead to vomiting, hypo- or hypertension, or even cardiac dysrhythmias [27]. POUR can cause urinary tract infection [28] and cause increase in the duration of hospitalisation [29].

### Conclusion

POUR is a common complication following surgery under spinal anaesthesia and can be a source of great distress to the patient, or it can go unnoticed. It can be easily reversible with minimal provider interventions, or it can have lasting effects on the patient. The incidence of POUR in our study was 11 % with 100% male preponderance. There was increased incidence of retention in 50 – 60 years age group followed by patients more than 60 years. The incidence was more during January, May/June, and September. Hernia surgery was the most common surgery the patients underwent who developed POUR. Alpha-blocker preoperatively and prophylactically may have a role in the patients at greater risk for POUR. Risk of POUR increases with increasing operating time and intraoperative intravenous fluid volume. Early ambulation, use of hot packs and luke warm water-soaked gauze has shown to reduce the incidence of POUR. Management of POUR is bladder drainage either by per urethral catheter placement or intermittent catheterisation. Complications of POUR include urinary tract infection, bladder overdistension leading to nausea, vomiting, hypotension and even dysrhythmias and increased duration of hospitalisation.

Figure 3: Patients Developing Retention

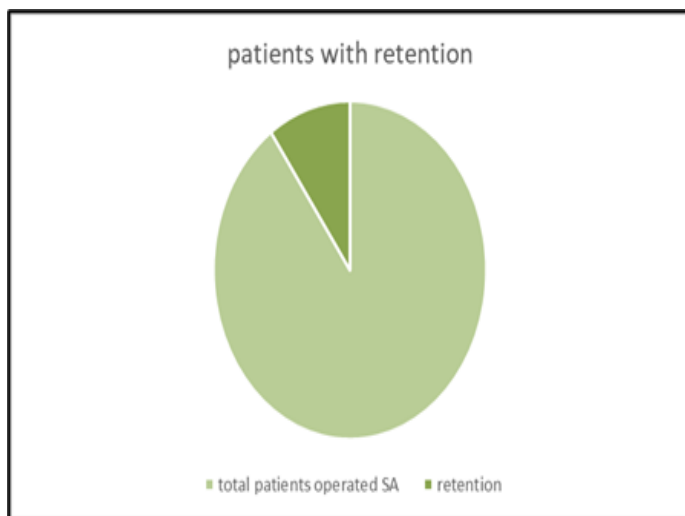


Figure 4: Monthly Distribution of Retention Cases

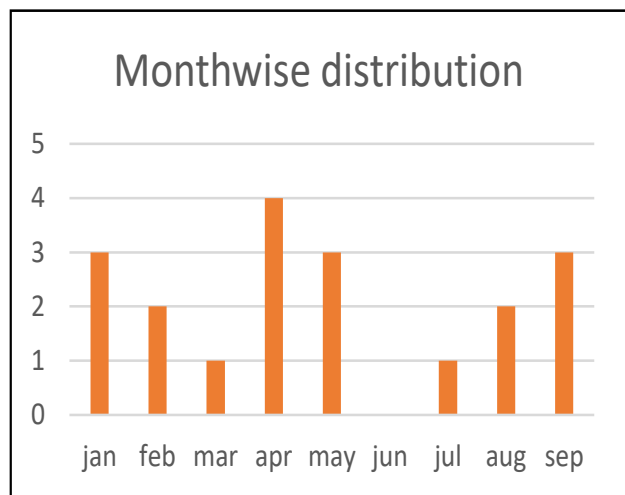
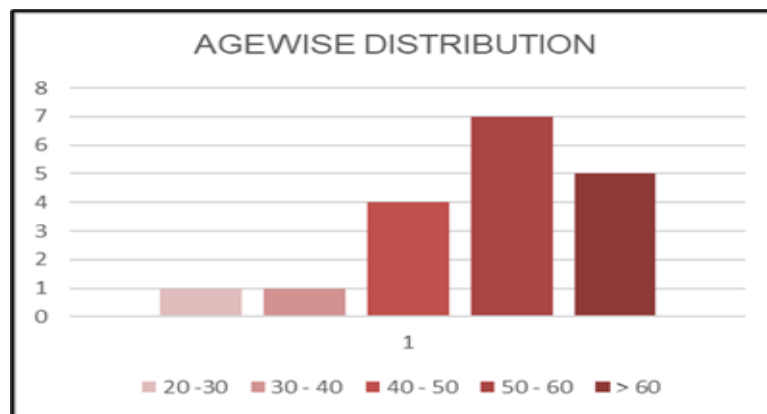


Figure 5: Age wise Distribution of Retention cases



## References

1. Lingaraj K, Ruben M, Chan YH, Das SD (2007) Identification of risk factors for urinary retention following total knee arthroplasty: A Singapore hospital experience. *Singapore Med J* 48: 213-216.
2. Baldini G, Bagry H, Aprikian A, Carli F (2009) Postoperative urinary retention anesthetic and perioperative considerations. *Anesthesiology* 110: 1139-1157.
3. Cataldo PA, Senagore AJ (1991) Does alpha sympathetic blockade prevent urinary retention following anorectal surgery? *Dis Colon Rectum* 34: 1113-1116.
4. Stallard S, Prescott S (1988) Postoperative urinary retention in general surgical patients. *Br J Surg* 75: 1141-1143.
5. Sarasin SM, Walton MJ, Singh HP, Clark DI (2006) Can a urinary tract symptom score predict the development of postoperative urinary retention in patients undergoing lower limb arthroplasty under spinal anaesthesia: A prospective study. *Ann R Coll Surg Engl* 88: 394-398.
6. Ehrenberg R, Lemberger P, Wiesenack C (2008) Urinary retention after spinal anaesthesia: Unilateral vs. bilateral spinal anaesthesia with 0.5% bupivacaine. A prospective randomized study: 8AP6-2. *EurJAnaesthesiol* 25: 119.
7. Pomajzl AJ, Siref LE (2024) Postoperative Urinary Retention. 2023 Jul 4. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing PMID: 31751034.
8. Geller Elizabeth J (2014) Prevention and management of postoperative urinary retention after urogynecologic surgery. *Int J Women's Health* 6: 829-838.
9. Paul Abrams, Linda Cardozo, Magnus Fall, Derek Griffiths, Peter Rosier, et al. (2003) The standardisation of terminology in lower urinary tract function: report from the standardisation sub-committee of the International Continence Society. *Urology* 61: 37-49.
10. Agrawal K, Majhi S, Garg R (2019) Post-operative urinary retention: Review of WJA <https://www.wjgnet.com> 1 January 15, 2019 Volume 8 Issue 1 literature. *World J Anesthesiol* 8: 1-12.
11. Urszula Kowalik, Mark K Plante (2016) Urinary Retention in Surgical Patients; *Surg Clin N Am* 96: 453-467.
12. Haleem S, Ozair A, Singh A, Hasan M, Athar M (2020) Postoperative urinary retention: A controlled trial of fixed-dose spinal anaesthesia using bupivacaine versus ropivacaine. *J Anaesthesiol Clin Pharmacol* 36: 94-99.
13. Kamphuis ET, Ionescu TI, Kuipers PW, de Gier J, van Venrooij GE, et al. (1998) Recovery of storage and emptying functions of the urinary bladder after spinal anaesthesia with lidocaine and with bupivacaine in men. *Anesthesiology* 88: 310-316.
14. Baldini G, Bagry H, Aprikian A, Carli F (2009) Postoperative urinary retention: anesthetic and perioperative considerations. *Anesthesiology* 110: 1139-1157.
15. Elsamra SE, Ellsworth P (2012) Effects of analgesic and anesthetic medications on lower urinary tract function. *Urol Nurs* 32: 60-67; quiz 68.
16. Toyonaga T, Matsushima M, Sogawa N, Jiang SF, Matsumura N, et al. (2006) Postoperative urinary retention after surgery for benign anorectal disease: potential risk factors and strategy for prevention. *Int J Colorectal Dis* 21: 676-682.
17. Tammela T, Kontturi M, Lukkarinen O (1986) Postoperative urinary retention. II. Micturition problems after the first catheterization. *Scand J Urol Nephrol* 20: 257-260.
18. Oishi CS, Williams VJ, Hanson PB, Schneider JE, Colwell CW, et al. (1995) Perioperative bladder management after primary total hip arthroplasty. *J Arthroplasty* 10: 732-736.
19. Dreijer B, Møller MH, Bartholdy J (2011) Post-operative urinary retention in a general surgical population. *Eur J Anaesthesiol* 28: 190-194.
20. Wu AK, Auerbach AD, Aaronson DS (2012) National incidence and outcomes of postoperative urinary retention in the Surgical Care Improvement Project. *Am J Surg* 204: 167-171.
21. Clancy C, Coffey JC, O'Riordain MG, Burke JP (2018) A meta-analysis of the efficacy of prophylactic alpha-blockade for the prevention of urinary retention following primary unilateral inguinal hernia repair. *Am J Surg* 216: 337-341.
22. Hansen BS, Søreide E, Warland AM, Nilsen OB (2011) Risk factors of post-operative urinary retention in hospitalised patients. *Acta Anaesthesiol Scand* 55: 545-548.
23. Tischler EH, Restrepo C, Oh J, Matthews CN, Chen

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- AF, et al. (2016) Urinary Retention is Rare After Total Joint Arthroplasty When Using Opioid-Free Regional Anesthesia. *J Arthroplasty* 31: 480-483.
24. Pavlin DJ, Pavlin EG, Gunn HC, Taraday JK, Koerschgen ME (1999) Voiding in patients managed with or without ultrasound monitoring of bladder volume after outpatient surgery. *Anesth Analg* 89: 90-97.
25. Hansen AB, Olsen KS (2015) The number of in-out catheterisations is reduced by mobilising the postoperative patient with bladder needs to the toilet in the recovery room: A randomised clinical trial. *Eur J Anaesthesiol* 32: 486-492.
26. Afazel MR, Jalali E, Sadat Z, Mahmoodi H (2014) Comparing the effects of hot pack and lukewarm-water-soaked gauze on postoperative urinary retention; a randomized controlled clinical trial. *Nurs Midwifery Stud* 3: e24606.
27. Kamphuis ET, Ionescu TI, Kuipers PW, de Gier J, van Venrooij GE, et al. (1998) Recovery of storage and emptying functions of the urinary bladder after spinal anesthesia with lidocaine and with bupivacaine in men. *Anesthesiology* 88: 310-316.
28. Baldini G, Bagry H, Aprikian A, Carli F (2009) Postoperative urinary retention: anesthetic and perioperative considerations. *Anesthesiology* 110: 1139-1157.
29. Petros JG, Rimm EB, Robillard RJ (1992) Factors influencing urinary tract retention after elective open cholecystectomy. *Surg Gynecol Obstet* 174: 497-500.

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