

# A study of incidence of post operative urinary retention following spinal anaesthesia and it's association with level of blockade

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## Abstract

**Background:** Post-operative urinary retention is a commonly encountered problem across all surgeries in patients undergoing spinal anaesthesia. PORP is associated with significant morbidity in post operative period. **Aim and objective:** To study the incidence of Post operative urinary retention following spinal anaesthesia and it's association with level of blockade **Methodology:** Present study was a prospective study carried out in patients posted for lower limb /lower abdominal surgeries under spinal anaesthesia. Data was collected with pretested questionnaire. Data included demographic data like age, sex, socioeconomic status etc. detailed history of the patients was taken. A through clinical examination was done. Spinal anaesthesia was given to all patients. Patients were monitored throughout intraoperative period. Vital parameters like pulse, blood pressure, oxygen saturation and respiratory rate were measured. Level of sensory block was assessed and noted 10 minutes after giving the drug block in all the patients. All patients were closely followed for 24 hours post operatively for voiding and were graded into various voiding difficulty grades. Data was analysed with appropriate statistical tests. **Results and discussion:** Mean age of the patients was 49.3± 3.1 years. Male to female ratio was 4:1. Incidence of post operative urinary retention was 40%. Increasing age was significantly associated with higher incidence of POUR. (p<0.05). Males show higher incidence of difficulty in voiding urine than females but the difference was not statistically significant (p>0.05). Diabetes mellitus and hypertension are risk factors for development of post operative urinary retention. There was no significant variation in post operative urinary retention in relation to height of sensory block level.

**Key Word:** urinary retention.

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## INTRODUCTION

Spinal anesthesia produces intense sensory and motor blockade as well as sympathetic blockade. As opposed to epidural anesthesia, in which medications are instilled outside the dura mater, the goal of spinal anaesthesia is to instil the desired medications into the cerebrospinal fluid (CSF). The sensori-motor block produced requires smaller doses of local anaesthetics (hence, local anaesthetic toxicity is rarely a concern) and is often more dense in character. But as in any other technique it also has certain side effects. Intra-operative problems like hypotension, bradycardia and even respiratory arrest can occur after spinal anaesthesia.<sup>1</sup> One of the most common post-

operative complaints is post-operative urinary retention (POUR). POUR has been defined as the inability to void despite a full bladder. The perioperative period includes myriad insults that may interrupt this process and promote the development of urinary retention. There is a high incidence of micturition difficulties postoperatively. Acute post-operative urinary retention can occur following all types of anaesthesia and operative procedures. The etiology of postoperative urinary retention involves a combination of many factors, including surgical trauma to the pelvic nerves or to the bladder, over distention of the bladder by large quantities of fluids given intravenously, postoperative oedema around the bladder neck, and pain- or anxiety-induced reflex spasm of the internal and external urethral sphincters. Urinary retention is more likely to occur after major surgery and with elderly male patients. Opioids and confinement to bed may also be likely explanations for the development of urinary retention after surgery. Patients at risk for urinary retention should be encouraged to void and provided a quiet environment in which to do so. They should be encouraged to sit, stand, or ambulate as soon as possible.<sup>2</sup> Expedient catheterization when needed and the prophylactic placement of indwelling catheters in patients with previous disturbances are recommended.<sup>3,4</sup> Present study was conducted to study the incidence of post operative urinary retention following spinal anaesthesia and its association with level of blockade.

### MATERIAL AND METHODS

Present study was an observational study conducted at Indira Gandhi Medical College and associated hospitals Shimla. Study population was 100 patients of ASA1 and ASA2 aged 20-60 years of either sex posted for lower limb /lower abdominal surgery under spinal anaesthesia.

**Inclusion Criteria:** 1. Patients posted for lower limb / lower abdominal surgery under spinal anaesthesia 2. Patients of ASA 1 and ASA 2 3. Patients in age group of 20-60 years 4. Patients willing to participate in the study.

**Exclusion criteria:** 1. Patients with urinary tract disease 2. Catheterised patients. 3. Patients with warfarin 4. Patients with sitting systolic blood pressure in the upper extremity of less than 100 mmHg at the time of eligibility screening 5. Patients with Intra operative IV fluid more than 1500 ml 6. Patients with intraoperative blood loss more than 750 ml.

Study was approved by ethical committee of the institute. A valid written consent was taken after explaining study to them.

Patients under the study were thoroughly assessed preoperatively regarding detailed history, physical examination and all necessary investigations. All Patients were catheterized. Vital parameters like pulse, blood

pressure both systolic and diastolic, respiratory rate, oxygen saturation were measured. After keeping complete resuscitation and anaesthesia instruments ready, spinal anaesthesia was given.

Painting and dressing was done with aseptic precautions. Depending on the requirement of spinal blockade level inj. Bupivacaine (heavy) was administered at level L3-L4 with spinal needle.

Intraoperatively patients were monitored for vital parameters like pulse, BP, respiratory rate and oxygen saturation etc.

All patients were closely followed for 24 hours post operatively for voiding and were graded into various voiding difficulty grades as given

**Grade 0:** Spontaneous voiding without difficulty.

**Grade 1:** Voiding with difficulty.

**Grade 2:** Intermittent single evacuation of bladder.

**Grade 3:** Intermittent repeated evacuation of bladder

**Grade 4:** Continuous catheterization.

Data was collected with pre tested questionnaire. Data included demographic data, clinical history and clinical examination. Intraoperative hemodynamic of the patient, level of blockade and details of post operative urinary retention were noted.

Data was entered in the excel sheet. Data was analysed with appropriate statistical tests.

### RESULTS

**Table 1:** Voiding difficulty in patients after spinal anaesthesia

Sr no	Voiding grade	No of patients	Percentage
1	G0	60	60%
2	G1	17	17%
3	G2	07	7%
4	G3	08	8%
5	G4	08	8%
6	<b>Total</b>	<b>100</b>	<b>100%</b>

**Table 2:** Voiding difficulty in patients according to age group

Sr no	Age	G0	G1	G2	G3	G4	Total
1	20-29	21	00	00	00	00	21
2	30-39	25	05	00	00	00	30
3	40-49	12	04	01	00	00	17
4	50-60	02	08	06	08	08	32
5	<b>Total</b>	<b>60</b>	<b>17</b>	<b>07</b>	<b>08</b>	<b>08</b>	<b>100</b>

**Table 3:** Voiding difficulty in relation to sex

Sr no	Sex	G0	G1	G2	G3	G4	Total
1	Male	47	14	04	08	07	80
2	Female	13	03	03	00	01	20
3	<b>Total</b>	<b>60</b>	<b>17</b>	<b>07</b>	<b>08</b>	<b>08</b>	<b>100</b>

**Table 4: Voiding difficulty in relation to co morbidity**

Co-Morbidity	VD score					Total
	G0	G1	G2	G3	G4	
NONE	57	12	02	02	02	75
DM	00	03	03	01	03	10
RD	03	01	01	01	00	06
HTN	00	01	01	03	02	07
DM + HTN	00	00	00	01	00	01
<b>Total</b>	<b>60</b>	<b>17</b>	<b>07</b>	<b>08</b>	<b>08</b>	<b>100</b>

**Table 5: Voiding difficulty in relation to sensory block**

Level of Sensory Block	VD SCORE					Total
	G0	G1	G2	G3	G4	
T4	00	01	00	01	00	02
T5	10	08	04	04	05	31
T6	39	06	03	02	03	53
T7	09	02	00	01	00	12
T8	02	00	00	00	00	02
<b>Total</b>	<b>60</b>	<b>17</b>	<b>07</b>	<b>08</b>	<b>08</b>	<b>100</b>

In our study we studied 100 patients undergoing spinal anaesthesia. Mean age of the patients was  $49.3 \pm 3.1$  years. Majority of the patients were from the age group of 50-60 years (32%) followed by 30-39 years (30%). Patients in the age group of 20-29 years and 40-49 years were 21% and 17% respectively. In our study, 80% of the patients were male and 20 % patients were female. Male to female ratio was 4:1. Out of total 100 patients 59 patients underwent lower limb surgeries and 41 patients underwent lower abdomen surgeries. Table 1 shows voiding difficulty in patients after spinal anaesthesia. Majority of the patients had spontaneous Voiding without difficulty G0 (60%). Voiding with difficulty (G1) was observed in 17% patients. Intermittent single evacuation of bladder (G2) was seen in 7% patients. Intermittent repeated evacuation of bladder (G3) was observed in 8% patients. Continuous catheterization was seen in 8% patients. Thus in our study incidence of post operative urinary retention was 40%. Table 2 shows Voiding difficulty in patients according to age group. In age group of 20-29 years, out of total 21 patients had no voiding difficulty. None of the patient had voiding difficulty. In age group of 30-39 years 25 (83.33%) patients had no urinary retention and 16.67% patients had Grade 1 difficulty in voiding urine. In age group of 40-49 years, out of total 17 patients majority 12(70.59%) had no urinary retention 4 patients (23.53%) had grade 1 difficulty in voiding urine and 1 patient (5.88%) had grade 2 difficulty in voiding urine. In the age group of 50-60 years, only 2 patients were not having difficulty in urine voiding remaining 30 patients had difficulty in passing urine. Grade 1 difficulty was seen in 8(25%) patients and grade 2 difficulty was seen in 6(18.75%). Grade 3 and grade 4 difficulty was observed in 25% patients each. Thus we can conclude that as the age increases there is increase in voiding difficulty of the patients post operatively.

Significant increase in the voiding difficulty in patients with increase in age was observed ( $p < 0.05$ ). Table 3 shows Voiding difficulty in patients according to sex. Out of total 100 patients 80 were male and 20 were female. Among male majority 47(58.75%) were not having any difficulty in voiding urine. 14 patients had grade 1 voiding difficulty and 4 patients had grade 2 voiding difficulty. In females 65% females did not have any difficulty in voiding urine after spinal anaesthesia. Males show higher difficulty in voiding urine than females but the difference was not statistically significant ( $p > 0.05$ ). In our study, 75 patients were without any associated co morbidity. 10% patients had Diabetes mellitus. Hypertension and respiratory diseases were seen in 7% and 6% patients respectively. One patient had both diabetes and hypertension. Table 3 shows voiding difficulty in relation to co morbidities. In patients with diabetes mellitus 7/10 (70%) patients required catheterization. In respiratory diseases 2/6(33.33%) patients required catheterization. In hypertensive patients 6/7 (85.71%) patients required catheterization. The patient with both DM and hypertension required catheterization. Thus we can say that Diabetes mellitus and hypertension are risk factors for development of post operative urinary retention. Table 5 shows voiding difficulty in relation to sensory block. In our study, out 100 patients, majority of the patients had T6 blockade (53%) followed by T5 (31%). We found that maximum height of sensory level was T4 and minimum being T8 sensory level. T 7 blockade was observed in 12% patients. T4 and T8 level blockade was observed in 2% patients each. In T6 level blockade 8/53 (15.09%) patients required catheterization. In T5 level blockade 13/31(41.93%) patients required catheterization. At T 7 blockade level 1/12 (8.33%) patients required catheterization. At T8 level blockade no one required catheterization. In our study there was no significant variation in post operative urinary retention in relation to height of sensory block level.

## DISCUSSION

In our study we studied 100 patients undergoing spinal anaesthesia. Mean age of the patients was  $49.3 \pm 3.1$  years. Majority of the patients were from the age group of 50-60 years (32%) followed by 30-39 years (30%). In our study, 80% of the patients were male and 20 % patients were female. Male to female ratio was 4:1. In our study, Majority of the patients had spontaneous Voiding without difficulty G0 (60%). Voiding with difficulty (G1) was observed in 17% patients. Intermittent single evacuation of bladder (G2) was seen in 7% patients. Intermittent repeated evacuation of bladder (G3) was observed in 8% patients. Continuous catheterization was seen in 8% patients. Thus in our study incidence of post operative urinary retention was 40%. In our study we found that as the age increases there

is increase in voiding difficulty of urine in the patients post operatively. Significant increase in the voiding difficulty in patients with increase in age was observed in our study ( $p < 0.05$ ). In a study conducted by Lee and colleagues (2007)<sup>5</sup> it was demonstrated that post operative urinary retention increases with age and the risk increases by 2.4 to 2.6 time in patients over 50 years of age is due to progressive neuronal degeneration leading to bladder dysfunction.<sup>6,7</sup> In a study undertaken by Hollma *et al.*, 376 men undergoing hip arthroplasty were assessed for post operative urinary retention (defined in their study as inability to void after surgery for which single or indwelling catheter is required) it was demonstrated that that increasing age was an independent risk factor for POUR.<sup>8</sup> This is similar to finding in our study where we found that incidence of grade 3 and grade 4 voiding problems, that is need for frequent evacuations and / or persistent catheterization was most prevalent in patients having age more than 50 years, where as it was negligible in younger patients. In our study, when comparison of different age groups was done in relation to requirement of catheterization for voiding difficulty, it was found that, none of the subjects in 20-29 and 30-39 years required catheterization. While in age group of 40-49 years catheterization rate was 5.8% and in the age group of 50-60 years it was 68.7%. Among male majority 47(58.75%) were not having any difficulty in voiding urine. 14 patients had grade 1 voiding difficulty and 4 patients had grade 2 voiding difficulty. In females 65% females did not have any difficulty in voiding urine after spinal anaesthesia. Males show higher incidence of difficulty in voiding urine than females but the difference was not statistically significant ( $p > 0.05$ ). In a study conducted by Tammela *et al.* (1986)<sup>9</sup>, it was found that higher incidence of post operative urinary retention has been reported in males as compared to women.<sup>10,11</sup> The difference thus found has already been found probably due to gender specific pathologies such as benign prostatic hypertrophy in males.<sup>11,12</sup> Possible reasons for sex related differences in urinary tract anatomy and physiology between male and female. Male urethra is longer and more tortuous than female urethra. There is also a presence of prostate in male which may enlarge in benign prostatic hypertrophy, thus obstructing to flow of urine. All these factors contribute in increased resistance for urinary flow leading to higher incidence in males. Diabetes mellitus and hypertension are risk factors for development of post operative urinary retention. In a study conducted by Dreijer *et al.* (2011) demonstrated diabetes mellitus as independent risk factors for development of post operative urinary retention after spinal anaesthesia.<sup>13</sup> Also in another study conducted by Petros *et al.* (1991) they found that diabetes mellitus as independent risk factor for development of POUR.<sup>11</sup> In

our study there was no significant variation in post operative urinary retention in relation to height of sensory block level. Detrusor muscle is completely relaxed after 2-5 minutes of spinal anaesthesia and its recovery depends on the duration of sensory block above the S2 and S3 sacral segments. Sensory block is regressed to S3 level after 7-8 hours post spinal anaesthesia. After the regression of sensory block to S3 level it further takes approximately 15 minutes for detrusor muscles functions to start, it may take 1-3 hours post sensory regression for normal function of detrusor to start (Axelsson *et al.*).<sup>4</sup> Thus it has been found in literature that detrusor activity normalises after S3 segment becomes free of effects of local anaesthetic agents. Thus theoretically higher the level of block, bladder function should take more time to normalise, but in studies it has been found that level of spinal blockade from short and intermediate acting drugs don't have any effect on bladder dysfunction.<sup>14</sup> Also in other study conducted by Keutziger *et al.* 2010 they found that level of blockade after spinal local anaesthetic agents is not an aggravating risk factor for post operative urinary retention.<sup>15</sup>

## CONCLUSION

Incidence of POUR was more in age >50 years and male sex with incidence of 40%. No effect was seen on incidence of POUR with high level of sensory blockade.

## REFERENCES

1. Jonnesco T. Remarks on general spinal analgesia. Br Med J. 1909;2:1396-401.
2. Pertek JP, Haberer JP. Effects of anaesthesia on postoperative micturition and urinary retention [French]. Ann Fr Anesth Reanim 1995;14:340-351.
3. Lanz E, Grab BM. Micturition disorders following spinal anaesthesia of different durations of action (lidocaine 2% versus bupivacaine 0.5%) [German]. Anaesthetist 1992;41:231-234.
4. Axelsson K, Mollefors K, Olsson JO, *et al.* Bladder function in spinal anaesthesia. Acta Anaesthesiol Scand 1985;29:315-21.
5. Lee SJ, Kim YT, Lee TY, Woo YN, Analysis of risk factors for acute urinary retention after non-urogenital surgery, Korean JUrol 2007;48:1277-1284. 116 30.
6. Warren JW, Platt R, Thomas RJ. Antibiotic irrigation and catheter-associated urinary-tract infections. N Engl J Med. 1978;299:570-3.
7. Yoshimura N, Chancellor MB: Physiology and pharmacology of the bladder and urethra, Campbell-Walsh Urology, 9th edition. Edited by Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA. Philadelphia, Elsevier, 2006, pp 1922-79.
7. Keita H, Diouf E, Tubach F, Brouwer T, Dahmani S, Mantz J, Desmots JM: Predictive factors of early postoperative urinary retention in the postanesthesia care unit. Anesth Analg 2005; 101:592-6Keita, H Diouf, E

- Tubach, F Brouwer, T Dahmani, S Mantz, J Desmonts, JM.
8. Gallo, Susan; Dupand, Jacqueline; Pshon, Nicole orthopaedic Nursing: March-April 2008 – volume 27 – Issue 2 –P41-115.
  9. Tammela T, Kontturi M, Lukkarinen O: Postoperative urinary retention. II. Micturition problems after the first catheterization. Scand J Urol Nephrol 1986; 20:257–60Tammela, T Kontturi, M Lukkarinen, O.investigation before and after operative in a consecutive series. AnnSurg 1980; 191:8.
  10. Coombes GM, Millard RJ: The accuracy of portable ultrasound scanning the measurement of residual urine volume. J Urol 1994; 152:2083–5.
  11. Petros JG, Rimm EB, Robillard RJ, Argy O: Factors influencing postoperative urinary retention in patients undergoing elective inguinal herniorrhaphy. Am J Surg 1991; 161:431–3.
  12. Petros JG, Mallen JK, Howe K, Rimm EB, Robillard RJ: Patient-controlled analgesia a postoperative urinary retention after open appendectomy. Surg Gynecol Obstet 1993; 177:172–5.
  13. Dreijer B, Moller MH, Bartholdy J. Post-operative urinary retention in a general surgical population. Eur J Anaesthesiol. 2011;28:190-4.
  14. Baldini G, Bagry H, Aprikian A, Carli F. Postoperative urinary retention: anesthetic and perioperative considerations. Anesthesiology. 2009;110:1139-57. Kreutziger J, Frankenberger B, Luger TJ, Richard S, Zbinden S. Urinary retention after spinalanaesthesia with hyperbaric prilocaine 2% in an ambulatory setting. British Journal of Anaesthesiology. 2010;104 (5):582-6.

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