

## Original Research Article

# POUR after spinal anesthesia in lower limb orthopaedic surgeries-a prospective study

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### ABSTRACT

**Background:** Postoperative urinary retention (POUR) is a common problem with overall rates looking at the entire surgical population quoted between 4% and 6%. POUR has been defined as the inability to void in the presence of a full bladder.

**Methods:** This was a prospective, single-centre, observational study conducted between June 2015 to December 2016 at a tertiary care centre of Northern India. The study group enrolled 186 patients undergoing various lower limb surgeries under spinal anesthesia.

**Results:** In the present study, out of 186 patients, 101 patients were male and 85 patients were female. Most of the patients were in the 41-60 years age group (78) followed by 72 patients were in the >61 years age group. 21 patients (11.29%) suffered with post operative urine retention (POUR) in whom catheterization was required, the incidence of POUR in joint replacement surgeries was 20.96% (13/62). In the present study incidence of POUR was more in males (12 patients) as compared to females (9 patients). POUR was more common in the elderly age group.

**Conclusions:** By carefully identifying patients at risk, adopting appropriate anesthetic techniques and perioperative care principles and accurately monitoring bladder volume by ultrasound, POUR may be prevented and the associated morbidity minimized. Hence it becomes imperative to evaluate the true incidence and consequences of POUR in large prospective clinical studies. Spontaneous micturition should remain a criterion for discharge after spinal anaesthesia.

**Keywords:** Arthroplasty, Catheterization, Lower limb surgeries, POUR, Spinal anaesthesia

### INTRODUCTION

Postoperative urinary retention (POUR) is a common problem with overall rates looking at the entire surgical population quoted between 4% and 6%.<sup>1,2</sup> POUR has been defined as the inability to void in the presence of a full bladder. The incidence of POUR varies according to the type of surgery. Although the incidence of POUR in general surgical population is around 3.8%, the incidence in joint arthroplasty varies widely (10.7-84%).<sup>3-8</sup>

Spinal anaesthesia is quick, cost-efficient, and safe, and seems ideal for lower limb orthopaedic operations.<sup>9</sup> Urinary retention after spinal anaesthesia has a reported incidence between 0% and 69%, which is why successful micturition is still an important discharge criterion in many centres.<sup>10,11</sup> Urinary retention is a common complication following any surgical procedure, including total joint arthroplasty. Urinary retention is usually treated with intermittent or indwelling urinary catheterization. The use of urinary catheters is associated with an increased prevalence of postoperative urinary

tract infection, with the duration of catheterization being the most significant risk factor associated with the development of urinary tract infection.<sup>12,13</sup>

**METHODS**

This was a prospective, single-centre, observational study conducted between June 2015 to December 2016 at a tertiary care hospital in northern India. Inclusion criteria were patients aged >18 years and ASA grade I-II, undergoing surgery of the lower limb lasting (knee and hip arthroplasty, trauma surgeries for lower limb) and informed consent for spinal anaesthesia and surgical procedure. All patients received spinal anaesthesia with 15 to 30mg of 0.5% bupivacaine. Exclusion criteria were prostate hyperplasia or urogenital pathologies (incontinence, cysto-ureteric reflux, known bladder retention), intraoperative blood loss >200 ml, pregnancy, alcohol or drug abuse, contraindications to or failure of spinal anaesthesia, or incomplete data records. The study group enrolled 186 patients undergoing various lower limb surgeries under spinal anaesthesia.

All patients followed a uniform preoperative food and liquid intake protocol. Patients were allowed to drink clear fluids up to 2 h before induction of anaesthesia. All patients voided before transfer to the operating area.

After surgery, patients were allowed to drink freely. Pain was measured on a numeric rating scale (0-10). All patients received acetaminophen (1000 mg) and diclofenac (75mg) i.v. after the end of surgery. Additional analgesics were administered according to a standardized protocol if numeric pain score was >3. The study group was monitored for postoperative urinary retention on the basis of symptoms and with use of bladder ultrasound scans performed by hospital. Ultrasound scans of the bladder were performed four hours after surgery if the spontaneous micturition had not occurred. It should be noted that ultrasound bladder scans used to diagnose urinary retention after spinal anaesthesia are part of daily clinical routine. Urinary retention was defined as a bladder volume >600 ml together with the inability to micturate.<sup>14</sup> Patients were catheterized when these criteria were met.

**RESULTS**

This study was carried out in 186 patients out of which 101 were male and 85 were female as shown in Table 1.

**Table 1: Gender distribution of patients.**

Gender	No. of patients	%
Male	101	54.30
Female	85	45.7
Total	186	100

Most of the patients were in the elderly age group as shown in Table 2. 41.93% of the total patients in 41-60

years age group followed by 38.70% in the >61 years age group. Only 19.35 of the patients were in <40 years of age. Most of the surgeries were done trauma for hip and femur fractures as shown in Table 3.

Joint replacement or arthroplasty surgeries done were accounting for 33.33% (62 Patients) of total study group. 21 patients suffered with post-operative urine retention (POUR). 13 patients of arthroplasty surgeries had POUR. Most of the patient with POUR were male i.e. 12 out of 21 patients as shown in Table 5.

**Table 2: Age distribution of patients.**

Age group	No. of patients	%
18-40	36	19.35
41-60	78	41.93
>61	72	38.70
Total	186	100

**Table 3: Type of surgery.**

Type of surgery	No. of patients	%
DHS	45	24.19
I/I femur nail	32	17.20
Long PFN	27	14.51
Bipolar hemiarthroplasty	26	13.97
THR	24	12.92
TKR	12	6.45
DPLP	12	6.45
Hybrid fixator for tibia	6	3.33
Knee arthrodesis	2	1.07
Total	186	100

**Table 4: Frequency of post-operative urine retention (POUR).**

Type of surgery	No. of pour
THR	5
Bipolar hemiarthroplasty	5
TKR	3
DHS	2
Long PFN	3
I/I femur nail	2
Knee arthrodesis	1
Total	21

**Table 5: Gender wise POUR distribution.**

Gender	Number of patients	%
Male	12	57.14
Female	9	42.85
Total	21	100

**DISCUSSION**

Postoperative urinary retention (POUR) is a common problem with overall rates looking at the entire surgical population quoted between 4% and 6%.<sup>1,2</sup> the incidence

in joint arthroplasty surgeries varies widely (10.7-84%).<sup>5-8</sup>

Currently, there is no standard protocol for the implementation and maintenance of indwelling catheters for elective joint arthroplasty and various other hip and knee surgeries. At many institutions, including ours, indwelling urinary catheters are utilized routinely for patients undergoing neuraxial anesthesia (spinal anesthesia) because of the theoretical risk of development of a neurogenic bladder. The hypothesis of the current prospective study was to study the prevalence of urinary retention post operatively (POUR).

In the present study, out of 186 patients, 101 patients were males and 85 patients were female. Most of the patients were in the 41-60 years age group (78) followed by 72 patients were in the >61 years age group. Most common surgeries performed were DHS followed by femur nail and joint arthroplasty. Mean time required for surgeries was 68 minutes (range 50 to 122 minutes).

In our study all patients were monitored for postoperative urinary retention on the basis of symptoms and with use of bladder ultrasound scans performed by hospital radiologist. Patients who had not voided within four hours and had a urine volume of >400 mL as measured with ultrasound were managed with catheterization. If the patient had a volume of <400 mL as measured with ultrasound, the bladder scan was repeated in two hours.

Out of 186 patients, 21 patients (11.29%) suffered with post-operative urine retention (POUR) in whom catheterization was done. 15 patients required catheterization after 4 to 6 hours of surgery when patients complain of urine retention signs and symptoms, 3 patients had urine overflow on the first night so required catheterization. The mean volume of urine in these patients was 625 mL (range, 450 to 800 mL).

Davis et al, in a retrospective study of sixty-two patients undergoing total hip arthroplasty, reported that the incidence of postoperative urinary retention following spinal anesthesia was significantly lower than that after epidural anesthesia (21.8% compared with 46.7%) ( $p < 0.05$ ).<sup>15</sup> In our study the incidence of POUR in joint replacement surgeries was 20.96% (13/62) which is comparable with study of Davis et al study.

In the present study incidence of POUR was more in males (12 patients) as compared to females (9 patients). POUR was more common in the elderly age group. POUR has been shown to increase with age, with the risk increasing by 2.4 times in patients over 50 yr of age. A higher incidence of POUR has been reported in men (4.7%) compared to women (2.9%)<sup>16</sup> Possible reasons for such age and gender influences include age-related progressive neuronal degeneration leading to bladder dysfunction and gender-specific pathologies such as benign prostatic hypertrophy among others.<sup>16,17</sup>

The main limitation of this study is the relatively low number of patients and the overall low number of catheterizations (n=21). Therefore, the findings and conclusions of this study require prospective validation in a larger study population.

In conclusion, we found an incidence of postoperative urinary retention of 11.29% in patients undergoing lower limb orthopaedic surgery under spinal anaesthesia. The incidence was higher males and in the elderly age group. Ultrasound bladder scans enabled reliable assessment of urinary volume and have the potential to become the standard of care in the postoperative care unit, but further prospective studies are required.

## CONCLUSION

In conclusion, several anesthetic and nonanesthetic factors contribute to the development of POUR in the surgical patient. By carefully identifying patients at risk, adopting appropriate anesthetic techniques and perioperative care principles and accurately monitoring bladder volume by ultrasound, POUR may be prevented, and the associated morbidity minimized. Hence it becomes imperative to evaluate the true incidence and consequences of POUR in large prospective clinical studies. Spontaneous micturition should remain a criterion for discharge after spinal anaesthesia.

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