

Original Article

Evaluation of Risk Factors of Postoperative Urinary Retention in Male Patients Undergoing Surgery Under Spinal Anaesthesia : A Prospective Study

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Background : Postoperative Urinary Retention (POUR) is common after regional anaesthesia with a reported incidence between 5% and 70%. POUR can lead to significant morbidity with additional surprise and mental trauma to the patient when unwarned. This study aimed to assess the occurrence of POUR in male patients undergoing Surgery under Spinal Anaesthesia and to study the risk factors related to it.

Methods : 692 male patients were analysed prospectively for the need for catheterisation which was defined as “the inability to void in the immediate Postoperative period with accompanying discomfort and a palpable Bladder.” All such patients were catheterised as an emergency. A record was made about the mean age, surgical condition, comorbidities, duration of Surgery, use of intra-operative sedatives, intra-operative fluid infused and International Prostate System Score (IPSS).

Results : The overall mean age of patients with POUR was 46 years. The incidence of POUR was highest among Perianal Surgeries ie, 52/70 (13%) followed by Hernia Surgeries, 18/70 (6.3%). An appreciable reduction was observed in urinary retention after administration of intra-operative sedatives ($p=0.022$) and lower IPSS ($p=0.001$). Factors such as age, intra-operative fluid administration, duration of Surgery and previous history of Diabetes did not reach statistical significance as being predictive of urinary retention.

Conclusion : An IPSS greater than 7 increases the risk of Postoperative Urinary Retention while the use of intra-operative Sedative in combination with Spinal Anaesthesia decreases the risk. In high-risk patients undergoing perianal procedures, pre-operative patient counselling about the possibility of Postprocedure retention is recommended.

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Key words : Postoperative Urinary Retention, Spinal Anaesthesia, Catheterisation, IPSS, Intra-operative Sedatives.

Postoperative Urinary Retention (POUR) refers to the patients' inability to void urine in spite of a full bladder in the postoperative period following surgical intervention¹. The reported incidence varies between a wide range of 5% and 70%^{2,3}. This extensive variability may be due to the presence of multiple definitions of POUR, types of surgery and anaesthesia used, differences in patient profiles and the perioperative fluid therapy utilized⁴. Untreated cases

Editor's Comment :

- Perianal procedures have a higher incidence of Postoperative Urinary Retention (POUR) as compared to Hernia repair.
- An International Prostate System Score (IPSS), score of more than 7 is a risk factor for retention while the administration of intra-operative sedatives in combination with regional anaesthesia reduced the incidence of POUR.
- Variables such as intra-operative fluid infused, diabetes mellitus, age of the patient and duration of surgical procedure did not significantly contribute to urinary retention in our study.

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of POUR can lead to significant morbidity such as prolongation of in-hospital stay, Urinary Tract Infections, Detrusor Muscle Dysfunction, Delirium, Cardiac Arrhythmias, etc⁵. These have thus led to an increasing focus on early detection of POUR. The current study was conducted to investigate the occurrence of Postoperative Urinary Retention in male patients undergoing surgery under Spinal anaesthesia and to study the contributing risk factors.

MATERIALS AND METHODS

All male surgical patients admitted to our Tertiary Care Centre from June, 2017 to November, 2019 were included in this prospective study. Within this cohort, a total of 692 patients who underwent surgery under Spinal anaesthesia were analysed. POUR was defined as “the inability to void in the immediate postoperative period with accompanying discomfort and a palpable Bladder.” Patients above the age of 18 years were included while those who had been electively catheterized during surgery and those with post-Transurethral Resection of the Prostate (TURP) were excluded from the study.

The operative procedures were broadly divided into Hernia, Perianal Surgeries and others. Operative procedures for Hernia included those for Inguinal, Incisional and Umbilical hernias while Perianal procedures were performed for Perianal Fissures, Fistula-in-ano, Hemorrhoids and perianal abscesses. ‘Other’ procedures included surgery for Hydrocele, Varicose Veins and Paraphimosis.

Three methods were used for the diagnosis of POUR namely history and clinical examination, Bladder catheterization and Ultrasonographic assessment². The primary outcome of this study was to study the contribution of mean age, type of surgical procedure, duration of Surgery (in minutes), intra-operative Sedative use, intra-operative fluid volume and IPSS score to Postoperative Urinary Retention. A p-value of <0.05 was considered to indicate statistical significance.

RESULTS

The mean age of the patients in this study was 46 years (from 18 to 87 years). There was no difference in age between those who voided and those who had retention after Hernia or Perianal surgery ($p=0.405$) (Table 1). Among the 692 patients subjected to various surgeries, the occurrence of POUR was seen in a total of 70 patients (10.1%). This was found to be maximum in perianal surgeries, 52 (13%) followed by hernia surgeries 18 (6.3%). When comparing individual surgeries, POUR was found to be maximum in bilateral indirect inguinal hernia (20%)

followed by Perianal abscess (17.81%), Hemorrhoids (17.2%) and Fissure-in-ano (12.1%). The difference of proportion among the different types of surgeries: hernia, perianal and ‘others’ with the development of POUR was found to be statistically significant ($p=0.013$).

A significant reduction in urinary retention was reported following administration of Intravenous (IV) sedative, midazolam (1 mg) intra-operatively along with spinal anaesthesia ($p=0.022$). Additionally, a higher IPSS (greater than 7) was associated with POUR ($p<0.001$) (Table 1).

For purpose of analysing the effect of intra-operative fluids, patients were divided into two groups, those who received up to 1000 ml of intra-operative fluids and those greater than 1000 ml. The study failed to show an association of POUR to the amount of intra-operative fluid administered ($p=0.691$).

Urinary retention was found to be more in diabetic patients as opposed to non-diabetics and in cases where the average duration of Surgery was longer (more than 60 minutes), however, a significant p-value was not obtained for both these parameters, $p=0.611$ and 0.401 respectively.

DISCUSSION

Postoperative Urinary Retention is common among surgical patients and may prolong the in-hospital stay and cause significant pain and morbidity⁶. It is important to identify patients with perioperative risk factors to avoid potential complications in the postoperative period⁴. Three methods have been described to diagnose urinary retention which includes physical examination, Bladder catheterization and

Table 1 — Factors affecting Postoperative Urinary Retention (POUR)

Variable	Voided	POUR	Incidence of POUR (%)	P-value
Mean Age				0.405
Up to 50 years	386	47	10.9	
More than 50 years	236	23	8.9	
Intra-operative sedative				0.022
Administered	87	3	3.3	
Not administered	535	67	11.1	
Intra-operative fluid administered				0.691
Up to 1000 ml	432	47	9.8	
More than 1000 ml	190	23	10.8	
International Prostate Symptom Score (IPSS)				0.001
Up to 7	589	59	9.1	
More than 7	33	11	25	
Duration of surgery (in minutes)				0.401
Up to 60 minutes	460	55	10.7	
More than 60 minutes	162	15	8.5	
Diabetes Mellitus				0.611
Yes	84	11	11.6	
No	538	59	9.9	

Ultrasonographic assessment². In our study, 70 (10.1%) patients developed urinary retention.

Age has been known to increase the risk of POUR in patients over the age of 50 years^{2,7,8}. Alex, *et al* also demonstrated that older individuals were at significant risk (67.7 versus 62.0 years, $p < 0.0001$)⁹. However, in our study, there was no difference in the age groups ($p = 0.405$).

An association between the type of surgical procedure and the incidence of POUR has been reported in the literature. The incidence of POUR has been reported to be higher in patients undergoing Anorectal Surgeries and varies with a wide range between 1% and 52%⁷. This may be attributed to the risk of injury to Pelvic Nerves and a pain-evoked reflex increase in the tone of the internal sphincter⁷. The risk of POUR in two studies was found to be higher in haemorrhoidectomy Surgery with the incidence of 21% and 34% respectively^{7,10}. Similarly, POUR was found to be higher among perianal surgeries, 52/70 patients (13%) in our study. However, on comparing individual surgeries, POUR was found to be maximum in bilateral indirect Inguinal Hernia (20%) followed by Perianal Abscess (17.81%), hemorrhoids and Fissure-in-ano. Blair, *et al* studied the incidence of POUR among Hernia Surgeries and found that the occurrence of POUR in bilateral Inguinal Hernias was 16.7%, as compared to 17.39% in the present study¹¹.

Administration of intravenous sedative along with Spinal anaesthesia resulted in the reduction of postoperative pain and subsequent reduction of the incidence of POUR and revealed a highly significant correlation ($p = 0.022$). Similar studies showed that the analgesic effect of Spinal Anaesthesia was potentiated by the administration of IV midazolam, resulting in a significant reduction of Postoperative Urinary Retention ($p < 0.01$, 0.028 and < 0.05 respectively)¹²⁻¹⁴.

The International Prostate Symptom Score (IPSS) has been used to assess the lower urinary tract in patients suffering from Bladder outlet obstruction as a result of prostatic enlargement¹⁵. It was observed from this study that when the IPSS was more than 7, there was a significant increase in the occurrence of POUR ($p < 0.001$). Other reports also demonstrated that patients with increased IPSS (> 8) had a higher chance of developing POUR¹⁶.

It is expected for urinary retention to be higher with excessive administration of intravenous fluids as a result of overdistension of the bladder. Studies have demonstrated a significant correlation between intra-operative fluid administration and POUR ($p < 0.0001$)^{3,17}. An increased intra-operative fluid support (> 1000 ml)

failed to increase the risk of POUR in the current study, as was reported in other studies^{6,7}.

There are contradictory reports in the literature regarding the duration of surgery and the risk of POUR. Many studies determined that the increase in mean surgery time was associated with an increased risk of urinary retention in the postoperative period^{3,8,18}. A direct correlation was observed in our study between the mean operating time (more than 60 minutes) with the development of POUR. However, this difference was not significant.

Diabetes Mellitus was found to be significantly associated with the development of POUR in many studies ($p = 0.039$, 0.004, < 0.01)^{4,19,20}. Another study consisting of 20,77,045 patients described the association of Diabetes to POUR ($p < 0.0001$)⁹. In our study, the contribution of Diabetes to POUR was not established ($p = 0.611$). Similarly, another study failed to demonstrate a significant correlation between diabetes and urinary retention ($p = 0.56$)¹¹.

CONCLUSION

Perianal procedures have a higher incidence of POUR as compared to Hernia repair. An IPSS score of more than 7 is a risk factor for retention while the administration of intra-operative sedatives in combination with regional anaesthesia reduced the incidence of POUR. Variables such as intra-operative fluid infused, Diabetes Mellitus, age of the patient and duration of surgical procedure did not significantly contribute to urinary retention in our study. Patient counselling for risk of retention requiring Postoperative catheterization is recommended for patients undergoing Perianal Surgeries with IPSS scores greater than 7.

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