



# Incidence of POUR in Patients Having Undergone Elective Spinal Surgery

Milind Kashyap<sup>a#</sup> and Navin Balasubramaniam<sup>a\*o</sup>

<sup>a</sup> Department of Orthopaedics, Saveetha Medical College and Hospital, Chennai, Tamil Nadu, India.

## Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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## ABSTRACT

**Purpose:** To determine the incidence of POUR (post operative urine retention) in patients that have undergone elective spinal surgeries.

**Methods:** This was a retrospective study carried out in the Department of Orthopaedics and was done by reviewing the post operative records of 150 patients that had undergone elective spinal surgery in the past 8 months and prospectively checked for POUR afterward.

**Results:** The end results show that out of the total number of patients studied, which is 148, (excluding 2 according to the exclusion criteria), 14 developed POUR at the end of the 8-month study while 134 remained unaffected, making the total incidence to be 9.4% for this study.

**Keywords:** POUR; elective spinal surgery; retrospective study.

## 1. INTRODUCTION

POUR (post operative urinary retention) is one of the most common complications of long-term anesthesia and surgical procedures. One of the more common surgeries that can predispose to

the development of POUR is orthopedic and spinal surgeries, apart from anorectal surgeries and hernia repairs, and the risk increases in higher age groups. The process of urination is composed of two basic processes or stages, filling and voiding. During the first stage, the

# 3rd MBBS Part II,

<sup>o</sup> Assistant Professor;

\*Corresponding author;

thoracolumbar section of the spinal cord that sends innervations to the bladder by the way of the hypogastric nerves inhibits the mobility of the detrusor muscle, letting the bladder fill up. During the second stage, the pelvic nerve innervation which is parasympathetic in nature activates the detrusor muscle and relaxes the bladder smooth muscles, leading up to voiding of the urine. Surgeries involving the spinal cord and the spine may interfere with the normal functioning of this filling and voiding mechanism, owing to the usage of local and epidural analgesics and anesthetics involved, predisposing the patients to develop POUR.

POUR may further predispose the patient to develop acute or chronic urinary retention, bladder and kidney damage, urinary tract infection, prolonged hospital stay, and significant mental and physical distress.

Another mechanism relating to the development of urinary retention in postoperative periods is the usage of perioperative medications such as opioids in particular.

Also, elimination of the anatomy playing a vital role in micturition as a result of the invasive surgical procedures can lead to POUR as well.

## 2. METHODS

The retrospective study was carried out in the Orthopaedic postoperative department of Saveetha Medical College and Hospital. Over a period of 8 months, the records of a total of 150 patients were studied retrospectively and the incidence of development of symptoms and signs of POUR in them was noted.

### 2.1 Exclusion criteria

Patients with urinary retention developed as a result of complications such as epidural abscesses or hematomas, and patients on end-stage renal dialysis.

## 3. RESULTS

At the end of the 8 months of the retrospective analysis of the patients' records, the following data was collected in regards to the basic parameters that were paid attention to.

Out of the total 148 patients that were studied in the prospect, 14 (9.4%) were found to show signs and symptoms of Urinary retention at the end of the study, while 134 (90.45%) patients did not show these signs or symptoms. Out of those

14, 5 (35.71%) males and 9 (64.28%) females showed these, while out of the non-symptomatic 134, 64 were males and 70 were females. Out of the ones that showed urinary retention, 3 (21.42%) had undergone cervical level surgery, 1 (14%) thoracic and 10 (71.42%) had gone through lumbar level surgeries. 3 (21.42%) out of the 14 had a previous history of retention, while 1 (0.74%) out of the 134 had any previous history. 5 (35.71%) out of the ones that showed signs and symptoms of Urinary retention at the end of the study had a history of diabetes mellitus while 36 (26.86%) had DM out of the latter 134. Similarly, 1 patient out of each of the group had presented with retention. 4 (28.57%) out of the 14 presented with constipation while 7 (5.22%) out of the 134 presented with constipation. One patient (14%) out of the 14 had a history of incontinence, while 6 (4.47%) out of the latter group had it. Out of the 14 that were found to have POUR, 11 (78.57%) had been catheterized with Foley's catheter, while 52 (38.80%) amongst the latter 134 had been catheterized. 2 (14.28%) out of the 14 had intraoperative complications, while only 9 (6.71%) out of the latter 134 had any complications.

The risk factors that could have had any significance were the female gender, chronic constipation, UTI, and catheterization with Foley's catheter. The results have been counted in the table below.

Females were found to be 1.64 times more likely to have POUR than men. Those with chronic constipation were 7.25 times more likely to develop POUR, while those with UTI had a 2.62 times higher risk. Those catheterized had a 5.78 times higher risk of developing POUR.

## 4. DISCUSSION

Large research conducted on the relationships between the risk factors for developing Post Operative Urinary Retention, a total of 31,251 patients were kept records of where at the end of the study 2858 patients had developed POUR while 28,393 patients hadn't [1]. The scope of the cited study was greater than this one. Male patients were found to have a higher risk of POUR [1] which contrasts with our studies. Prevalent environmental conditions and local cultural differences could be the reasons. In the cited study risk factors found significant were benign prostatic hyperplasia, diabetes mellitus, and previous urinary tract infection, [1] while this study found only previous urinary tract infections amongst those as its risk factors while the rest

differed. In regards to the levels of surgery, the cited study found that the lesser the levels operated upon, the lesser was the risk, while this study found that the risk was highest with lumbar surgeries (71.42%) while least for thoracic (14%) [1]. Another study analyzed 397 patients and the incidence was found to be 8.8% [2] which was lower compared to this study, which had an incidence rate of 9.4%. Better surgical procedures and environmental conditions could be the reason. Moreover, the risk factors were found to be benign prostatic hyperplasia, chronic constipation, and prior urinary retention [2], which had more in common with this study. Another study reported an incidence rate of 24.8% in the development of POUR [3]. The risk factors in this cited study were found to be increasing age and a prevalence of it in males more than females [3]. Our study found a similar pattern with the age of the patients but contrasted with the gender predisposition of the cited study. Yet another study analyzed 200 patients out of which 19 developed incidences of POUR. It found the incidence to be independent of the total number of levels operated upon [4], which contrasted with our study. Another study by Gabrielle et al found the incidence higher in men again, while

higher incidences in the patients that had been catheterized [5], the former in contrast while the latter finding similar to ours. Gandhi et al conducted another research involving 647 patients out of which only 36 developed POUR [6]. The significant risk factors were found to be the male gender, benign prostatic hyperplasia, age, diabetes, and depression [6] which shared some similarities with ours. Another study conducted by Sungjoon Lee et al. [7] found their incidence rate to be 27.1% [8], significantly higher than ours. Similar to this study, the cited one found the age of the patient to be a significant risk factor. An incident rate of 38% was noted by another study that studied the prospects after cervical and lumbar surgeries only [9], while ours studied thoracic in addition. Studies conducted by Gönüllü et al found a 24% incidence in men and a 15% incidence in women after general surgeries, contrasting our study on only spinal surgeries [10]. A study by Stallard et al tried establishing a relationship between intraoperative opiate use and retention and found that the two were directly related [11], while our study focused more on surgery and not on medication usage during surgery.

**Table 1. Basic parameters**

Parameter	Urinary Retention	no Urinary Retention	p-Value
No. of patients	14 (9.4)	134 (90.45)	
Sex			
M	5 (35.71)	64	0.38
F	9 (64.28)	70	
Surgery Level			0.24
Cervical	3 (21.42)	52	
Thoracic	1 (14)	8	
Lumbar	10 (71.42)	74	
Age			<0.001
Mean	61.3 (8)	54 (13.7)	
Median	63 (14)	55 (18)	
Range	37-82	21-82	
History of Retention	3 (21.42)	1 (0.74)	<0.001
History of DM	5 (35.71)	36 (26.86)	0.48
Presenting with Retention	1	1	0.04
Presenting with Constipation	4 (28.57)	7 (5.22)	0.002
Presenting with incontinence	1 (14)	6 (4.47)	0.71
Postop UTI	2 (14.28)	8	0.28
Intraop Foley placement	11	52	0.004
Intraop Complications	2 (14.28)	9 (6.71)	0.30

**Table 2. Associated Risk Factors**

Risk Factor	Odds (CI 95%)	p-Value
Sex (%)	1.64	0.39
Chronic Constipation (%)	7.25	0.005
UTI (%)	2.62	0.24
Foley (%)	5.78	0.009

## 5. CONCLUSION

POUR is one of the most common complications of long-term anesthesia and surgical procedures. One of the more common surgeries that can predispose to the development of POUR is orthopedic and spinal surgeries, apart from anorectal surgeries and hernia repairs, and the risk increases in higher age groups.

The urinary system works as a filter for the body, discarding excess fluid, salt, and metabolic waste products that are not needed. Long-term urinary retention can cause severe physiological and psychological harm to the patient. Surgeries done are common predictors of the development of this condition in patients, owing to the usage of nervous blockers such as anesthesia, beta-blockers, and opiates and analgesics on the body which interfere with the normal functioning of the nervous system. Further severe and debilitating complications, predisposition to diseases and prolonged hospital stay are some of the consequences of POUR.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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