

احتباس ادراری پس از اعمال جراحی

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REVIEW

- 1 Post-operative urinary retention: Review of literature
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which is often underestimated and often gets missed.

POUR refers to patients' inability to void urine in spite of full bladder after the surgical intervention in the postoperative period.

The reported incidence varies for the wide range of 5%-70%.

Occurrence of POUR may depend on the various reasons like 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

The use of ultrasonography to diagnose POUR has gained popularity in recent years.

The various advantages of ultrasound as a diagnostic tool include its non-invasive technique, high accuracy, and absence of any risk of trauma or infection.

MECHANISM OF MICTURITION

- ▶ Micturition is a complex process which can be divided into two phases viz storage phase and voiding phase.
- ▶ Storage phase is mediated through sympathetic innervation whereas voiding phase by parasympathetic fibres. Overall, micturition is a spinal reflex which is further governed by brainstem centres.
- ▶ The capacity of the normal bladder is 400-600 mL.
- ▶ The first urge to void occurs when the bladder volume is approximately 150 mL whereas the sensation of fullness occurs at 300 mL.
- ▶ The pelvic splanchnic nerves carry the reflex from the stretch receptors to the brainstem through afferent fibres when the bladder contains urine more than 300 mL.
- ▶ This activates the voiding phase and the parasympathetic fibres conduct the efferent pathway

Alterations in physiology in perioperative period

- ▶ This can be attributed to the effects of anaesthesia,
- ▶ the surgical procedure performed the intraoperative physiologic stressors, drugs, pain, anxiety etc.
- ▶ Many drugs used in perioperative period such as sedatives, analgesics and anaesthetic agents are known
- ▶ to interfere with the micturition pathway

Table 2. Criteria Used to Define POUR

Clinical Criteria*

Patient discomfort, sensation of a full bladder, palpable, distended bladder^{41,48}

Distended bladder⁶⁵

Discomfort caused by a distended, palpable bladder and inability to void¹¹¹

Patient discomfort or palpable bladder, with a volume of urine > 400 ml^{18,20,21,50,51,83}

Inability to void with bladder distention⁵⁴

Inability to void urine for > 12 h after induction of anesthesia with > 500 ml urine drained on catheterization⁶

Inability to void^{62,66}

Inability to void 8 h after the end of surgery, and the bladder is distended or the patient is uncomfortable³²

Inability to void in 8 h after removal of Foley catheter¹¹²

Need of catheterization in 24 h^{14,17}

Unable to empty the bladder in 10 h, discomfort, and palpable bladder²⁴

Disturbances in micturition as severe/moderate urge to urinate, need of intravenous charbachol¹²⁴

Urinary retention was graded as follows: 0 = none; 1 = mild hesitancy; 2 = straight catheter required; 3 = Foley catheter required¹²²

Micturition score⁸⁴

Catheterization in 48 h after the end of the surgery¹²⁷

Parturient unable to void spontaneously and with a residual volume greater than 500 ml (measured by catheterization) were categorized as urinary retention⁸⁹

Need of Bladder Catheterization/Not Specified Criteria

References 26, 27, 29, 59, 67, 68, 81, 86, 87, 90, 94, 105, 107, 110, 108, 114–116, 132, 133, 135–138, 141–143, 145, 147, 153, 166, 183, 184, 187

Ultrasound Assessment*

Inability to void with a bladder volume > 600 ml in 30 h¹⁹

Inability to void with a bladder volume \geq 500 ml in 30 h⁷

Residual volume > 500 ml⁶¹

Table 1. The risk factors for postoperative urinary retention

Patient related factors	Operation and Anesthesia related factors	Utilized Medicines in the Perioperative Period
-Age	-Type and Duration of Operation	-Anticholinergics (oxybutynin, tolterodine, atropine)
-Sexuality	-Given Liquid Amount in the Postoperative Period	-Antiarrhythmics
-Medical Record of the Patient *Diabetes Mellitus *Existence of a Urinary Problem	-Type and Duration of Anesthesia	-Opioids
-Usage of Cigarettes and Alcohol		-Antipsychotics
-Body Mass Index (BMI)		-Antiparkinsons
-PUR Experience		-Sympathomimetics
-Anxiety		-Beta blockers
-Constipation		-Antihistaminics

Table 1 Various risk factors for urinary retention in the postoperative period

Definitive	Equivocal	Unrelated
Age ^[1,3,5,9,10] ; Pre-existing neurologic abnormality (stroke, cerebral palsy, multiple sclerosis, diabetic and alcohol neuropathy, poliomyelitis) ^[1,9] ; Bladder volume on entry to PACU ^[3] ; Surgical procedure (anorectal, colorectal, urogynaecological) ^[5,7,11,12] ; Intraoperative aggressive fluid administration ^[1,3,5,6,11,13] ; Postoperative pain and need for postoperative analgesia ^[5,7,9,11,14] ; Postoperative opioid use ^[1,5,11]	Gender ^[1,3,7,9,15] ; Preoperative urinary tract pathology ^[5,7,9,16,17] ; Anaesthetic technique (general anaesthesia <i>vs</i> neuraxial anaesthesia) ^[1,2,6,9,10,12,17] ; Duration of surgery ^[1,3,5-7,18]	American Society of Anaesthesiologists physical status ^[18] ; Presence of pelvic drain ^[18] ; Pelvic infection ^[18]

Opioids, commonly used for both intraoperative and postoperative analgesia, are known to cause urinary retention by **blunting the sensation of bladder fullness** (due to parasympathetic inhibition) along with increasing the sphincter tone (due to augmented sympathetic activity).

Neuraxial opioids have been reported to have greater incidence of urinary retention as compared to intravenous administration.

General anaesthetics also predispose to urinary retention as they cause relaxation of smooth muscle and hence decrease bladder contractility. In addition, they may also cause autonomic dys-regulation of the bladder tone.

Neuraxial local anaesthetics increase the propensity for POUR by interfering with both the afferent and efferent pathways of micturition. The longer acting agents entail higher risk for causing bladder dysfunction due to prolonged over-distention

Risk factors

Age

The incidence of POUR increases with increasing age.

This possibly is related to deterioration of the neurologic pathway responsible for urination with advancing age.

Increased incidence of prostatomegaly in older males could also be a contributory factor for POUR_[1,3,5,9,10].

Gender

Though majority of the studies and reviews report higher incidence of POUR in males_[1,3,9,15], but Toyonaga *et al*_[7] found female gender to be an independent predictor of POUR.

Pre-existing neurologic abnormality

Patients with pre-existing neurologic disorders like stroke, cerebral palsy, multiple sclerosis, diabetic and alcohol neuropathy, poliomyelitis are at higher risk for urinary retention in the postoperative period.

Preoperative urinary tract pathology

The evidence on pre-existing urinary tract pathology as a potential risk factor for POUR remains equivocal.

Toyonaga *et al*_[7] reported various factors responsible for POUR after surgical interventions like anorectal diseases

Bladder volume on entry to post anaesthesia care unit

A prospective study conducted to determine the risk factors for predicting early POUR reported the presence of bladder volume of more than 270 mL after the surgery remain an independent predictor of POUR_[3].

Surgical procedure

Certain surgical procedures entail a higher risk of POUR than other surgeries_[5].

Owing to multiple reasons, anorectal, colorectal, and urogynaecological surgeries have been observed to have a significantly higher risk of POUR_[5,11,12].

Anaesthetic technique

the overall incidence of POUR was higher with regional anaesthesia as compared to general anaesthesia (GA)_[1]. Contradictory, few other studies negate the effect of type of anaesthesia on occurrence of POUR

Intraoperative fluid administration

However, there is no clear consensus as to the cut-off limit for volume of intraoperative fluids with various authors using different values e.g., 750 mL_[3,7], 1000 mL_[13], and 1200 mL

Duration of surgery

Longer duration of surgery can be a contributing factor for POUR; possibly due to more fluid administered and higher amount of opioids used

Postoperative pain

can cause higher incidence of POUR by causing inhibition of the micturition reflex due to increased sympathetic discharge[

Concerns related to POUR

- ▶ Pour can have multiple impacts on the patients in the postoperative period.
- ▶ Urinary retention in the postoperative period can potentially delay the **discharge from hospital** leading to increase in the health costs[9 , 19] .
- ▶ Apart from causing prolonged hospitalization, POUR is also a source of significant discomfort and morbidity to the patient.
- ▶ An over-distended bladder can cause severe **suprapubic pain, nausea and vomiting**.
- ▶ Bladder distension and the resulting pain can result in sympathetic overactivity leading **to haemodynamic disturbances** such as hypertension, **cardiac dysrhythmias**
- ▶ Incomplete emptying of the bladder due to retention of urine also predisposes the patient **to urinary tract infections (UTI) in the postoperative period**.
- ▶ **Even a single brief catheterization** has the propensity to introduce infection into the urinary tract[

Over-distension of the bladder,

- ▶ can cause long-term changes in bladder contractility and elasticity due to detrusor muscle dysfunction.
- ▶ Stretching of bladder beyond its maximum capacity of 400-600 mL has
- ▶ potential to cause ischemic damage and irreversible insult to the contractile elements of the detrusor muscle and the associated motor end-plates.
- ▶ This can lead to longterm micturition difficulties, higher post-voiding residual volumes and thereby further increased predisposition to UTIs.

Diagnosis of POUR

- ▶ Diagnosis of POUR has been done by three basic methods viz clinical signs and symptoms, bladder catheterization and ultrasound assessment

Clinical signs and symptoms

The traditional technique for identification of urinary retention and bladder distension after surgery was by assessing the patient for suprapubic pain and discomfort, difficulty or inability to void, presence of suprapubic dullness, and palpable bladder

clinical estimation of postoperative bladder volume was incorrect in 54% and 46% cases when done by patients and nurses respectively.

Bladder catheterization

Catheterization of bladder can be used both as a diagnostic as well as therapeutic measure for POUR

However, catheterization, being an invasive procedure, itself carries many risks such as urethral trauma, discomfort, and urinary tract infection

Role of ultrasonographic assessment

- ▶ Its role in the diagnosis of POUR has received recognition in the last decade
- ▶ The use of ultrasound for prediction and diagnosis of POUR
- ▶ can help avoid unnecessary catheterizations while also preventing potential complications of bladder over-distension in high-risk patients.
- ▶ diagnostic tool for POUR.
- ▶ use in the post anaesthesia care unit (PACU), measurement of bladder volume
- ▶ use in screening screening patients preoperatively in order to prevent development of postoperative bladder distension
- ▶ manual examination of bladder volume with ultrasound and found that ultrasound was superior in identifying patients with bladder overdistension.

USG

Bladder volumes ranging from 300-600 mL have been used as the criteria for diagnosing POUR and for catheterizing the bladder

- ▶ accuracy and reliability of ultrasonographic bladder scanning may be limited in conditions such as pregnancy, severe abdominal scars, abdominal herniation, co-existing abdominal pathology

ultrasound showed good accuracy and correlation with volume emptied by catheterization

These authors reported that bladder measurement of largest transverse diameter of ≤ 9.7 cm does not require catheterization

However, patients with bladder diameter of > 10.7 cm should be catheterized
single measurement of the largest transverse diameter is a technically simpler method

for assessment of bladder volume and can be used for prediction of POUR with good inter-observer reliability.

Prevention

- ▶ Intraoperative preventive strategies primarily involve judicious fluid management and reduction of blood loss
- ▶ patients who received less than 250 mL fluid perioperatively had significantly lower incidence of POUR
- ▶ Optimal management of postoperative pain also plays an important role in preventing POUR
- ▶ Sympathetic stimulation secondary to pain results in decreased detrusor contraction and increased outflow resistance; thus leading to difficulty in voiding.

pharmacological methods for prevention of **POUR.**

- ▶ Alpha-adrenergic antagonists aid micturition by increasing
- ▶ intravesical pressure and decreasing outflow resistance
- ▶ **phenoxybenzamine**, an alpha adrenergic blocker, and found favourable results
- ▶ no longer used due to its carcinogenic potential
- ▶ **Tamsulosin**, a newer alpha-adrenergic antagonist, has also been found to be effective
- ▶ in reducing the incidence of POUR

MANAGEMENT

- ▶ early decompression should be the priority; especially in high-risk patients
 - ▶ encouraged to void spontaneously
 - ▶ emptying of the bladder by urethral catheterization remains the primary modality of treatment
 - ▶ At present, there is no clear consensus for the criteria for determining the timing for catheterization.
 - ▶ Urethral catheterization can be done by two basic approaches viz single in-and-out
 - ▶ catheterization or use of indwelling catheter
 - ▶ A single in-and-out catheterization or clean-intermittent-catheterization.
 - ▶ catheterization-associated UTI are one of the most common causes of nosocomial
 - ▶ infections which may deteriorate to cause sepsis and even death.
 - ▶ The incidence of UTI increases by 5%-7% for each day the urethral catheter is *in situ*
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- ▶ Further large studies need to be undertaken
 - ▶ for definite conclusion for thresholds and ultrasound based assessment of volume at
 - ▶ which catheterization should be done