

Post-operative Acute Urinary Retention

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Acute urinary retention (AUR) occurs predominantly in men and the incidence increases with age. The most common cause of urinary retention is benign prostatic hypertrophy (BPH). For men in their 40s who have no or mild obstructive symptoms (American Urologic Association Symptom Score 7 or less), the incidence of acute urinary retention is 2.6/1000 person years and 3.0/1000 person years in people with moderate to severe symptoms. In contrast, men in their 70's with mild to moderate symptoms have an incidence of AUR of 9.3/1000 person years and this rises to 34.7/1000 person years in those with moderate to severe symptoms.¹ Over five years, the risk of AUR for men in their 70s is 10% and for men in their 80s it is almost 30%.¹ These findings are based on a cohort of over 2,000 men 40–79, followed over four years and is one of the few longitudinal epidemiologic studies in the area.

Definition

Acute urinary retention has been defined as painful inability to void with a urine volume on catheterization of less than 800 ml.^{2,3} Chronic retention has been defined as the presence of the post-void residual urine volume greater than 500 mls (estimated on bladder ultrasound scan) with or without upper tract dilatation on ultrasound and/or uremia occurring in a patient who is still able to void spontaneously. Acute on chronic retention has been defined as painful inability to void with a urine volume on catheterization of greater than 800 mls.

Implications

The clinical implications of AUR are significant. First, men who are admitted to hospital for immediate surgery after acute urinary retention are at higher risk of developing perioperative complications than are those sent home for delayed sur-

gery.⁴ Second, acute urinary retention can affect glomerular filtration and the ability of renal tubular function to reabsorb protein. Fifteen patients whose renal function was still affected six months after the episode of acute urinary retention were re-evaluated at 18 months. The lowered creatinine clearance and elevated alpha-1 microglobulin excretion had increased in prevalence from 57% to 79% and 71% to 100%, respectively.⁵ Third, post-operative urinary retention increases the length and cost of acute hospital stay.⁶ These implications highlight the urgency of identifying and treating acute urinary retention as soon as possible.

Post-operative Urinary Retention

There are three processes that contribute to the occurrence of acute urinary retention.⁷ These are:

1. a resistance to the flow of urine, either structural (such as BPH or a urethral stricture) or functional (such as failure of the sphincter to relax (dyssynergia) or constipation);
2. alteration in sensory or motor innervation to the bladder;
3. overdistension of the detrusor muscle.

Overfilling of the bladder can occur during surgery and general anesthetic.^{1,8} Some reports also suggest that narcotics given perioperatively or post-operatively may contribute to urinary retention.^{9,10} However, in a study by Boulis, there was no correlation between the incidence of post-operative urinary retention and post-operative narcotic use.⁶

Post-operative urinary retention following prostatectomy occurred in 9.2% of men who had presented with acute retention as compared to 2.3% in those who had obstructive symptoms only.⁴ A retrospective review of 379 men reported 12% failure to void after transurethral resection of the prostate (TURP) on the

initial trial without a catheter.³ A Canadian study of 50 men, mean age 69.5 years, who presented with acute urinary retention, found that 38% had residual urine >100 mls post-op and were begun on intermittent catheterization. At three months, 10% were unable to void after the prostatectomy.¹¹

Other surgical procedures may also result in post-operative urinary retention. Acute urinary retention occurred in 38% of people undergoing cervical and lumbar spine procedures and contributed to longer hospitalization and increased hospital costs.⁶ In this retrospective chart review of 709 patients, urinary retention was defined as an inability to effectively empty the bladder and spontaneously void. It was also defined as a documented post-void residual urine (PVR) of greater than 100 mls, continued intermittent straight catheterization because of a failure to meet criteria for normal voiding (PVR <100 mls) or an initial urination of more than four hrs after a patient's arrival on a ward. Duration of retention was no different between men (48.4±4.6 hr) and women (62.4±7.3 hr) and there was no significant difference between the overall incidence of post-operative urinary retention between men (39.1%) and women (36.2%). Post-operative retention after cervical and lumbar laminectomy lasts substantially longer than the retention that occurs after anterior cervical discectomy or lumbar discectomy.

In a series of 103 men, mean age 66.5 years, 10.7% had post-operative retention following hip replacement. Three factors predicted retention—namely inability preoperatively to pass urine into a bottle while lying in bed ("bottle test"), urine flow rates indicative of obstruction and a history of previous urologic disease.¹²

Para-urethral collagen injections for treatment of genuine stress incontinence caused temporary urinary retention in a study of 111 women, age range 33–90 years.¹³ Transient post-operative urinary retention is common following surgery for

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stress urinary incontinence. Electromyography (EMG) studies in 10 patients post-operatively showed that six had EMG activity of the external urethral sphincter, suggesting that failure of relaxation of the striated urethral sphincter contributed to post-operative urinary retention.¹³

The type of surgery for genuine stress incontinence or urethral hypermobility is independently associated with the time to void post-operatively. The mean time following modified open Burch procedures was 7.1 days, following anterior colporrhaphies with suburethral plication was 9.5 days, and vaginal wall sling procedures had a mean of 19.1 days. Other contributing factors included older age, previous vaginal bladder neck suspension, increasing volume at first sensation on bladder filling (preoperative cystometry), higher preoperative post-void residual urine and post-operative cystitis.¹⁴ Pressure flow studies

were unhelpful in predicting the risk of voiding difficulties after surgery.

Identified risk factors for post-operative urinary retention are shown in Table 1.

Management Options

The management of acute and chronic urinary retention in the acute care setting has been fully reviewed.¹⁶ Immediate management by catheterization is most commonly by the urethral route.¹⁷ The debate over rapid vs. gradual decompression of the bladder has been recently reviewed.¹⁸ There are no randomized controlled trials that compare rapid complete emptying vs. gradual (clamping) emptying to relieve the distended bladder. Hematuria is present in 2–16% of patients but is not clinically significant. Hypotension and post-obstructive diuresis can be easily monitored and careful replacement of urinary output depends on clinical assessment of volume status.

Suprapubic catheterization has been compared to urethral latex catheterization for bladder drainage in men.¹⁹ This was a non-randomized study with a three-year follow-up of 86 consecutive patients with acute urinary retention. Urinary tract infection was lower in those with suprapubic catheter (18% vs 40%). The rates of urethral strictures in those with a suprapubic catheter compared to urethral catheter were 0% and 17%, respectively. A further study in men comparing suprapubic to urethral catheters found that the suprapubic route may be more easily managed, comfortable and cost effective.²⁰

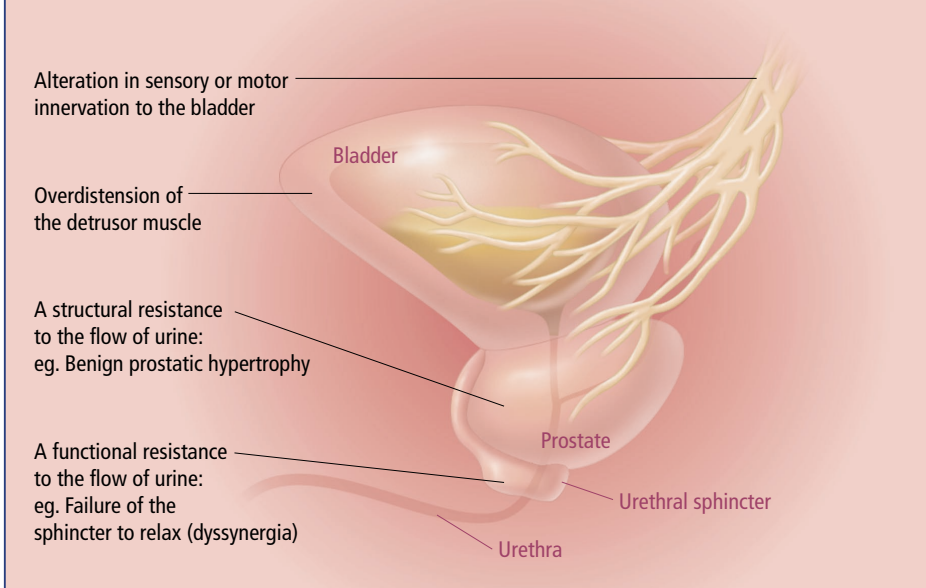
Intermittent catheterization (IC) compared to indwelling catheterization has been evaluated following abdominal hysterectomy. The average time to independent voiding was 53 hours in those with an indwelling catheter and 20 hours for those on IC. Infection rate was 23% in those with indwelling catheter and 13% in those on

Table 1

Risk Factors for Post-operative Urinary Retention

Procedure	Factor	Value/Parameter	Reference
Prostatectomy	– Correlation with older age	83 v 70 years	26
	– No correlation with age	73 v 71 years	3
	– Pre-op Acute or Chronic Urinary Retention versus Lower Urinary Tract Symptoms Only (LUTS)	AUR/CUR v LUTS	3, 26
	– Higher Nocturnal Frequency	4 v 2.8 voids	26
	– Higher Pre-op Retention volume	1780 vs 1080 ml	
	– Low maximal detrusor pressure	24 v 73 cm H ₂ O	
	– Inability to void during pre-op urodynamics		
Hip replacement	– Inability to pass urine while supine		12
	– Obstructive urinary flow rates		
	– History of previous urinary retention		
Incontinence Surgery	– Modified Open Burch procedures	7.1 days time to void	15
	– Anterior colporrhaphies with suburethral plication	9.5 days	
	– Vaginal wall sling procedures	19.1 days	
	– Burch/Urethral sphincter contraction on EMG	EMG Activity	14
Cervical and lumbar Spine Procedures	– Age retention vs no retention	52 v 48 years	6
	– Cervical/lumbar laminectomy—longer retention versus Anterior cervical/lumbar discectomy	C/L lam vs C/L disc	
Medication	– Anticholinergic and narcotic increased retention		9
	– Pre-op Beta Blocker increase risk of retention		6
	– Post-op Narcotic use—no correlation with retention		6
Other	– Rapid Overfilling of Bladder Post-surgery	1000 ml	8

Processes that contribute to the occurrence of acute urinary retention



IC and those who had no catheter. In those who had IC, most only needed to be catheterized once.²⁰ Jolley has suggested a practical protocol for assessing retention and the use of IC.²⁰ The rationale and evidence for IC including self-IC and clean-IC has been well described.²¹

An indwelling catheter for 24 hours in patients having elective joint replacement resulted in a lower incidence of urinary retention compared to intermittent catheterization (27% vs 52%).²² A recent prospective randomized controlled trial in patients following total joint arthroplasty with epidural anesthesia evaluated the difference between indwelling foley catheter and intermittent catheterization on urinary retention and urinary tract infections.²³ The cost effectiveness of the two approaches was also evaluated. The indwelling catheter and intermittent catheterization were only continued for 48 hours. There was no difference in the rate of urinary tract infections between indwelling catheters and intermittent catheterization, 8% vs 12%, respectively. Urinary retention occurred in 19% of those who had indwelling catheterization and 35% in the intermittent catheterization group. Retention managed by indwelling catheter saved more than 150 minutes of direct nursing contact per patient and US \$3,000 in total hospital cost.

The role of an alpha blocker has been evaluated in a randomized controlled trial to determine if it can prevent post-operative retention after surgical treatment for genuine stress incontinence. There was no significant difference between the treatment group (Indoramin) and the placebo group for any of the outcome measures.²⁴

Preoperative assessment can identify patient characteristics, procedures, and other factors which predict increased risk of post-operative retention and alert medical and nursing staff to watch for this possible complication. At least for elective total hip replacement in men, the "bottle test" is a simple clinical test predictive of post-operative retention. Objective evaluation of this test with other operative procedures in men and its equivalent in women could be worthwhile. The observation that a person can void some urine does not rule out urinary retention. On ward portable ultrasound scans are a quick and non-invasive method for nursing staff to screen for urinary retention.²⁵ A new suprapubic surgical wound is a contraindication to a bladder scan because of the risk of wound infection.

In summary, preoperative vigilance to patient characteristics, risk factors and types of procedures will identify people likely to experience post-operative urinary retention. Depending on the procedure

and anticipated duration of retention, a trial of voiding followed by early intervention with intermittent catheterization, urethral or suprapubic catheterization is indicated to preserve renal function and reduce post-operative hospital stay. ♦

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