

# Postoperative Urinary Retention

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### INTRODUCTION

Urinary retention is a rare podiatric postoperative complication, but it still can prolong hospital stays and increase health care costs. Furthermore, the podiatric resident is often ill prepared to manage this situation as he or she begins residency.

In the minds of residents, postoperative urinary retention (POUR) is usually secondary to postoperative pain, postoperative nausea and vomiting, and more serious postoperative complications such as infection, and deep vein thromboses, if thought of at all. The incidence of POUR ranges from 5-70%, depending on different surgical specialties and the respective procedures, as well as an inconsistent definition of POUR. Universally, it is the inability to void in the presence of a full bladder. Inability to void 8 hours after the end of surgery, or after a Foley catheter is removed is a commonly-used criterion. In addition, outside the parameter of time, the inability to void in the presence of >600 cc of urine as seen on bladder scan is considered urinary retention.

Micturition is the discharge of urine from the bladder. The normal adult bladder holds about 400-600 cc of urine. At about 150 cc, the first urges to void begin, and a sense of fullness is felt at about 300 cc. The detrusor muscle in the bladder wall contracts to push urine out of the bladder through the bladder neck and into the urethra. The bladder neck sphincter muscle must relax to allow the urine to pass. When the coordination of these two actions become deranged, POUR can occur.

### RISK FACTORS

Urologic/gynecologic, anorectal, and inguinal procedures have a greater incidence of POUR compared to podiatric and orthopedic procedures. Other risk factors of POUR include anesthetic technique, where general anesthesia confers a higher risk for POUR than MAC anesthesia, and spinal and epidural anesthesia confer an even higher risk. Males are at a higher risk than females, but this is likely due to many older men having some degree of benign prostatic hyperplasia (BPH), whether they know it or not. Other than male sex and older age (>50 years), other risk factors include previous pelvic surgery, neurological diseases, and preoperative medications, specifically alpha agonists and beta-blockers. Longer duration of surgery, sedative medications, and postoperative analgesia can also contribute to POUR.

### DIAGNOSIS, PITFALLS, AND CONSIDERATIONS

If a patient has not voided 8 hours after surgery or 8 hours after removal of a Foley catheter, a bladder scan is often used to determine how much fluid is in the bladder. Clinical examination and questioning is often unreliable. Palpating for a distended bladder is made difficult by many patients' body habitus. Presence of urgency, distention, and pain and tenderness is also unreliable because the patient is often sedated on pain medications. Even a bladder scan can underestimate the actual amount of urine present because of body habitus, tissue edema, scarring, and previous surgery. The most accurate way to determine urine volume is directly, via straight catheterization and drainage of the bladder. It is usually a good idea to have the bladder scan performed again post-void to check for post-void residual urine. If there is greater than 150 cc, an indwelling Foley catheter and urology consult should be considered.

In the outpatient setting, a bladder scan can be used because it is quick and noninvasive. In patients with at least one risk factor, a bladder scan can be performed at 4 hours postoperative, and if >600 cc are present, one time straight catheterization can be performed, and the patient can be sent home. Again, a post-void bladder scan to check for residual volume is a good idea. If there are <600 cc on the scan, the patient can be sent home without straight catheterization. Regardless, all patients should be advised to seek medical attention if after 8 hours they have not voided.

In the inpatient setting, the patient can be straight catheterized once if after 8 hours he or she has not voided and a bladder scan shows >600 cc. In some cases, the POUR will resolve by itself afterwards. If it does not resolve, a straight catheterization may be performed again, but straight catheterizations are invasive and are not without complications. Prostatitis in males, urinary tract infection, urethral trauma, hematuria, and patient discomfort are things to consider. More than 2 straight catheterizations are discouraged, and an indwelling Foley catheter should be considered in cases of refractory cases of POUR. It should be pointed out that repeating a bladder scan after a straight catheterization is a good idea to check for post-void residual volume. Furthermore, patients with severe BPH, congenital defects related to the urinary tract, or recent urological surgery should not be straight catheterized, unless urology has been consulted. Some patients require a urologist to place catheters, and some POUR complications may escalate

into a patient requiring a suprapubic catheter if traditional urethral catheters are contraindicated.

Systemic complications of straight catheterization include transient hypotension, (which can lead to syncope), and post-obstructive diuresis, (which can lead to dehydration and electrolyte imbalances). These can be self-limiting the majority of the time. One should take great care in fluid management in patients with concomitant congestive heart failure or advanced kidney disease, as fluid overload is potentially life-threatening in this patient population. Patients with chronic kidney disease should be questioned to determine if at baseline he or she makes urine, as many kidney disease patients are oliguric, and end-stage kidney disease patients are anuric.

These complications of straight catheterization are more pertinent to the podiatric resident than those of the actual urinary retention. Most commonly, urinary tract infection, pyelonephritis, kidney injury, and physical bladder damage can occur from unresolved urinary retention, but the management of these should be deferred to the hospitalist, infectious disease specialists, and/or the urologist. Inserting a Foley catheter until urology can assess the patient is prudent. Usually POUR is self-limiting, but a urology consult is a must if the patient has to be sent home with an indwelling Foley catheter because of persistent POUR. These patients will need follow up with outpatient urology.

A misguided notion beginning residents may consider is increasing the intravenous (IV) fluids for the patient. However, POUR is not an issue of the kidneys making urine, but of urine leaving the bladder. If IV fluids are increased in the setting of urinary retention, the bladder will become more distended. With increasing distention, the muscarinic receptors in the smooth muscle bladder wall become less concentrated as the bladder wall stretches. This effect of reduced concentration of receptors inhibits the detrusor muscle function. The ability of the bladder to contract is then diminished. Even when straight catheterization allows the bladder size and receptor concentration to return to normal, normal micturition is not always restored. Normal function will return more slowly in these cases.

## PROPHYLAXIS AND TREATMENT

There are no prophylactic guidelines for POUR in orthopedic/podiatric surgery, given the incidence is so low. Tamsulosin has been studied in pelvic/anorectal surgeries. Madani et al gave 0.4 mg of Tamsulosin 14 and 2 hours before surgery, and 10 hours after (2). This yielded a 5.9% incidence of POUR versus 21.1% in their control group. Mohammadi-Fallah et al (3) had similar results giving 0.4 mg 6 hours before and 6-12 hours after surgery, witnessing a drop from 15% to 2.5% in POUR.

Another alpha blocker, prazosin, has been investigated, where 1 mg was given 12 hours before surgery, and again 12-24 hours after surgery. Gonollu et al (4) found a decrease from 25% to 10.8% in POUR incidence. It should be noted that although medications like tamsulosin are primarily used for male BPH/hypertrophy, they still can be used in female patients experiencing POUR. Bethanachol, a muscarinic agonist, can also be administered in the face of POUR. As mentioned above, if there is no medical response, the patient is typically sent home with an indwelling Foley catheter or taught how to straight catheterize themselves, with close urology outpatient follow up.

## CONCLUSION

The important questions to ask in male, and even female patients undergoing longer, more complex surgery under general anesthesia are whether they have experienced POUR in the past and about previous surgical history, especially pelvic/anorectal surgeries. In these patients, the likelihood of experiencing POUR again is high, and it may be worthwhile to prophylax, as described in these studies. At a minimum, one can administer one of these medications once POUR has been encountered.

Lastly, other considerations include patient position when trying to void, warm compresses, and the environment. Many older male patients have family members or friends in the room, and it could be helpful to give the patient some privacy. Some component of POUR could be volitional. Usually, the patient's surgical extremity is elevated and male patients trying to use the bedside urinal while laying down may be difficult and hinder the conscious aspect of voiding. Warm compresses to the suprapubic area have been described to help in nursing textbooks, although there are no studies to corroborate this. However, it is worth a try, as it is easy, inexpensive, and if you as a surgeon can save your patient from the unpleasant experience of getting a straight catheter, it will make a difference to your patient and his or her experience.

## REFERENCES

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