

---

---

---

---

---

---

---

---

## Technical Tips

### EVALUATION AND TREATMENT OF ACUTE URINARY RETENTION

Gary M. Vilke, MD,\* Jacob W. Ufberg, MD,† Richard A. Harrigan, MD,† and Theodore C. Chan, MD\*

\*Department of Emergency Medicine, University of California, San Diego Medical Center, San Diego, California and †Department of Emergency Medicine, Temple University School of Medicine, Philadelphia, Pennsylvania

Reprint Address: Gary M. Vilke, MD, Department of Emergency Medicine, UC San Diego Medical Center, 200 West Arbor Drive  
Mailcode #8676, San Diego, CA 92103

□ **Abstract**—Acute urinary retention is a common presentation to the Emergency Department and is often simply treated with placement of a Foley catheter. However, various cases will arise when this will not remedy the retention and more aggressive measures will be needed, particularly if emergent urological consultation is not available. This article will review the causes of urinary obstruction and systematically review emergent techniques and procedures used to treat this condition. © 2008 Elsevier Inc.

□ **Keywords**—urine; retention; obstruction; catheter

#### BACKGROUND AND INCIDENCE

Acute urinary retention (AUR) treated with urinary catheters has a history in the Western medical literature dating back to ancient Greece (1). AUR is a common complaint on presentation to the Emergency Department, increases in incidence with age, and most often occurs in men over the age of 60 years (2). Men in their 70s have a 10% risk of AUR occurring over 5 years, increasing to almost a third of men in their 80s (3). The timing of presentation is often during evening hours or night time, as one of the more common causes is failure to void after catheter removal, either post-urological procedure or after hospital discharge. Presentations during these hours can make obtaining urological consultation more challenging.

#### ETIOLOGY OF ACUTE URINARY RETENTION

Acute obstruction of urinary outflow is most often the result of physical blockages or by urinary retention caused by medications. The most common cause of acute urinary obstruction continues to be benign prostatic hypertrophy, with other obstructive causes listed in Table 1 (4). Common medications that can result in acute urinary retention are listed in Table 2.

#### DIAGNOSIS

The diagnosis of urinary obstruction is typically obtained by history, with reports of decreased or absent urine output over a significant time period and complaints of increasing suprapubic or lower abdominal fullness or pain. In a non-verbal patient, a diagnosis of AUR should be entertained if the patient has had no urine output, which may be associated with increased restlessness or agitation. In the population with chronic intermittent urinary outflow obstruction, urosepsis may be the presenting clinical picture and urinary obstruction may be diagnosed only when attempting to obtain a urine specimen by placing a Foley or straight catheter. Diagnosis of urinary retention usually can be confirmed by bedside ultrasound if still in question after obtaining a complete history, particularly if there is difficulty in or contraindication to placing a Foley catheter.

## TREATMENT

Treatment options that can be utilized by the emergency physician for acute urinary retention include a progressive stepwise approach with increasing skill requirements. These typically follow in order from least invasive to most invasive: Foley catheter placement, Coudé catheter placement, and suprapubic catheterization (5,6).

There are a number of conditions that are special considerations and thus have specific treatments. These include paraphimosis, which is typically treated initially with manual reduction if possible, followed by the previously mentioned modalities if reduction fails; and phimosis, which is traditionally treated with a dorsal slit before moving on to a suprapubic catheterization (7–10). The rest of this article will discuss the actual procedures for treating acute urinary obstruction.

Urological consultation should be at least attempted in the event of inability to place a Foley or Coudé catheter, as urologists have other options for placing a urethral catheter before resorting to suprapubic placement, such as guidewire utilization, filiforms and followers, and cystoscopy. However, if consultation is not readily available or the need for decompression is emergent, then options described in this article can be considered for use by the emergency physician.

### *Foley Catheter Placement*

The specifics of Foley catheter placement will not be addressed in this article, as it is a commonly performed procedure and well described in many other sources. Indications for Foley placement include acute urinary retention, need for monitoring of urine output, collection of urine for diagnostic purposes, radiographic evaluation of lower urinary tract, and for treatment of a neurogenic bladder or a mechanical inability to void. Contraindications include abdominal or pelvic trauma with blood at the me-

**Table 1. The Common Causes of Acute Urinary Obstruction**

Benign prostatic hypertrophy
Bladder calculi
Bladder hematoma/clots
Bladder neoplasm
Cystitis
Meatal stenosis
Neurogenic etiologies
Paraphimosis
Penile trauma
Phimosis
Prostate cancer
Prostatic trauma/avulsion
Prostatitis
Urethral inflammation post urethral procedures or manipulation
Urethral strictures or foreign body

**Table 2. Medications Associated with Acute Urinary Retention**

Alpha-adrenergic agonist agents
Amphetamine
Ephedrine
Phenylephrine
Phenylpropanolamine
Pseudoephedrine
Antidysrhythmics
Disopyramide
Procainamide
Quinidine
Anticholinergics
Anisotropine
Atropine
Belladonna
Dicyclomine
Glycopyrrolate
Homatropine
Hyoscyamine
Mepenzolate
Methantheline
Oxybutynin
Propantheline
Scopolamine
Anticonvulsants
Carbamazepine
Antidepressants
Amitriptyline
Amoxapine
Doxepin
Imipramine
Maprotiline
Nortriptyline
Antiemetics
Prochlorperazine
Antihistamines
Brompheniramine
Chlorpheniramine
Cyproheptadine
Diphenhydramine
Hydroxyzine
Antihypertensive agents
Hydralazine
Nifedipine
Trimethaphan
Antiparkinsonian agents
Amantadine
Benzotropine
Bromocriptine
Levodopa
Trihexyphenidyl
Antipsychotics
Chlorpromazine
Fluphenazine
Haloperidol
Thioridazine
Thiothixene
Beta-adrenergic agonist agents
Isoproterenol
Metaproterenol
Terbutaline
Hormones
Estrogen
Progesterone
Testosterone
Muscle relaxants
Baclofen
Cyclobenzaprine
Diazepam
Pain medications
Indomethicin
Morphine sulfate

**Table 3. Equipment Needed for a Suprapubic Catheterization**

Betadine solution
Sterile gloves
Percutaneous suprapubic cystostomy kit (which usually includes)
1% lidocaine
22-gauge 3-inch spinal needle
25-gauge needle
10-cc syringe
Sterile drape, fenestrated
4 × 4 gauze sponges
#11 blade scalpel
Suture material
J-tip guide wire
Dilatator
Sheath
14-French Foley catheter
Sterile closed system urinary drainage bag
Tape

atus, an obvious penile deformity, a high-riding prostate, or a perineal hematoma. Complications of Foley catheter placement include microscopic hematuria, with gross hematuria being less common, the inability to pass the catheter, infection, and passage of catheter into a blind pouch.

Some pearls to placing a Foley catheter include the following: if the kit has lubricant supplied in a tube, some can be injected directly into the urethral meatus in addition to the catheter itself. If there is too much discomfort from the procedure, lidocaine jelly can be used as the lubricant. Many providers use anesthetic lubrication in all patients, not just those intolerant of regular lubrication jelly. The Foley catheter balloon should not be inflated until the bladder has been accessed, demonstrated by urine being visible in the Foley catheter collection tubing. The biggest error that occurs in Foley catheter placement in women is trying to catheterize the clitoris, mistaking it for the urethra. The urethra is more posterior and has a slit-like opening. If the catheter hangs up at the sphincter, gradual steady pressure will facilitate cannulation.

### Coudé Catheter Placement

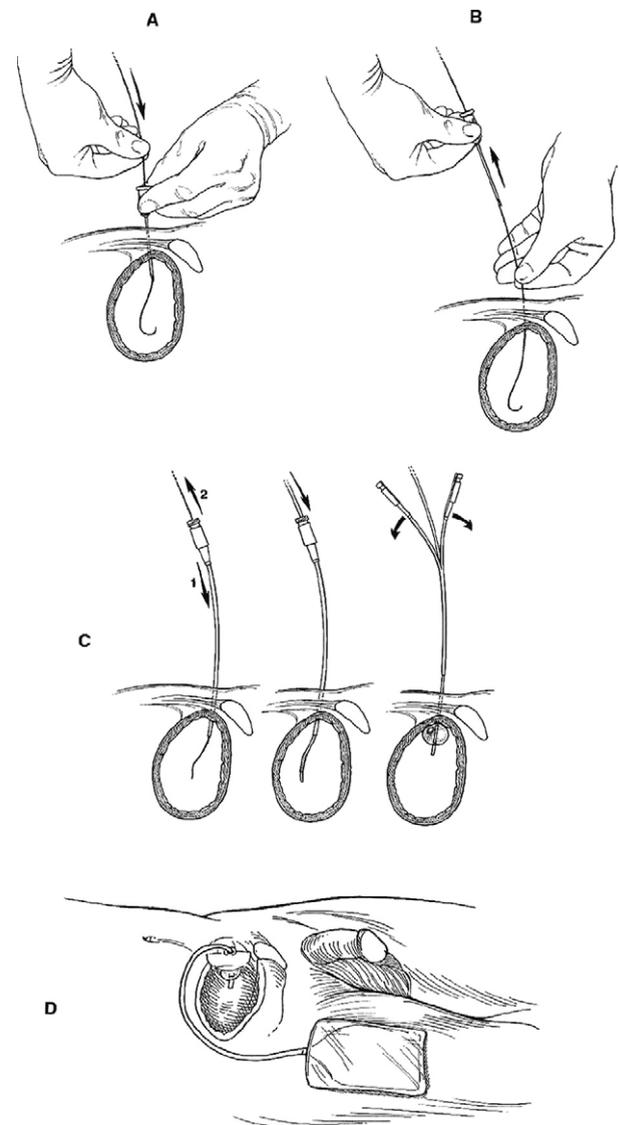
Indications and contraindications for use of the Coudé catheter are the same as for Foley catheter placement, but typically the Coudé catheter is used after failure of Foley placement due to difficult passage in a man with an enlarged prostate. The complications are also similar. The procedure to place the Coudé uses the same technique as the Foley except that the catheter used is a Coudé. The Coudé catheter is placed into the meatus of the penis with the curved tip *pointing up*, cephalad, and is advanced with gentle but continuous pressure past the resistance point, typically in the region of an enlarged prostate. The Coudé is advanced until the hub is at the glans, at which point urine should be returning through

the catheter. Similar to the Foley catheter, the Coudé utilizes a balloon that requires 10 mL of saline.

The use of a Coudé catheter is rarely, if ever, needed in pediatric patients. Additionally, care should be taken in patients who have a history of urethral strictures who have failed Foley catheter placement, as false tracts may have been created that can be extended by the use of a Coudé catheter.

### Suprapubic Catheterization

Indications for suprapubic catheterization include AUR in a patient who has contraindications for urethral cath-



**Figure 1. (A–D) Suprapubic catheterization. Reproduced with permission, from: Chan TC, *Atlas of Emergency Procedures*, St. Louis, MO: Mosby; 2001.**

eterization attempts. This includes abdominal or pelvic trauma with blood at meatus, an obvious penile deformity, a high-riding prostate, or a perineal hematoma. Failure in urethral catheterization in a patient with AUR is an additional indication. An empty bladder, previous lower abdominal surgery with scarring, and previous pelvic radiation with scarring are contraindications to this procedure. Significant systemic bleeding disorders are a relative contraindication and should be considered on a case-by-case basis. The list of needed equipment for a suprapubic catheterization is found in Table 3, and the procedure is described below and pictured in Figure 1.

The bladder should be palpated and identified and an insertion site, which is midline and 2 cm cephalad to the pubic bone, should be prepared in sterile fashion. Local

anesthesia should be used at the insertion site, utilizing 5 mL of 1% lidocaine by raising a wheal and then injecting the local tissue toward the bladder with the 22-gauge spinal needle at an angle aiming 20–30 degrees caudal from midline. While the needle is being advanced and lidocaine is being injected, intermittent stopping and withdrawing to assess for urine return should be performed. Once urine is returned, the needle should be kept in place, the syringe removed, and the guidewire should be advanced through the needle into the bladder. Then the needle should be removed, leaving the wire in place. A small stab incision with the scalpel into the skin just next to the wire should be made. The dilatator and sheath are then advanced over the wire into the bladder. Then the dilatator and guidewire are removed, leaving only the

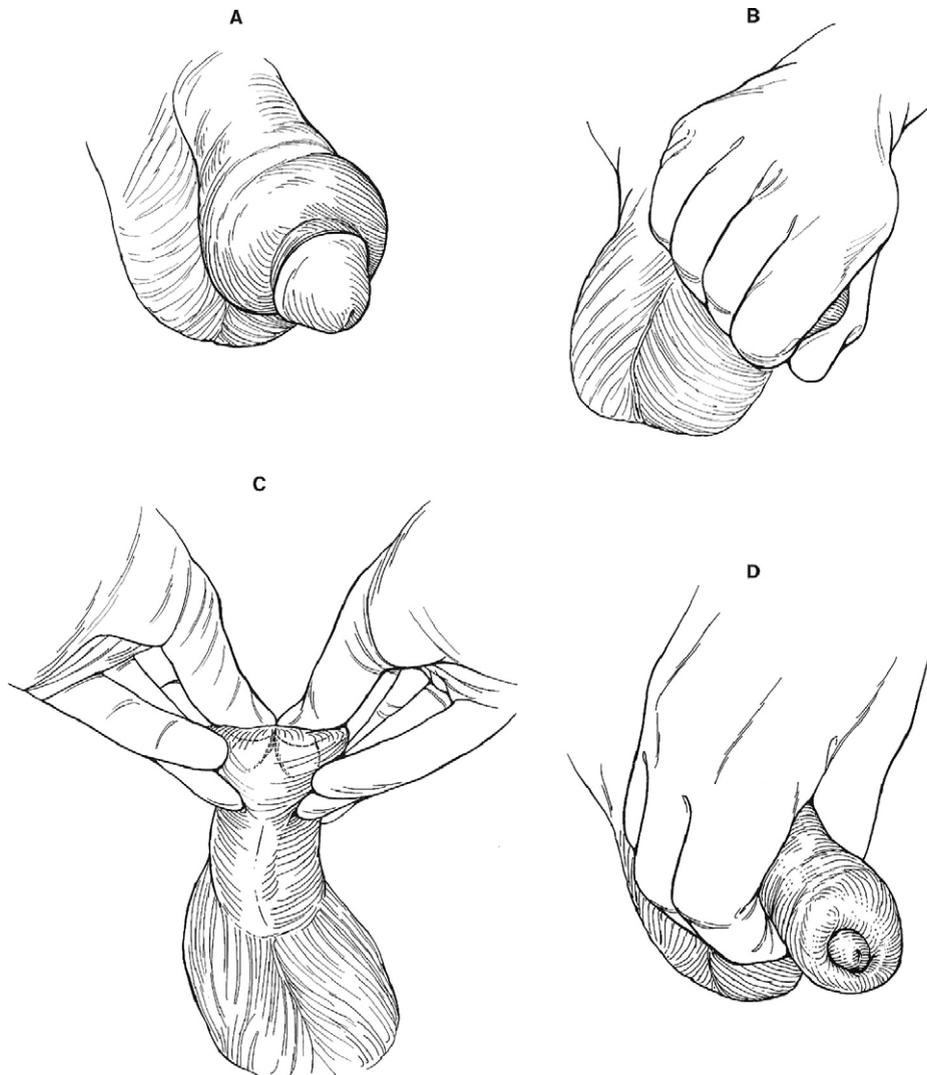


Figure 2. (A–D) Paraphimosis manual reduction. Reproduced with permission, from: Chan TC, *Atlas of Emergency Procedures*, St. Louis, MO: Mosby; 2001.

**Table 4. Equipment Needed for Performing a Dorsal Slit**

Sterile gloves
Betadine
Sterile towels
Lidocaine 1% without epinephrine
5-cc syringe with 27-gauge 1.5-inch needle
Straight hemostat
Straight scissors
4.0 or 5.0 vicryl suture
Needle holder
Forceps
Foley catheter

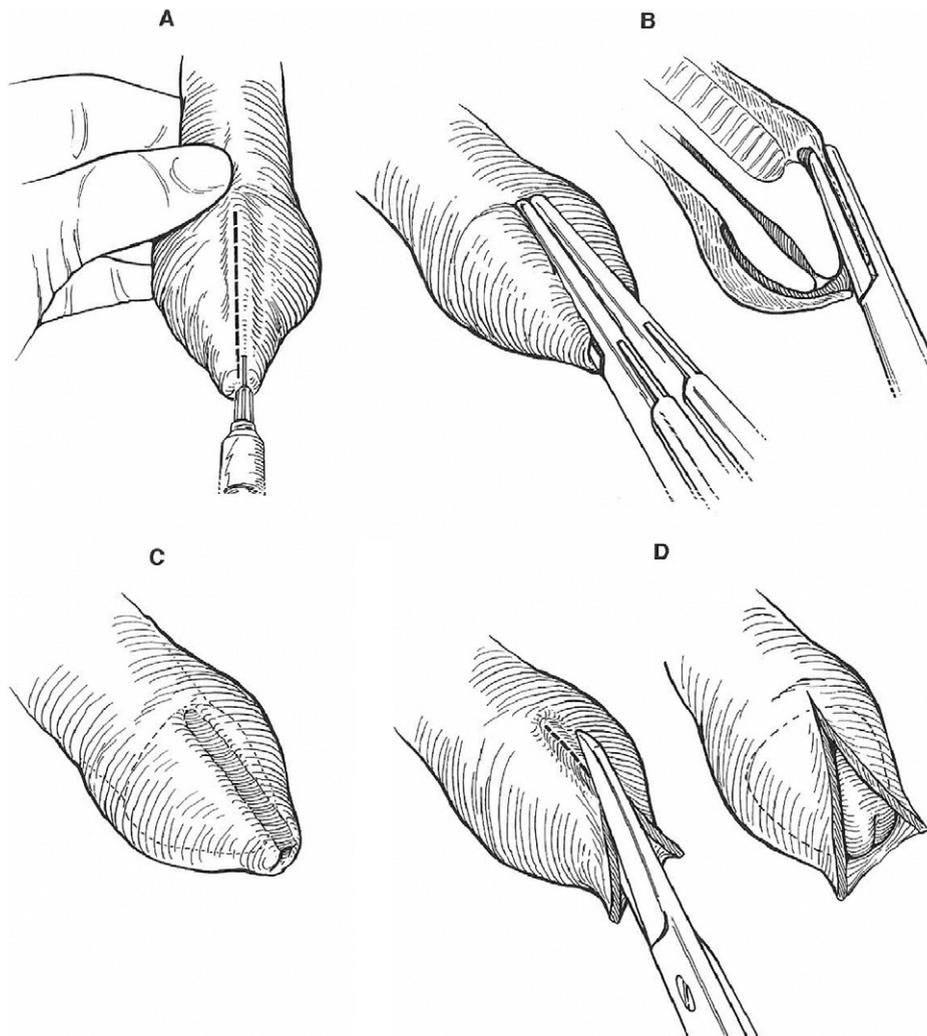
sheath in the bladder. The Foley catheter is then passed through the sheath and correct placement is confirmed by return of urine. The Foley balloon is inflated and the catheter is attached to a closed urine collection system. Finally, the sheath is removed by peeling it away from

the catheter. The catheter should be pulled back until the balloon is snug against the inner bladder wall and then the area is dressed with 4 × 4 gauze and sterile dressing.

Potential complications of suprapubic catheterization include: hematuria, bowel perforation, ureteral injury, large vessel injury, catheter obstruction by kinking or from blood, extravasation around the catheter, infection or abscess formation, inadvertent tube removal, and failure of the procedure. If unable to palpate the bladder, the use of ultrasound may be helpful to identify the bladder location. Gross hematuria is a frequent, but usually transient occurrence. Occasionally, bladder irrigation may be needed to clear clots from the catheter.

#### *Paraphimosis Manual Reduction*

The only indication for performing a paraphimosis reduction is the presence of paraphimosis. There are no contra-



**Figure 3. (A–D) Dorsal slit in phimosis. Reproduced with permission, from: Chan TC, *Atlas of Emergency Procedures*, St. Louis, MO: Mosby; 2001.**

indications. Before performing the procedure, remove the Foley catheter if one is in place. It should be removed to facilitate reduction in all but the mildest of cases of paraphimosis. The procedure is depicted in Figure 2. Place a small amount of lubricant on the proximal aspect of the glans and inner surface of the foreskin. Grasp the swollen foreskin with the non-dominant hand and apply slow gentle pressure for several minutes while elevating to reduce some of the edema. Then, with the non-dominant hand, securely hold the proximal aspect of the swollen ring of foreskin with a ring formed by the thumb and the index and middle finger. Slowly begin pushing the glans into the foreskin with the dominant thumb that is placed over the urethral meatus. Continue until the foreskin is replaced over the glans. Place a Foley catheter.

The only complication of this procedure is the inability to reduce the paraphimosis. Sedation and analgesia may be required if the patient is awake and experiencing too much discomfort. Instead of manual compression of the swollen foreskin, a 5- or 6-cm piece of elastic bandage may be placed for a few minutes.

#### *Dorsal Slit*

Phimosis without ability to void or ischemia to penis is the emergent indication for performing a dorsal slit. Bleeding dyscrasia is the only relative contraindication. The equipment needed for performing a dorsal slit is listed in Table 4, with the steps of the procedure as follows and shown in Figures 3 and 4. Prepare and drape the dorsum of the penis in a sterile fashion. Using a 27-gauge needle, raise a wheal of anesthesia in the foreskin just proximal to the glans on the dorsal aspect of the penis. Extend the injection along the longitudinal axis distally to the tip of the foreskin. Make sure the full thickness of the foreskin is anesthetized. After 3 or 4 min, check to make certain the anesthesia is effective. Slide the hemostats along the space between the foreskin and the glans, and gently open, forming a tract. Remove the hemostats, then replace with one tip between the foreskin and glans, and one tip outside the foreskin,

straddling the region of anesthesia. Make certain the tip of the hemostats is not in the urethral meatus. Close the hemostat over the region of anesthesia and keep clamped for 10 min. Remove the hemostat, and cut the serrated clamped tissue with the scissors. If the skin edges continue to ooze, a running stitch using a vicryl suture can be placed on each side. Retract the foreskin and clean the glans. Place a Foley catheter when indicated.

Complications of performing a dorsal slit include infection, bleeding, incision of the urethra, and a cosmetically poor appearance.

## CONCLUSIONS

Although many of the treatments for acute urinary retention beyond Foley or Coudé catheter placement will rarely need to be used, the emergency physician should be familiar with these procedures.

## REFERENCES

1. Moog FP, Karenberg A, Moll F. The catheter and its use in late antiquity and the early middle ages. *J Urol* 2005;174:439–41.
2. Hargreave TB, McNeill AS. Acute urinary retention in men: the risks and outcomes with medical therapy. *Curr Urol Rep* 2005;6:263–70.
3. Jacobsen SJ, Jacobsen DJ, Girman CJ, et al. Natural history of prostatism: risk factors for acute urinary retention. *J Urol* 1997;158:481–7.
4. Curtis LA, Dolan TS, Cespedes RD. Acute urinary retention and urinary incontinence. *Emerg Med Clin North Am* 2001;19:591–619.
5. Stine RJ, Avila JA, Lemons MF, Sickorez GJ. Diagnostic and therapeutic urologic procedures. *Emerg Med Clin North Am* 1988;6:547–78.
6. Neuwirth H, Frasier B, Cochran ST. Genitourinary imaging and procedures by the emergency physician. *Emerg Med Clin North Am* 1989;7:1–28.
7. Williams JC, Morison PM, Richardson JR. Paraphimosis in elderly men. *Am J Emerg Med* 1995;13:351–3.
8. Ganti SU, Sayegh N, Addonizio JC. Simple method for the reduction of paraphimosis. *Urology* 1985;25:77.
9. Olson C. Emergency treatment of paraphimosis. *Can Fam Physician* 1998;44:1253–4.
10. Holman JR, Stuessi KA. Adult circumcision. *Am Fam Physician* 1999;59:1514–8.