Management of acute urinary retention

Acute urinary retention is a common urological emergency that may present to any practitioner. This article provides guidance for the initial and ongoing management of this condition and looks at the evidence base supporting it.

Acute urinary retention (AUR) is a common urological emergency that may be encountered in any hospital ward, emergency department or primary care setting. Patients suffer an abrupt inability to pass urine that is often associated with severe lower abdominal pain as their bladder enlarges.

In a review of the Department of Health (England) Hospital Episode Statistics Database (1998–2003), AUR accounted for more than 30 000 hospital admissions per year (Cathcart et al, 2006). AUR is not common in women. Of the 32 162 hospital episodes of urinary retention that were recorded in 2002, 86% of patients were men and 14% were women (Department of Health, 2003). For this reason this article will address primarily the management of AUR in men. The initial management is similar, however, whatever the gender.

The incidence of AUR in men is 3/1000 each year (Cathcart et al, 2006). Over 10% of men in their seventh decade will experience AUR over a 5-year period (Jacobsen et al, 1997). AUR results in prostatectomy in 24–42% of male patients presenting in Britain and North America. This subgroup of patients may suffer significantly more perioperative morbidity than elective prostatectomy patients with no prior history of AUR (Pickard et al, 1998).

AUR presents to all practitioners of all specialties. It is therefore imperative that practitioners are able to diagnose and manage AUR appropriately.

Aetiology

Postulated aetiologies of AUR can be broadly classified into four groups (Raz et al, 1973; Choong and Emberton, 2000):

1. Increased resistance to flow – this is most commonly caused by an increase in the smooth muscle tone at the bladder neck, which may result in dynamic outflow obstruction. Mechanical obstruction such as a urethral stricture or prostatic enlargement may also result in AUR
2. Inappropriate detrusor muscle innervation – this may result from a primary neurological problem, e.g. a spinal cord lesion, diabetic neuropathy or a stroke
3. Bladder over-distension – this most commonly occurs postoperatively when the patient has not been catheterized perioperatively, and may also have received intravenous fluids and opiate or alpha-adrenergic medication. The inability to void perioperatively leads to bladder distension. Alcohol and postoperative pain may also cause urinary retention via this mechanism, for example after an inguinal hernia repair
4. Influence of drugs – antimuscarinic and alpha-adrenergic medications, for example oxybutynin and nasal decongestants, are acknowledged precipitants of AUR. Epidural anaesthesia can also precipitate urinary retention (*Table 1*).

Mr JJ Aning *is Urology Research Registrar,* **Dr J Horsnell** *is Urology Senior House Officer,* **Mr HW Gilbert** *is Consultant Urological Surgeon and* **Mr RB Kinder** *is Consultant Urological Surgeon, Department of Urology at Cheltenham General Hospital, Cheltenham GL53 7AN*

Correspondence to: Mr JJ Aning

History

A thorough history will often identify the likely cause of AUR. Patients present with a sudden inability to void that is usually associated with pain. This is frequently an acute and unheralded phenomenon but careful questioning may elicit a history of gradually deteriorating lower urinary tract symptoms (hesitancy, frequency, poor stream, post-micturition dribbling, incomplete bladder emptying) before the AUR episode. It is essential to take a full drug history, specifically asking about antimuscarinic medication and recreational drug usage. Constipation, urinary tract infections and excessive alcohol intake are common precipitants of AUR and should

Table 1. Aetiological factors related to acute urinary retention

Increased resistance	Benign prostatic hypertrophy
	Prostate cancer
	Urethral stricture
	Clot retention
	Infection
	Constipation
	Calculus
Inappropriate innervation	Trauma
	Neurological disorders (cerebrovascular accident, multiple sclerosis)
	Diabetes mellitus
	Drugs
Overdistension	Post general anaesthetic
	Alcohol

be considered. Macroscopic haematuria affects the immediate management of the patient and must be asked about before catheterizing the patient. It is appropriate to initiate treatment of the AUR while taking the history to relieve the patient's discomfort. Important topics to cover in the history are summarized in *Table 2*.

Examination

A systematic, comprehensive examination should be performed to confirm the diagnosis of AUR while not missing other important pathologies. Specific features to look for are:

- On inspection – evidence of abdominal distension or previous surgery. Look for and exclude the presence of a pulsatile swelling (abdominal aortic aneurysm)
- On palpation of the abdomen confirmation of bladder distension must be established. The distended bladder arises from the pelvis therefore it is not possible to get below it. The swelling should be in the midline (if no previous abdominal surgery), relatively fixed, and dull to percussion. The bladder may extend above the umbilicus if there is an element of chronic retention. Gentle pressure to the swelling may result in an urge to void or severe pain
- Examination of the external genitalia – this is mandatory and may reveal a phimosis, evidence of trauma or blood at the external urethral meatus
- Digital rectal examination (DRE) – this is also mandatory but should be performed after relief of the retention. The size, consistency and contour of the gland should be recorded. It is sufficient to classify the gland as small/medium/large, soft/firm or regular/irregular. Assess perineal sensation and anal tone to exclude cauda equina compression.

Investigations

The role of investigations in the management of AUR is to identify the underlying aetiology and assess the risk of complications secondary to AUR.

As part of the routine investigation of AUR the majority of patients will have a full blood count, urea and electrolytes and C-reactive protein measured. This enables the assessment of haemoglobin level, indicates whether infection may have contributed to the acute presentation and allows quantification of the level of renal impairment which may have occurred secondary to the obstruction. A catheter stream urine should be sent for microscopy and culture.

Table 2. Topics to cover in the history of a patient with acute urinary retention

Previous urinary symptoms	Dysuria
	Frequency
	Nocturia
	Post-micturition dribbling
	Haematuria
	Poor flow
Previous urological surgery	
Neurological symptoms	

Further investigations depend on the suspected underlying aetiology. An ultrasound scan of the renal tract is indicated if there is evidence of renal impairment. This assesses upper tract involvement, which manifests as hydronephrosis. This is significant as it implies high pressure urinary retention. An abdominal radiograph is unlikely to be useful unless there is a history consistent with renal colic before AUR. The value of prostate-specific antigen in AUR is unclear, may be spurious and does not affect the acute management of AUR. DRE after the relief of retention is more useful for identifying prostate cancer as a possible underlying pathology.

Management

Catheterization

The initial management of AUR is relief of the pain by prompt drainage of the bladder. This is achieved by insertion of a urethral or suprapubic catheter. The urethral route is the preferred initial method of catheterization in the UK (Manikandan et al, 2004), primarily because of the familiarity of health-care staff with this procedure. If passage of a urethral catheter is unsuccessful then suprapubic catheterization, if not contraindicated, should be performed by a competent individual. Kumar and Pati (2005) describe a number of suprapubic catheter insertion techniques. The authors' preferred method of suprapubic catheter insertion uses the Seldinger technique to place a balloon catheter. Bonanno catheters (Becton Dickinson, Oxford) are small calibre and have no balloon to keep them in situ, so are usually temporary adjuncts. In the authors' experience they are prone to blockages or displacement and should be avoided if possible.

Unguided suprapubic catheterization is contraindicated in the immediate management of AUR:

- If there is a past medical history of bladder cancer
- If there is a history of recent haematuria
- If there is any suspicion of clot retention.

The above factors are alert signals that the underlying pathogenesis of AUR may include bladder carcinoma. Suprapubic catheterization in the presence of bladder carcinoma may lead to the seeding of malignancy along the suprapubic tract and increase the risk of local and distant cancer spread. These patients require urethral catheterization and failing this analgesia followed by urgent cystoscopy to assess, diagnose and treat lower urinary tract pathology before relieving the obstruction.

Documentation

The history, residual volume (amount of urine voided on catheterization), renal function and DRE findings (specifically prostate size) at presentation provide invaluable infor-

mation as to the likely patient prognosis and must be documented. These factors specifically guide both the short- and long-term management plans regarding suitability for a trial without catheter and future follow up and intervention. Consent, catheter type and gauge, and ease of catheter insertion should also be recorded in the hospital notes (NHS Quality Improvement Scotland, 2004). The hourly urine output should be observed after initial catheterization. This is important because in acute or chronic retention with renal impairment there may be a profound early diuresis requiring careful attention to fluid balance.

Pharmacotherapy

- If there is evidence of urinary tract infection (UTI) or sepsis, commence antibiotics according to local protocols, taking into account patient history, observations, temperature, positive urinalysis or urine culture
- If the patient describes lower urinary tract symptoms and has a benign feeling prostate on DRE, commence an alpha blocker if a trial without catheter (TWOC) is going to be undertaken
- Aperients before TWOC are often beneficial if there is a recent history of constipation
- If prostate malignancy is suspected, appropriate treatment may improve lower urinary tract symptoms.

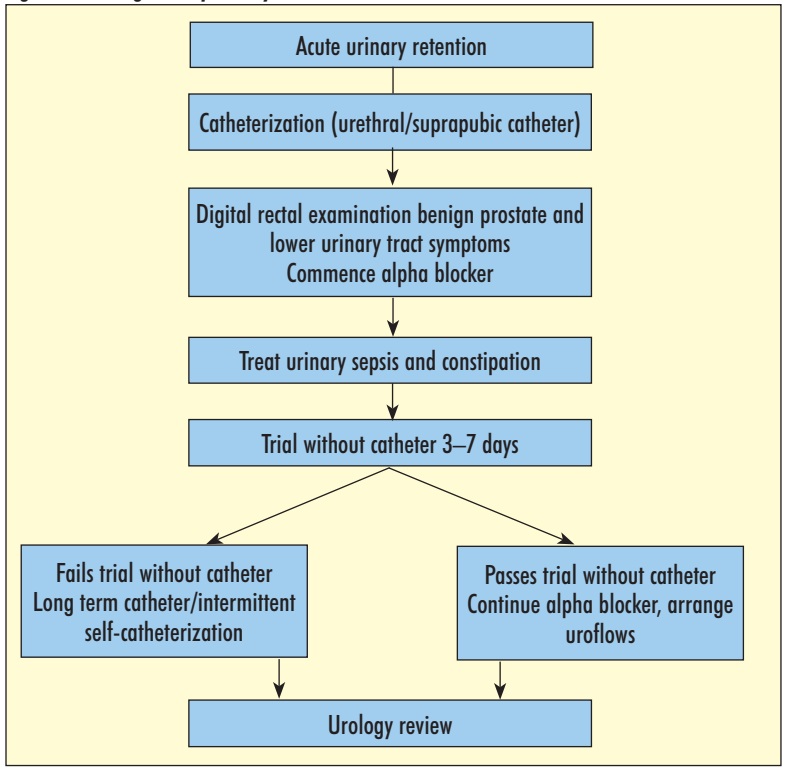
Decision to perform a trial without catheter

It may be inappropriate to perform a TWOC in some patients presenting with AUR. Evidence suggests that TWOC is of particular benefit in the following groups:

- Patients with gross constipation
- Patients who have had no previous lower urinary tract symptoms
- Patients prescribed with drugs with anticholinergic or alpha-adrenergic properties
- Patients in severe postoperative pain before their AUR.

In patients outside these categories it would be appropriate to consider a TWOC when a post-catheterization residual is less than 1 litre. Patients who had a residual greater than 1 litre are likely to fail a TWOC (Taube and Gajraj, 1989; Hastie et al, 1990). These patients should be referred to urology with a catheter in situ. If a postoperative patient suffers AUR at a time when he is bed bound, after for example hip surgery, it is appropriate to delay TWOC until reasonable mobility is attained.

Figure 1. Management pathway for acute retention.



Trial without catheter

The role of TWOC is to establish whether the patient can void unaided after AUR. To ensure that the patient has the best chance of voiding, a time between day 3 and day 7 after relief of the urinary retention episode should be considered for the TWOC (Djavan et al, 1998; Manikandan et al, 2004; Desgrandchamps et al, 2006). If the TWOC fails (unable to void adequately with residuals of more than 250 ml urine), the patient should be re-catheterized with a long-term catheter or taught to intermittently self catheterize and referred to the urology team. If the TWOC is successful, but the lower urinary tract symptoms persist, a referral to urology should be made. In AUR secondary to benign prostatic hyperplasia it is appropriate to continue alpha blockers after a successful TWOC.

Refer urology

The majority of patients who suffer AUR will require urology follow up. However, there are some exceptions:

- AUR secondary to constipation
- AUR secondary to a UTI with no previous lower urinary tract symptoms
- AUR secondary to postoperative pain only with no history of lower urinary tract symptoms
- The very elderly or patients with co-morbidities in whom surgery would not be appropriate (*Figure 1*).

Discussion

There is reasonable consensus on the management of AUR, but certain aspects of clinical practice are not evidence based (Manikandan et al, 2004). The rationale behind key management issues are discussed below.

Suprapubic *vs* urethral catheterization

Urethral catheters are prone to bacterial colonization and are thought to be associated with a higher incidence of UTIs in the pre- and perioperative period (Garibaldi et al, 1974; Djavan et al, 1998). There is, however, no convincing prospectively collected evidence that a short-term period of catheter drainage at home before readmission

for planned surgery results in increased risk of perioperative complications (Desgrandchamps et al, 2006).

Suprapubic catheters are associated with a lower morbidity from UTIs. Suprapubic catheters enable an easy trial of voiding and avoid further urethral trauma if the TWOC fails. Suprapubic catheter insertion does involve a risk of bowel perforation and catheter dislodgement.

Inpatient admission *vs* discharge and outpatient follow up

Once retention is relieved a decision needs to be made to admit or discharge the patient. If the patient is able to manage his catheter and is well, it is appropriate to consider discharge and arrange outpatient urology follow up. Contraindications to discharge include evidence of renal impairment, significant post-obstruction diuresis, sepsis, dehydration, and inability of the patient to manage his catheter and cope at home (Manikandan et al, 2004).

Alpha blockers

Alpha blockers work by reducing sympathetic tone at the bladder neck and thus reducing bladder outlet resistance (Lin et al, 1997). They have revolutionized the management of benign prostatic hyperplasia (McConnell et al, 2003) and increase the chance of a patient having a successful TWOC after an episode of acute retention. Up to 62% of patients will have a successful TWOC after receiving alfuzosin (McNeill et al, 2005).

The trial without catheter

TWOC is accepted as part of the management of AUR. It allows patients to avoid unnecessary surgery. Prospective and retrospective studies confirm that over 80% of patients with benign prostatic hyperplasia will require surgery within 7 years of initial presentation with AUR (Craigen et al, 1969; Breum et al, 1982; Klarsov et al, 1987).

AUR in women

The aetiologies of AUR in women are classically classified as neurological, pharmacological, anatomical, myopathic, functional and psychogenic (Walsh et al, 2002). AUR often presents in the obstetric and gynaecological environments, e.g. immediately post partum. In the authors' experience the causes may obscure and the differential diagnosis must include bladder tumour, pelvic nerve damage and uterine enlargement, for example secondary to fibroids. In the absence of specific pathological causes Fowler's syndrome may need to be considered.

Conclusions

AUR is a common and painful emergency requiring urgent relief. The aetiology of AUR can be multifactorial although the initial management is uniform. Understanding the principles of further management will facilitate the patient's management pathway. BJHM

Conflict of interest: none.

Breum L, Klarskov P, Munck LK, Nielsen TH, Nordestgaard AG (1982) Significance of acute urinary retention due to intravesical obstruction. *Scan J Urol Nephrol* **16:** 21–4

Cathcart P, Van der Meulen J, Armitage J, Emberton M (2006) Incidence of primary and recurrent acute urinary retention between 1998 and 2003 in England. *J Urol* **176:** 200–4

Choong S, Emberton M (2000) Acute urinary retention. *BJU Int* **85:** 186–201

Craigen AA, Hickling JB, Saunders CRG, Carpenter MA (1969) Natural history of prostatic obstruction. *J R Coll Gen Pract* **18:** 226–32

Department of Health (2003) *Hospital Episode Statistics, 2002-03.* Department of Health, London

Desgrandchamps F, De La Taille A, Doublet JD (2006) The management of acute urinary retention in France: a cross sectional survey in 2618 men with benign prostatic hyperplasia. *BJU Int* **97:** 727–33

Djavan B, Shariat S, Omar M et al (1998) Does prolonged catheter drainage improve the chances of recovering voluntary voiding after acute urinary retention? *Eur Urol* **33:** 110

Garibaldi RA, Burke JP, Dickman ML, Smith CB (1974) Factors predisposing to bacturia during indwelling urethral catheterisation. *N Engl J Med* **291:** 215–19

Hastie KJ, Dickinson AJ, Ahmad R, Moisey CU (1990) Acute retention of urine: is a trial without catheter justified. *J R Coll Surg Edin* **35:** 225–7

Jacobsen SJ, Jacobsen DJ, Girman CJ et al (1997) Natural history of prostatism: risk factors for acute urinary retention. *J Urol* **158:** 481–7

Klarskov P, Andersen JT, Asmussen CF et al (1987) Symptoms and signs predictive of the voiding pattern after acute urinary retention in men. *Scan J Urol Nephrol* **21:** 23–8

Kumar P, Pati J (2005) Suprapubic catheters: indications and complications. *BJHM* **66**(8): 466–8

Lin VK, Benaim EA, Vazquez DJ, McConnell JD (1997) Prostatic smooth muscle gene expression is modulated by androgen ablation and alpha blockade. *J Urol* **157:** 280 (Abst 1088)

Manikandan R, Srirangam SJ, O'Reilly PH, Collins GN (2004) Management of acute urinary retention secondary to benign prostatic hyperplasia in the UK: a national survey. *BJU Int* **93:** 84–8

McConnell JD, Roehrborn CG, Bautista OM et al (2003) The long term effect of doxazosin, finasteride, and combination therapy on the clinical progression of benign prostatic hyperplasia. *N Engl J Med* **349**(25): 2387–98

McNeill SA, Hargreaves TB, Roehrborn CG, ALFAUR Study Group (2005) Alfuzosin 10mg once daily in the management of acute urinary retention: results of a double-blind placebo controlled study. *Urology* **65**(1): 83–90

NHS Quality Improvement Scotland (2004) *Best Practice Statement: urinary catheterisation and catheter care.* NHS Quality Improvement Scotland, Edinburgh (www.nhshealthquality.org/nhsqis/files/Urinary_Cath_COMPLETE.pdf accessed 25 July 2007)

Pickard R, Emberton M, Neal DE (1998) The management of men with acute urinary retention. *BJU Int* **81:** 712–20

Raz S, Zeigler M, Caine M (1973) Pharmacological receptors in the prostate. *Br J Urol* **45:** 663

Taube M, Gajraj H (1989) Trial without catheter following acute retention of urine. *Br J Urol* **63:** 180–2

Walsh PC, Retik AB, Vaughan ED, Wein AJ eds (2002) *Campbell's Urology.* Vol 2. Saunders, New York: 959–60

KEY POINTS

- The immediate management of acute urinary retention is catheterization and relief of pain.
- Suprapubic catheterization is contraindicated if bladder malignancy is suspected.
- Alpha blockers should be commenced if acute urinary retention is secondary to benign prostatic hyperplasia.
- Urinary tract sepsis and constipation should be treated before trial without catheter.
- A trial without catheter is appropriate 3–7 days after the initial acute urinary retention episode.
- Urology referral is appropriate in the majority of cases of acute urinary retention as these patients are likely to require surgical intervention in the future.
- Documentation is mandatory.