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Management of Acute and Chronic Retention in Men

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Abstract

Urinary retention is complex and may present in various ways as a result of a myriad of pathologic processes. Retention is >10 times more common in men than in women, and acute urinary retention (AUR) is rare in younger men; men in their 70 s are at five times more risk of AUR than men in their 40 s. Most of the epidemiologic data referred to in the literature are for AUR; data for chronic urinary retention (CUR) are sparse. Management of urinary retention must begin with modifying risk factors for developing AUR by using 5α-reductase inhibitors, follow-up, and early surgical intervention for those who may benefit. Once retention occurs, delay of surgery when possible must be the aim to reduce the risk of perioperative morbidity and mortality as well as to allow the bladder to recover its contractility. Finally, perhaps it is time to use suprapubic catheterisation for retention patients as a first-line approach.

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1. Introduction

Urinary retention remains an important health issue. It is associated with significant reduction in patients' quality of life, and its impact has been compared with an episode of renal colic [1]. Urinary retention is complex and may present in various ways as a result of a myriad of pathologic processes. Additionally, the plethora of definitions of *retention* in the literature makes this condition even more difficult to understand. *Urinary retention* is the inability to empty the bladder to completion [2]. It may be acute, chronic, or acute on chronic.

2. Epidemiology

Community-based studies suggest that 10% of men in their 70 s have experienced acute urinary retention (AUR) over a 5-yr period; the risk increases to one in three over 10 yr [1,3]. AUR is rare in younger men; men in their 70 s are at five times more risk of AUR than men in their 40 s [2,4]. It can be calculated that a 60-yr-old man would have a 23% probability of experiencing AUR if he were to reach the age of 80 [4]. Precipitated AUR is less common than spontaneous AUR in older men, and this has implications for their management [1,5].

Retention is >10 times more common in men than in women, in whom an underlying neurologic cause should always be considered [3]. The most common underlying causes in women are infection or inflammation occurring postpartum or secondary to herpes, Bartholin's abscess, acute urethritis, or vulvovaginitis. AUR is rare in children and is usually associated with infection or occurs postoperatively. Most of the epidemiologic data referred to in the literature are for AUR; data for chronic urinary retention (CUR) are sparse [2].

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3. Aetiology

3.1. *Acute retention*

AUR is usually characterised by the sudden, painful inability to void; painless AUR is rare and is often associated with central nervous system pathology [1–3,5]. AUR may be further subdivided into precipitated or spontaneous retention [1,2,5].

Precipitated AUR may be triggered by such events as surgical procedures with general or locoregional anaesthesia, excessive fluid intake, bladder overdistension, urinary tract infections (UTIs), prostatic inflammation, excessive alcohol intake, or use of drugs with sympathomimetic or anticholinergic drugs [1,2,5].

In most cases, no triggering event is identified and AUR is called *spontaneous*. Spontaneous AUR is most commonly associated with benign prostatic hyperplasia (BPH) and is regarded as a sign of progression [1,2,5]. The difference between precipitated and spontaneous retention has clinical relevance because BPH surgery is less common in cases of precipitated AUR [1,5].

AUR occurs in an obstructed or decompensated lower urinary tract. The exact cause of AUR is unclear; however, several mechanisms have been suggested. These include increased resistance to flow of urine with either mechanical obstruction (urethral stricture, clot retention) or dynamic obstruction (increased α-adrenergic activity, prostatic inflammation); bladder overdistension (immobility, constipation, drugs inhibiting bladder contractility); and neuropathic causes (diabetic cystopathy) [1,2,3,5]. Underlying causes are shown in Figure 1.

3.2. *Chronic retention*

The aetiology of CUR is more complex and can be divided into high-pressure chronic retention (HPCR) and low-pressure chronic retention (LPCR) [6–8]. The terms *high* and *low* refer to the detrusor pressure at the end of micturition (ie, at the start of the next filling phase) [7,8]. Bladder outlet obstruction usually exists in HPCR, and the voiding detrusor pressure is high but is associated with poor urinary flow rates. The constantly raised bladder pressure in HPCR during both the storage and voiding phases of micturition creates a backward pressure on the upper-tract drainage and results in bilateral hydronephrosis. Other patients may have large-volume retention in a very compliant bladder with no hydronephrosis or renal failure, and they are said to have LPCR. Urodynamic studies in these patients show low detrusor pressures, low flow rates, and very large residual volumes. Lower urinary tract symptoms (LUTS), however, are usually mild in CUR, certainly in the early stages, until the onset of nocturnal enuresis, which results from the drop in urethral resistance during sleep. In nocturnal enuresis, urethral resistance is overcome by the maintained high bladder pressure, which causes incontinence (sometimes inappropriately called *overflow incontinence*).

Obstructive

- Mechanical obstruction (eg, benign prostatic hyperplasia, urethral stricture)
- Dynamic obstruction (ie, increase in smooth muscle tone; eg, postoperative pain, drugs)

Neurological

- Interruption of sensory or motor innervation to the bladder (eg, pelvic surgery, multiple sclerosis, spinal injury, diabetes)

Myogenic

- Overdistension of the bladder (eg, postanaesthesia, high alcohol intake)

Fig. 1 – Aetiology of urinary retention.

4. Pathology and pathogenesis

The following five factors have been implicated in pathogenesis [1,3,5,9,10]: prostatic infarction, α-adrenergic activity, decrease in the stromal–epithelial ratio, neurotransmitter modulation, and prostatic inflammation.

Prostatic infarction caused by infection, instrumentation, and thrombosis is far more common in prostatectomy specimens after AUR than in transurethral resection of the prostate (TURP) specimens for LUTS alone. This condition may lead to neurogenic disturbance, preventing relaxation of the prostatic urethra, or to swelling and a rise in urethral pressure.

Some cases of AUR are associated with a rise in the prostatic intraurethral pressure through an increase in α-adrenergic stimulation (eg, stress, cold weather, sympathomimetic agents used in cold remedies). Prostatic infarction or prostatitis may contribute to this process. Bladder overdistension also leads to increased adrenergic tone.

A decrease in the stromal–epithelial ratio has been noted in AUR. This decrease may partly explain the effect of the agent finasteride, which is known to act mainly on the epithelial component of the prostate and has been reported to reduce the risk of retention.

Reduction of nonadrenergic, noncholinergic transmitters (eg, vasoactive polypeptide [VIP], neuropeptide Y [NPY]) has been postulated as an underlying cause.

Finally, Tuncel et al reported an increased incidence of prostatic inflammation in men with AUR compared with men with LUTS. This finding is further supported by evidence suggesting that prostatic inflammation may be a predictor of BPH progression.

5. Presentation and initial assessment

5.1. *Acute retention*

The most common presentation is a patient with lower abdominal pain and swelling, an inability to pass urine (or passing only small amounts of urine), and a palpable mass that arises from the pelvis and that is dull to percussion. Although it is stated that patients with AUR usually do not have previous LUTS, it is more likely that many of these patients did not complain of these symptoms before; either they might not have recognised the significance of their symptoms or they might have assumed the symptoms to be an inevitable consequence of ageing. Examination should include a digital rectal examination that notes size and texture of the prostate, anal tone, and presence or absence of constipation. Although AUR is primarily a clinical diagnosis, a bladder volume scan (if available) will further confirm the diagnosis before catheterisation. The volume drained is usually <1 l; if the volume drained is ≥ 1 l, this can be used as a distinction between acute and acute-on-chronic retention, particularly if associated with less pain (a finding that is more typical of CUR).

5.2. *Chronic retention*

CUR occurs when a patient retains a substantial amount of urine in the bladder after each void [2,6]. Defining a volume for CUR is more difficult. The finding of persistent residual volumes of >300 ml (some authors suggest >500 ml) after voiding is often used as evidence of CUR; some patients may present with many litres in their bladders [2,6–8]. Patients may be asymptomatic or may describe low-volume micturition, increased frequency, or difficulty initiating and maintaining micturition. Other features of CUR include nocturnal incontinence, a palpable but painless bladder, and signs of chronic renal failure [2,6]. LUTS are uncommon [7,8].

In both types of retention, urinalysis should always be performed and a catheter specimen of urine (CSU) should be sent if there are signs of infection. Urinary infection should be treated. Urea, creatinine, and electrolytes should be checked; this is especially important in HPCR. Renal ultrasound is indicated in patients with high-volume retention and in patients with abnormal renal function. Prostate-specific antigen (PSA) testing is best avoided during the acute episode, since any instrumentation of the prostate leads to a spurious rise in PSA [11].

6. Differential diagnosis

Differential diagnosis is not usually difficult, but diverticulitis or a diverticular abscess, perforated or ischaemic bowel, or abdominal aortic aneurysm are all recognised as potentially more serious conditions that can be referred into hospital as *acute retention*. Urinary retention may occur secondary to any of the above conditions; therefore, the patient should be reexamined soon after catheterisation to confirm that the symptoms and signs have resolved. Additionally, any patient with an abdominal mass should be considered for catheterisation to exclude a distended bladder prior to further examination or investigation. Occasionally, an obese patient with renal failure may be mistaken for a case of AUR.

7. Management

7.1. *Acute retention*

Treatment of acute retention (Fig. 2) requires urgent catheterisation. Whether patients are catheterised at home by a general practitioner, in accident and emergency departments, or in surgical or urology wards depends mainly on local circumstances, as does the decision to admit or send home after catheterisation [1,5,12]. Keeping patients in hospital awaiting definitive treatment results in a longer total hospital stay [5].

The urine volume drained in the first 10–15 min following catheterisation must be accurately recorded in the patient's notes to enable a distinction between acute and acute-on-chronic retention. This has important clinical implications. The results of the Alfuzosin in Acute Urinary Retention (ALFAUR) study show a significantly increased risk of failure for trial without catheterisation (TWOC) in the elderly ($\geq$65 yr) and in patients with a drained volume ≥ 1 l [5]. In the second part of the study, patients with initially successful TWOC were more likely to have recurrent AUR if their post-TWOC

Normal renal function

If no: Montor fluid balance; check renal function daily; elective TURP if fit, long-term catheter if not

If yes: Prostate feels benign

If no: Further investigation for prostate cancer

If yes: Retention <1 l or no LUTS or no precipitating cause

If no; Teach catheter care and use of flip-flow valve/leg bag, discharge for date for TURP

If yes: Commence α-blocker, laxatives, TWOC at 48 h

Yes: Successful TWOC

If no: Teach catheter care and use of flip-flow valve/leg bag, discharge for date for TURP

If yes: Discharge on α-blocker or 5α-reductase inhibitor, review in outpatients with flow rate and residual volume estimation

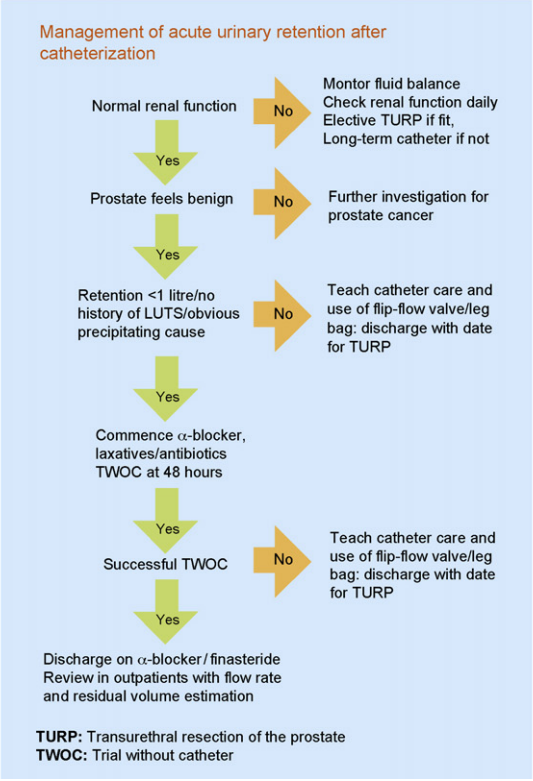

Fig. 2 – Management of acute retention after catheterisation. LUTS = lower urinary tract symptoms; TURP = transurethral resection of the prostate; TWOC = trial without catheter.

volume was high. It has been proposed that these patients should be offered elective TURP at an earlier stage.

7.2. *Chronic retention*

The management of CUR is more complex (Fig. 3). Catheterisation is less urgent because the condition

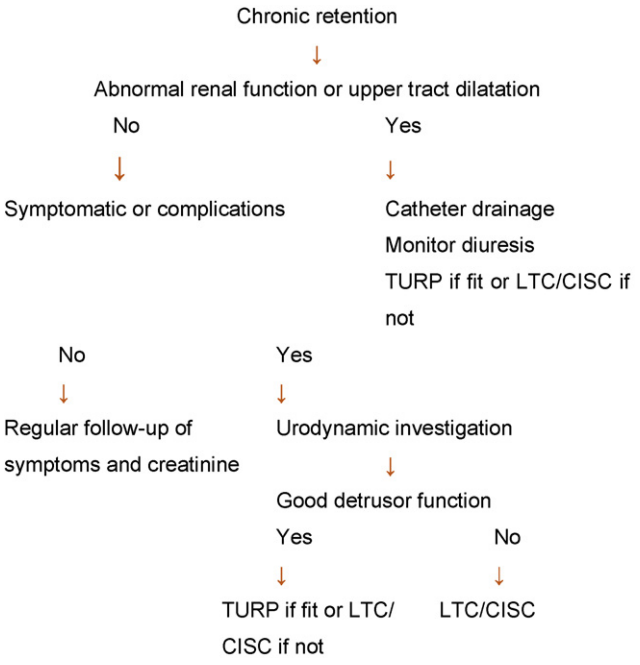

Fig. 3 – Management of chronic urinary retention. CISC = clean intermittent self-catheterisation; LTC = long-term catheter; TURP = transurethral resection of the prostate.

is generally less painful or painless. Early catheterisation is indicated if renal dysfunction or upper tract dilatation is present. Patients must be monitored for postobstructive diuresis and may pass many litres of urine in the first few days following catheterisation. The diuresis can result from offloading of retained salt and water (retained in the weeks prior to the episode of retention); loss of the corticomedullary concentration gradient, caused by reduced urinary flow through the chronically obstructed kidney; or a high urea level that results in osmotic diuresis.

In about 10% of cases, diuresis is excessive and requires careful fluid replacement. Daily weighing is an accurate way of monitoring fluid output. After the first 24 h, fluid replacement should not strictly follow output; this would perpetuate the diuresis. Potassium levels, which are often high, should be monitored and will usually (but not always) fall with the diuresis. Catheterisation is often followed by haematuria; this is caused by renal tract decompression and not usually by the catheter itself. The practice of slow decompression is unnecessary, and haematuria usually settles after 48–72 h. If there is evidence of renal failure, which settles with catheterisation, the patient should not undergo a TWOC before a definitive procedure has been considered. If presenting electively through out-

patients, the indications for catheterisation before TURP in cases of CUR are, again, renal impairment and water and salt retention; otherwise, it is best to avoid catheterisation so as to avoid infection and bladder shrinkage before TURP, but the patients should be listed for early surgery. Patients with LPCR do poorly after TURP, frequently failing to void completely after surgery, even after prolonged periods of catheterisation; this is probably due to detrusor changes over time [6,12]. Intermittent self-catheterisation (ISC) should be considered in this group [6].

7.3. *Urethral versus suprapubic catheterisation*

The principal advantages of suprapubic catheterisation are fewer UTIs, less stricture formation, and permission of TWOC without catheter removal [13–16]. Patients have frequently expressed a preference for suprapubic catheterisation with increased comfort [13–17]. The latter is often overlooked when deciding on the type of catheter to provide patients; the ability to maintain active sexual function is particularly important to some patients [17]. A significant number of patients will fail TWOC and will often have to undergo repeat catheterisation, with all the resulting discomfort [5]. The benefits of suprapubic catheterisation in AUR have been shown in many studies [13–16], and it could be regarded as the preferred route of catheterisation. The recent Reten-World survey, however, reported that most urologists performed urethral catheterisation (>80%) with suprapubic catheters (SPCs) inserted for urethral catheter failures [5]. Additionally, the survey also reported similar complication rates for both types of catheter. Surprisingly, there was no difference in asymptomatic bacteriuria, lower UTI, or urosepsis between the two catheterisation approaches. This may be a result of shorter catheterisation duration and evolution in catheter types. Urethral catheters were associated with an increased incidence of urinary leakage.

Some disadvantages are associated with SPC insertion. It is a more complex procedure that not all health professionals are adequately skilled to perform [17,18]. Serious complications, such as bowel perforation and peritonitis, have been reported [19]. Concerns regarding SPC safety may disappear in the future with the introduction of the potentially safer Seldinger SPC catheters. This is a new type of SPC insertion kit that replaces the traditional blind insertion of the trocar with SPC insertion over a guidewire [20,21]. This kit has been shown in a very small study to be associated with increased patient satisfaction and clinician confidence [21]. It is hoped that, in the future, this kit may support the training of junior doctors, thereby allowing the use of SPC insertion in the emergency setting.

7.4. *Trial without catheter*

TWOC is now considered for most patients. It involves catheter removal after 1–3 d, allowing the patient to successfully void in 23–40% of cases [1,5], which enables patients to return home without the potential morbidities associated with an in situ catheter [5]. TWOC also allows surgery to be delayed to an elective setting or may prevent the need for surgery [1,5]. Factors leading to a high probability of successful TWOC include lower age (<65 yr); UTI with no previous obstructive symptoms; identified precipitating cause (eg, gross constipation, recently started anticholinergic or sympathomimetic drugs); postvoid residual (PVR) <1000 ml; and prolonged catheterisation. Conversely, factors leading to a high probability of unsuccessful TWOC include patient age >75 yr, drained volume >1 l, previous LUTS, and voiding detrusor contraction (on urodynamics) of <35 cmH_2O [1,5,22].

The duration of catheterisation before TWOC alters the chance of a successful trial of catheter removal [1,3,5,22]. In one study, a successful TWOC was achieved in 44% of patients after 1 d of catheterisation, in 51% of patients after 2 d, and in 62% of patients after 7 d [3]. Patients most likely to benefit from prolonged catheterisation were those with PVR >1300 ml [1,3,5]. Catheterisation >3 d, however, significantly increased the risk of comorbidities and prolonged hospitalisation [3,5].

Half of those for whom initial TWOC is successful will experience recurrent AUR over the next year and 35% will require surgery within the following 6 mo [1,5]. Patients with PVR >500 ml, no precipitating factor for AUR, and maximum flow rate <5 ml/s were at increased risk of further retention [23]. In the ALFAUR study, most of the patients who required surgery after a successful TWOC needed it for recurrent AUR [1,5]. This emphasises the importance of follow-up for patients with risk factors for recurrent AUR, despite initial successful TWOC.

7.5. *Alpha-blockers and trial without catheter*

AUR due to BPH may be associated with an increase in α-adrenergic activity [1,24]. Inhibition of these receptors by α-blockers may decrease bladder outlet resistance, thereby facilitating normal micturition [1,24]. Alfuzosin 10 mg daily for 2–3 d after catheterisation almost doubles the likelihood of a successful TWOC, even in patients who are elderly (≥65 yr) with

PVR $\geq$ 1000 ml [1,5,24]. Furthermore, continued use of alfuzosin significantly reduced the risk of BPH surgery in the first 3 mo; this effect was not significant after 6 mo [1,5]. This allows more patients to return home without a catheter in situ, thereby reducing the subsequent perioperative complications of prostate surgery [23]. Patients at risk of recurrent AUR after successful TWOC had a high PSA and PVR [1,5]. Similar work with tamsulosin confirms these findings. The Reten-World survey revealed that 82% of patients received an α1-blocker before catheter removal; TWOC success was greater in those receiving α-blockers, regardless of age [5].

7.6. *Hospitalise or send home?*

The decision regarding whether to admit patients or to send them home is dependent on local resources and preference [1,5,22]. A UK survey found that most urologists (65.5%) preferred to admit their patients, with 19.3% only admitting in the presence of abnormal renal function [22].

7.7. *The role of clean intermittent self-catheterisation*

Clean intermittent self-catheterisation (CISC) is an alternative to an indwelling catheter. It is a safe, simple, and well-accepted technique that results in fewer UTIs than indwelling catheterisation [3,6]. There are no external devices, and maintenance of sexual activity is possible. It may also increase the rate of successful spontaneous voiding. CISC can be used instead of an indwelling catheter after an episode of AUR or CUR or it can be used in patients who fail to void following a prostatectomy (who go into retention secondary to detrusor failure following TURP). This is particularly important for patients with neurological bladder dysfunction. A period of CISC prior to TURP may be useful in patients with LPCR, as it may allow recovery of bladder contractility.

7.8. *Prostatectomy after retention*

Previously, AUR was considered an absolute indication for TURP [1,3,5]. More recently, however, other treatments have been considered. AUR is the indication for prostatectomy in 25% of patients in the United States and in $\leq$50% of patients in the United Kingdom. Prostatectomy after AUR is associated with an increased morbidity due to infection, perioperative bleeding, and increased transfusion rates as well as with a $\leq$3-fold increase in mortality. Additionally, a higher percentage of men fail to void after TURP compared with men undergoing surgery for symptoms alone [3].

8. Prevention and risk factors

Community-based studies and the placebo arms of long-term randomised studies have identified predictive risk factors for AUR [4]. Risk factors include men >70 yr of age with LUTS, an International Prostate Symptom Score (IPSS) >7 (ie, moderate or severe LUTS), a flow rate of <12 ml/s and/or a prostate volume of >40 cm^2 or a PSA >1.4 ng/ml. Studies have suggested that hesitancy may also predict a greater risk of subsequent AUR. Placebo-controlled trials have shown that treatment with 5α-reductase inhibitors for periods of >6 mo reduces the risk of AUR by >50%.

9. Conclusions

Urinary retention remains a significant burden for both the patient and health care services. The management of this condition must begin with modifying risk factors for developing AUR with 5α-reductase inhibitors, with follow-up, and with early surgical intervention for those who may benefit. Once retention occurs, delay of surgery when possible must be the aim to reduce the risk of perioperative morbidity and mortality as well as to allow the bladder to recover its contractility. This is the situation in which the use of α1-blockers and TWOC are most useful. Finally, perhaps it is time to use SPC for retention patients as a first-line approach, as many studies have long suggested.

Conflicts of interest

The authors have nothing to disclose.

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