

Chapter 2

Lower Urinary Tract Emergencies

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ACUTE URINARY RETENTION

Definition

Painful inability to void, with relief of pain following drainage of the bladder by catheterisation.

The combination of reduced or absent urine output with lower abdominal pain is not in itself enough to make a diagnosis of acute retention. Many acute surgical conditions cause abdominal pain and fluid depletion, the latter leading to reduced urine output, and this reduced urine output can give the erroneous impression that the patient is in retention, when in fact they are not. Thus, central to the diagnosis is the presence of a *large* volume of urine, which when drained by catheterisation, leads to resolution of the pain. What represents 'large' has not been strictly defined, but volumes of 500 to 800 mL are typical. Volumes <500 mL should lead one to question the diagnosis. Volumes >800 mL are defined as acute-on-chronic retention (see *Is It Acute or Chronic Retention?* below).

Pathophysiology

There are three broad mechanisms:

- increased urethral *resistance*, i.e., bladder outlet obstruction (BOO)
- low bladder *pressure*, i.e., impaired bladder contractility
- interruption of sensory or motor innervation of the bladder

Causes in Men

The commonest cause is benign prostatic enlargement (BPE) due to benign prostatic hyperplasia (BPH) leading to BOO; less common causes include malignant enlargement of the prostate, urethral stricture, and, rarely, prostatic abscess.

Urinary retention in men is either *spontaneous* or *precipitated by an event*. Precipitated retention is less likely to recur once the event that caused it has been removed. Spontaneous retention is more likely to recur after a trial of catheter removal, and therefore is more likely to require definitive treatment, e.g., transurethral resection of the prostate (TURP). Precipitating events include anaesthetics and other drugs (anticholinergics, sympathomimetic agents such as ephedrine in nasal decongestants); nonprostatic abdominal or perineal surgery; and immobility following surgical procedures, e.g., total hip replacement.

Causes in Women

There are more possible causes in women, but acute urinary retention is less common than it is in men. The causes include pelvic prolapse (cystocele, rectocele, uterine), the prolapsing organ directly compressing the urethra; urethral stricture; urethral diverticulum; postsurgery for 'stress' incontinence; Fowler's syndrome (impaired relaxation of external sphincter occurring in premenopausal women, often in association with polycystic ovaries); and pelvic masses (e.g., ovarian masses) (Fowler 2003).

Causes in Either Sex

A wide variety of pathologies can cause urinary retention in both men and women: haematuria leading to clot retention; drugs (as above); pain (adrenergic stimulation of the bladder neck); postoperative retention; sacral (S2–S4) nerve compression or damage—so-called cauda equina compression (due to prolapsed L2–L3 disc or L3–L4 intervertebral disc, trauma to the vertebrae, benign or metastatic tumours); radical pelvic surgery damaging the parasympathetic plexus (radical hysterectomy, abdominoperineal resection); pelvic fracture rupturing the urethra (more likely in men than women); neurotropic viruses involving the sensory dorsal root ganglia of S2–S4 (herpes simplex or zoster); multiple sclerosis; transverse myelitis; diabetic cystopathy; damage to dorsal columns of spinal cord causing loss of bladder sensation (tabes dorsalis, pernicious anaemia).

Neurological Causes of Retention—A Word of Warning!

It is all too easy to assume that urinary retention in a man is due to BPH. Of course this is by far the commonest cause in elderly men, but in the younger man (below the age of 60, but even in some men older than 60), spend a few moments considering whether there might be some other cause. Similarly, in women,

where retention is much less common than in men, think *why* the patient went into retention.

Be wary of the patient with a history of constipation and be particularly wary where there is associated back pain. We all get back pain from time to time, but pain of neurological origin, such as that due to a spinal tumour or due to cauda equina compression from a prolapsed intervertebral disc (pressing on S2–S4 nerve roots, thereby impairing bladder contraction) may be severe, relentless, and progressive. The patient may say that the pain has become severe in the weeks before the episode of retention. Nighttime back pain and sciatica (pain shooting down the back of the thigh and legs), which are relieved by sitting in a chair or by pacing around the bedroom at night, are typical of the pain caused by a neurofibroma or ependymoma affecting the cauda equina. Interscapular back pain is typically caused by tumours that have metastasized to the thoracic spine.

Altered sensation due to a cauda equina compression can manifest as the inability to tell whether the bladder is full, inability to feel urine passing down their urethra while voiding, and difficulty in knowing whether one is going to pass faeces or flatus.

Male patients with a neurological cause for their retention (such as spinal tumour) may report symptoms of sexual dysfunction that may appear bizarre (and may therefore be dismissed). They might have lost the ability to get an erection or have lost the sensation of orgasm. They might complain of odd burning or tingling sensations in the perineum or penis.

It doesn't take more than a minute or two to ask a few relevant questions (Are you constipated? Have you had back pain? Do your legs feel funny or weak?), to establish whether the patient has a sensory-level sign (the cardinal sign of a cord compression) and other neurological signs and to test the integrity of the sacral nerve roots that subserve bladder function—S2 to S4. In the male patient, this can be done by squeezing the glans of the penis while performing a digital rectal examination (DRE). Contraction of the anus, felt by the physician's palpating finger, indicates that the afferent and efferent sacral nerves and the sacral cord are intact. This is the bulbocavernosus reflex (BCR). In women, once catheterised, the 'same' reflex can be elicited by gently tugging the catheter onto the bladder neck, again while doing a DRE. Again, contraction of the anus indicates that the afferent and efferent sacral nerves and the sacral cord are intact.

If you don't know about these rare causes of retention, you won't think to ask the relevant questions. Missing the diagnosis

in such cases can have profound implications for the patient (and for you!). One should have a low threshold for arranging an urgent magnetic resonance imaging (MRI) scan of the thoracic, lumbar, and sacral cord, and of the cauda equina in patients who present in urinary retention with these additional symptoms or signs.

Risk Factors for Postoperative Retention

Postoperative retention may be precipitated by instrumentation of the lower urinary tract; surgery to the perineum or anorectum; gynaecological surgery; bladder overdistention; reduced sensation of bladder fullness; preexisting prostatic obstruction; and epidural anaesthesia. Postpartum urinary retention is not uncommon, particularly with epidural anaesthesia and instrumental delivery.

Urinary Retention: Initial Management

Urethral catheterisation is the mainstay of initial management of urinary retention. This relieves the pain of the overdistended bladder. If it is not possible to pass a catheter urethrally, then a suprapubic catheter will be required. Record the volume drained—this confirms the diagnosis, determines subsequent management, and provides prognostic information with regard to outcome from this treatment.

IS IT ACUTE OR CHRONIC RETENTION?

There is a group of elderly men who are in urinary retention, but who are not aware of it. This is so-called high-pressure chronic retention. Mitchell (1984) defined high-pressure chronic retention of urine as maintenance of voiding, with a bladder volume of >800 mL and an intravesical pressure above 30 cm H₂O, often accompanied by hydronephrosis (Abrams et al. 1978, George et al. 1983). Over time this leads to renal failure. The patient continues to void spontaneously and will often have no sensation of incomplete emptying. His bladder seems to be insensitive to the gross distention. Often the first presenting symptom is bed-wetting. This is such an unpleasant and disruptive symptom that it will cause most people to visit their doctor. In such cases inspection of the abdomen will show gross distention of the bladder; which may be confirmed by palpation and percussion of the tense bladder.

Sometimes the patient with high-pressure chronic retention is suddenly unable to pass urine, and in this situation so-called acute-on-chronic high-pressure retention of urine has developed.

On catheterisation, a large volume of urine is drained from the bladder (often in the order of 1 to 2L and sometimes much greater). The serum creatinine will be elevated and an ultrasound will show hydronephrosis (Fig. 2.1) with a grossly distended bladder.

Recording the volume of urine obtained following catheterisation can help define two groups of patients, those with acute retention of urine (retention volume <800mls) and those with acute-on-chronic retention (retention volume >800mls). Prior to catheterisation, if the patient reports recent bedwetting you may suspect that you are dealing with a case of high-pressure acute-on-chronic retention. The retention volume will confirm the diagnosis.

Where the patient has a high retention volume (more than a couple of litres), the serum creatinine is elevated, and a renal ultrasound shows hydronephrosis, anticipate that a post-obstructive diuresis is going to occur. This can be very marked and is due to a number of factors:

- Reduction in urine flow through the loop of Henle removes the 'driving force' behind development of the corticomedullary concentration gradient. In addition, continued perfusion of the kidney effectively also 'washes out' this gradient, which is



FIGURE 2.1. Hydronephrosis in a case of high-pressure chronic retention.

essential for allowing the kidney to concentrate urine. Once normal flow through the nephron has recommenced following emptying of the bladder and removal of the back pressure on the kidney, it takes a few days for this corticomedullary concentration gradient to be re-established. During this period, the kidney cannot concentrate the urine and a diuresis occurs until the corticomedullary concentration gradient is re-established.

- The elevated serum urea acts as an osmotic diuretic.
- Excessive salt and water, laid down during the period of retention, is appropriately excreted by the kidney.

Usually the patient comes to no harm from this diuresis, even when several litres of urine are excreted per 24 hours. However, occasionally the intravascular volume may fall and postural hypotension may develop. One good way of anticipating this is to record lying and standing blood pressure. If there is a large discrepancy between the two, consider intravenous fluid replacement with normal saline.

WHAT TO DO NEXT FOR THE MAN WITH ACUTE RETENTION

Precipitated retention often does not recur. Spontaneous retention often does.

Precipitated urinary retention should be managed by a trial of catheter removal. In spontaneous retention, many urologists will try to avoid proceeding straight to TURP after just one episode of retention, instead recommending a trial of catheter removal, with or without an alpha blocker, in the hope that the patient will void spontaneously and avoid the need for operation. A trial without catheter is clearly not appropriate in cases where there is back pressure on the kidneys—high-pressure retention. About a quarter of men with acute retention will void successfully after a trial without catheter (Djavan et al. 1997, Hastie et al. 1990). Of those who pass urine successfully after an initial episode of retention, about 50% will go back into retention within a week, 60% within a month, and 70% after a year. This means that after 1 year, only about one in 5 to 10 men originally presenting with urinary retention will not have gone back into retention. Recurrent retention is more likely in those with a flow rate <5 mL/s or average voided volumes of <150 mL. An alpha blocker started 24 hours before a trial of catheter removal increases the chances of voiding successfully (30% taking placebo voiding successfully, and 50% taking an alpha doing so; McNeill et al. 1999). However,

whether continued use of an alpha blocker after an episode of acute retention reduces the risk of a further episode of retention (McNeill et al. 2001) isn't yet known.

So, a trial of an alpha blocker is reasonable, but a substantial number of men with spontaneous acute retention of urine will end up going back into retention and will therefore eventually come under the care of a urologist for TURP.

RETENTION IN PATIENTS WITH A CATHETERISABLE STOMA

An increasing number of patients have undergone reconstructive surgery involving the formation of a catheterisable stoma, such as a Mitrofanoff stoma.

Patients with a Mitrofanoff catheterisable stoma are sometimes unable to pass a catheter into their stoma. This not infrequently occurs after spinal or other surgery. The spinal surgery may change the 'angle' of the stoma or their bladder may become overfull in the post-operative period which again may distort the stoma to the extent that it is difficult to pass a catheter. In this situation, attempting to pass the catheter yourself, using plenty of lubrication, is reasonable. If you fail, try to pass a floppy guidewire through the stoma (preferably under radiological control if this is available). This may pass into the bladder where the catheter will not. A catheter, with the tip cut off, can then be passed over the guidewire and into the bladder. If this fails, pass a suprapubic catheter, empty the bladder, and then usually the patient will be able to pass their catheter without any problems.

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Additional Reading

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