

Review Article

Urinary Retention in Women

Masaarane B¹, Al-Rashdi H², Shareef O³, Lyttle M³ and Masaarane M^{2*}

¹Lancaster Medical School, Lancaster University, Lancaster, LA1 4YW, England, UK

²Urology Department, Sultan Qaboos Comprehensive Cancer Care and Research Centre / University Medical City, Muscat, Oman

³Urology Department, Mid Cheshire Hospitals NHS Foundation Trust, Crewe, CW1 4QJ, England, UK

***Corresponding author:** Masaarane M, Urology Department, Sultan Qaboos Comprehensive Cancer Care and Research Centre / University Medical City, Muscat, Oman

Tel: 00447713880653 (England) / 0096887466938 (Oman)

Email: mmasaarane@yahoo.co.uk / m.masaarane@ccrc.gov.om

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Abstract

Urinary retention in women is a condition which presents diagnostic and management challenges that require input from multiple specialties—including uro-gynaecologists, neurologists and psychiatrists in addition to urologists and specialist continence nurses.

This review article draws on an extensive body of literature and provides a concise yet comprehensive summary of previously published primary and secondary sources.

It offers insights into the challenges of investigating, diagnosing, and managing urinary retention in women, with the aim of educating and raising awareness among both generalists and specialists. The review also underscores the importance of a holistic, multidisciplinary approach in selected cases.

Keywords: Aetiology; Evaluation; Treatment

Introduction

Urinary retention in women is a rare condition with an estimated annual incidence of 7 cases per 100,000, excluding causes, such as postpartum, and post-incontinence surgery retention. Urinary retention is much more common in men due to benign prostatic enlargement with the female-to-male ratio of 1 to 13 [1]. Whilst urinary retention in men is mainly managed by urologists, it may follow a different pathway in women, involving a multi-disciplinary team of uro-gynaecologists, neurologists and psychiatrists in addition to urologists and specialist continence nurses.

Definitions

Urinary retention is categorized according to the International Continence Society (ICS) as: acute urinary retention (AUR), chronic urinary retention (CUR), or acute on chronic urinary retention (AOCR) [2].

Acute urinary retention (AUR) is defined as the “inability to pass any urine despite having a full bladder which is painfully distended and readily palpable or percussible on examination”.

AUR in women will typically present immediately after a triggering event such as childbirth, or surgery in a patient who previously had no urinary issues. Patients usually feel great relief after catheterisation. The amount of urine drained from bladder following catheterisation is usually less than 1000ml. Chronic urinary retention (CUR) is defined as a non-painful bladder, which remains palpable or percussible after the patient has passed urine. It is the inability to completely empty the bladder despite the ability to void, with elevated

high post-void residual (PVR) volumes. ICS's definition emphasises physical findings and does not include any cutoff figure for PVR. Although no universally accepted threshold exists, CUR has been commonly defined as a PVR greater than 300 ml [3].

CUR generally develops slowly over time and is not painful but may be associated with symptoms such as feeling of incomplete emptying, poor or interrupted stream, frequency and overflow urinary incontinence.

CUR can be asymptomatic and discovered incidentally following an abdominal / pelvic ultrasound or other images.

Chronic urinary retention can be sub-divided into high-pressure chronic retention (HPCR) and low-pressure chronic retention (LPCR) [4].

The terms “high” and “low” refer to the bladder pressure at the end of voiding, but in practical terms, HPCR refers to patients with urinary retention affecting the upper urinary tract with consequent abnormal renal function and/or hydronephrosis. While patients with LPCR have normal kidney function and normal kidneys on ultrasound (no hydronephrosis).

Acute on chronic retention (AOCR) occurs when acute urinary retention (AUR) occurs on top of a pre-existing chronic urinary retention (CUR) resulting in an inability to void. The amount of urine drained from bladder following catheterisation is usually >1000ml but can be significantly more than this.

Aetiology

Several causes have been identified accounting for female urinary retention. They can be categorized into five main domains: obstructive, functional, neurological, pharmacological and psychogenic.

Obstructive

Bladder outlet obstruction can be caused by extrinsic urethral compression leading to squeezing or kinking of the urethra, most commonly by pelvic organ prolapse, pelvic tumors (like uterine fibroids, cervical tumours or ovarian masses), constipation -particularly in the elderly- and iatrogenic occlusion after sling surgery/vaginal tape insertion for stress urinary incontinence [5,6]. Although fibroids and pelvic tumors usually cause retention by obstruction, it is worth noting that they may exert direct pressure on pelvic nerves causing neuropathy which either contributes to or causes retention.

Intrinsic urethral causes, such as strictures whether idiopathic, infectious (e.g., genital herpes), or due to chronic inflammation (e.g., lichen sclerosus or genital erosive lichen planus) – as well as urethral diverticula or cancer are rare.

Functional (non-neurological)

Caused by an abnormal contraction or failure of relaxation of the urethral sphincter during voiding. An example of this type of retention is Fowler's syndrome.

In 1988, Clare J. Fowler, a neurologist, described a syndrome characterized by painless chronic urinary retention with high bladder volumes. It typically occurs in teenage girls and young women in the second and third decades of life. There is often a triggering event such as a surgical procedure or acute illness [5,6]. Noticeably, patients with Fowler's syndrome have minimal voiding issues, such as an intermittent stream or infrequent micturition before the onset of urinary retention [7].

• **Key Clinical Features of Fowler Syndrome:** Absence of urological, gynaecological or neurological disease.

• Painless retention with a large residual volume of urine (> 1000 ml) in the absence of a sensation of bladder fullness.

• Association with polycystic ovaries, endometriosis, subfertility, and psychological disorders in around 40-50% of the patients [8].

• High urethral closure pressure, and detrusor underactivity are urodynamic features of Fowler's syndrome [9].

The aetiology of Fowler's syndrome remains unclear. However, Fowler hypothesized that hormonal imbalance associated with polycystic ovary syndrome may result in failure of relaxation and hyperactivity of the external urethral sphincter leading to a raised urethral pressure. Contraction of the sphincter has an inhibitory effect on detrusor contraction.

Insertion of a urethral catheter can be easy, but discomfort / pain may develop on removing it, as if the sphincter was gripping the catheter, hence the reluctance of some of these women to do intermittent self-catheterisation.

Neurological

Urinary retention may occur either because of impaired detrusor contractility or failure of sphincter relaxation. Most often, the neurological lesion is localized to the sacral spinal cord (conus medullaris or cauda equina) [10,11].

Neurogenic bladder can be classified in terms of the anatomic location of the causative lesion to:

• Supraspinal lesions (central nervous system above the pons): Stroke.

- Brain tumor
- Parkinson disease.
- Multiple system atrophy (Shy-Drager syndrome).

Spinal lesions:

- Spinal cord trauma.
- Multiple sclerosis.

Peripheral nerve lesions:

- Diabetes Mellitus.
- Neurosyphilis (Tabes dorsalis)
- Herpes zoster
- Lumbar disc herniation
- Radical pelvic surgery (Radical hysterectomy, Abdominal-Perineal resection, or Proctocolectomy).

Pharmacological

Medications (either prescribed, over the counter or recreational drugs) may be associated with varying degrees of voiding dysfunction, ranging from incomplete bladder emptying to complete urinary retention [12,13,14]. The list includes:

- Antipsychotics, tricyclic antidepressants.
- Selective serotonin reuptake inhibitors.
- Antihistamines, anticholinergics (or drugs with anticholinergic side effects), antispasmodics.
- Opioids.
- Alpha-adrenergic agonists
- Intra-detrusor botulinum toxin injection to treat overactive bladder symptoms.
- Cannabis.

Psychogenic Urinary Retention

The term psychogenic urinary retention has fallen out of favour, and it is now encompassed by the umbrella of functional bladder disorders. It has been described in both urology and psychiatry literature with anecdotal cases of successful voiding following psychotherapy, though the true pathophysiology of this entity is unclear [15].

It is a diagnosis of exclusion with the presence of past psychological trauma. It presents in young females with psychiatric background, such as childhood trauma, sexual abuse, or emotional conflicts [16].

Management options include cognitive behavioral therapy, relaxation technique, biofeedback and supportive therapy, with a multidisciplinary approach being essential in such cases [17].

It is worth mentioning that a high prevalence of psychiatric concurrence was reported in women with urinary retention including depression, anxiety, and post-traumatic stress disorder (PTSD). Self-harm was reported in 14% of cases, and personality disorders in 16% [18].

These factors may hinder patient engagement with healthcare professionals and negatively impact management.

History and Examination

Comprehensive history about the onset of urinary retention, associated pain, prior history of voiding difficulties, triggering factors, past surgical intervention, and medications provides clues to the type and cause of retention. Social and psychiatric history as well as any over the counter and recreational drug use is nearly as important as the urological history. The presence of bowel symptoms, back pain or neurological symptoms could suggest a possible neurological cause. While sexual disorders could point to psychogenic/ functional cause.

Thorough abdominal, pelvic, and neurological examination looking for scars from previous surgery, vaginal prolapse and masses is essential in establishing any underlying pathology.

Investigations

Record baseline urinalysis and renal function test. Abdominal and pelvic Ultrasound is the initial imaging modality which will allow assessment of bladder volume, upper urinary tract (hydronephrosis) and presence of any pelvic pathology. Additional imaging like CT or MRI are requested in the event of uncertain findings or if a neurologic cause is suspected.

Although cystoscopy is often used in the diagnostic workup, it is not routinely indicated unless warranted by clinical history or investigations findings.

In general, if urethral catheterisation is straightforward, cystoscopy is unlikely to show any obstructive cause that could have resulted in urinary retention. However, in cases of difficult catheterisation, it can add some value by identifying causes such as a stricture or, rarely, a foreign body inserted into the bladder.

Urodynamic studies are generally unnecessary for AUR but may be helpful in CUR to differentiate between different underlying causes, particularly in patients with neurological conditions [19].

Management

The Initial management step for both acute and chronic urinary retention is the same which is inserting an indwelling urethral catheter (IDC). This will relieve the pain of AUR and protect the upper tracts in CUR. The colour and volume of urine drained in the bag after 10-15 minutes of catheterisation should be documented. It provides diagnostic, management and prognostic value. It is usually less than

1000 ml in AUR. But it could reach liters of urine in the acute on chronic retention. Some cases of CUR do not require catheterization, particularly if PVR is <500mL provided that the renal function is within normal range, there is no hydronephrosis on ultrasound, the patient does not complain from bothersome symptoms, and it is not complicated by recurrent urinary tract infections or bladder stones [20].

Special attention should be paid to high pressure chronic retention (HPCR) cases. They may develop post-catheterisation diuresis defined as urine output of 200 mL/hr for two consecutive hours or >3L/24hrs [21,22]. It is a polyuric response initiated by the kidneys after the relief of a urinary obstruction to eliminate accumulated salt and fluids. These patients require a hospital admission for urine output and vital signs monitoring in addition to fluids replacement if indicated.

Reversible causes like medications, constipation, postoperative pain and urinary tract infections should be identified and treated before planning a Trial Without Catheter (TWOC).

AUR will usually resolve within a few days, especially if the trigger was identified and reversed. Resolution of CUR is more problematic and depends on the underlying cause.

HPCR patients should not undergo a TWOC before a definitive intervention to treat the causative factor has been carried out.

If the TWOC was unsuccessful then it is better to teach patients how to do clean intermittent self-catheterisation (CISC). CISC is preferred over indwelling urethral catheter (IDC) whenever possible. It improves bladder function recovery, has lower incidence rate of urinary tract infections, maintains sexual function, and has a better quality of life. However, not all women are willing / able to do CISC. It can be challenging in elderly patients, those who have poor hand dexterity, poor eyesight and large body habitus.

If CISC is inappropriate, long-term indwelling urethral catheter (IDC) or suprapubic catheter (SPC) can be offered, with the latter being preferable [23]. SPC is superior with respect to infection rate and quality of life, with one study reporting an overall 72% satisfaction rate with the SPC and 89% of patients preferring SPC over IDC after trialing both [24].

Bethanechol is a cholinergic agonist that can increase detrusor muscle tone. However, it is not recommended to treat urinary retention cases owing to its limited efficacy and high incidence of adverse effects [25,26,27].

Although α -blockers such as Tamsulosin are well established agents in the management of urinary retention in men; its role in women is controversial, and it is not licensed for this indication. Some studies showed no significant difference in the success of TWOC compared with placebo [28]. While other studies have shown Tamsulosin to help reduce postoperative urinary retention [29,30].

Given the well tolerated profile and in the absence of simple alternative treatment options, there seems little harm in trialing them, provided the patient accepts the off-licensed use. Many women undergo urethral dilatation as part of management, although there is no evidence to support its efficacy in presence of a normal cystoscopy [31,32].

If, however, urethral stenosis is confirmed, this can be treated by urethral dilatation.

Patients with pelvic organ prolapse clearly benefit from treatment of the prolapse. Using a pessary to correct pelvic organ prolapse resulted in improvement in 75% of patients with urinary retention [33].

Surgical prolapse repair resulted in normal post-void residual volumes in 89% of patients [34].

Sacral nerve stimulation (SNS) or percutaneous tibial nerve stimulation (PTNS) may be beneficial in some women with neurological or functional urinary retention.

Currently, S3 nerve stimulation is the only intervention that can restore a bladder sensation and the ability to void in women with Fowler's syndrome. The therapeutic effectiveness exceeds 70%, although the revision rate is relatively high, exceeding 50% [35,36].

A simpler alternative treatment is, Botulinum toxin injection into the external urethral sphincter, which has been demonstrated to be an effective and safe treatment for managing urinary retention in Fowler's syndrome [38].

To manage symptoms effectively and prevent recurrence of urinary retention, 3–4 monthly injections are required.

Special Conditions

Post-partum Urinary Retention (PUR)

Post-partum urinary retention (PUR) is a frequently encountered condition in the immediate postpartum period with incidence ranging from 0.28% to 36% [37,38].

This wide variation in incidence is due to different cut-off values used to define covert (asymptomatic) PUR.

The aetiology of PUR is multifactorial. Hormonal, neurological (due to overstretching of pelvic plexus), and mechanical factors especially in women undergoing instrumental delivery, predispose women to PUR.

Risk factors for PUR include:

- Nulliparity: a less distensible perineum compared with multiparous women, longer duration of the second stage of labor and the pressure exerted by the fetus on the pelvis may cause more stretching, leading to injury to perineal musculature and neuropraxia with subsequent retention [39]
- Instrumental delivery and the need to perform episiotomy [40].
- Epidural analgesia [41].

PUR is classified as overt or covert (asymptomatic).

Overt PUR is commonly defined as the inability to void spontaneously following delivery, necessitating catheterisation [42]. However, some definitions specify a time-based criterion, describing it as the failure to void within six hours after childbirth [43].

The covert form can be identified as incomplete bladder emptying following spontaneous micturition, demonstrated by high PVR using transabdominal ultrasound or catheterisation after urination. There is no agreed or standardized cut-off value which defines covert PUR, although >150 ml is commonly accepted, however, it is a value set arbitrarily [44]. In non-pregnant women with a bladder capacity of around 400–500 mL, it is reasonable to accept

PVR >150 mL as a clinically relevant cut off (indicating that PVR over 30% of the bladder volume is abnormal). However, bladder volumes during pregnancy do increase due to hormonal effect, and values up to 1L have been measured in postpartum women after spontaneous micturition [45].

One study showed that many women experience inadequate voiding after vaginal delivery, with 92% of women with PVRV >150 mL after the first void were able to adequately empty their bladder on the 4th day after delivery [46].

Therefore, some proposed to increase the cutoff to >500 mL, because some women need more time to restore normal emptying of their bladders after delivery [47].

Most PUR cases are transient, self-limiting and resolve spontaneously over the first few days after delivery. However, in one study long-term voiding dysfunction was found in 8.2%, 6.7%, and 4.9% after 1, 2, and 3 years respectively [48]. Patients with long-term voiding dysfunction had noticeably high initial residual volumes of >1L that reportedly persisted for several hours and were not managed with adequate continuous drainage.

The Royal College of Obstetrics and Gynaecology recommends that “no woman should be allowed to go longer than six hours without voiding or catheterization following delivery” [49].

Although, there is insufficient evidence about the long-term adverse effects of covert PUR, ultrasound screening for residual urine after delivery in asymptomatic women may be considered as it is a simple, inexpensive, and non-invasive test. Greater attention, however, should be directed at women who report voiding difficulties.

Post-operative Urinary Retention (POUR)

Post-operative urinary retention (POUR) is a common consequence of gynaecological surgery, especially following surgical correction of stress urinary incontinence and pelvic organ prolapse with an estimated incidence rate between 2.5–24% [50]. However, the rate of prolonged POUR beyond 4 weeks is low at 2–4%. Therefore, most cases are transient and can be expected to resolve spontaneously within 4 weeks with some form of bladder drainage, preferably CISC [51,52]. When POUR does not resolve spontaneously, active intervention may be required. Options include urethral dilatation, stretching or incision of the sling.

Conclusion

Urinary retention in women arises from a wide range of conditions. It poses significant diagnostic and management challenges. A multi-disciplinary and holistic approach is therefore recommended.

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