Urinary retention is the inability to empty the bladder completely. Urinary retention can be acute or chronic. The most common cause of urinary retention is benign prostatic hyperplasia (BPH). Another common cause is medications. Older people are at higher risk for developing drug-induced urinary retention, because of existing co-morbidities such as benign prostatic hyperplasia and the use of other concomitant medication that could reinforce the impairing effect on micturition.

People with urinary retention can present with complete lack of voiding, incomplete bladder emptying, or overflow incontinence. Urinary tract infection and renal failure are complications of urinary retention.

Acute urinary retention
People with acute urinary retention cannot urinate at all, even though they have a full bladder. Acute urinary retention, a potentially life-threatening medical condition, requires immediate treatment. It can cause great discomfort or pain, and requires catheterisation to provide relief.

Increased resistance of the urinary flow, interruption of the sensory innervation of the bladder, weakness of the detrusor muscle, and over-distention of the bladder may all contribute to acute urinary retention. The most common cause of infectious acute urinary retention is acute prostatitis. Research suggests that up to 10% of acute urinary retention is related to medication use.

Acute urinary retention occurs mainly in ageing men as a consequence of comorbidity and the use of concomitant medications.

Chronic urinary retention
Chronic urinary retention develops over a period of time. People with chronic urinary retention can still urinate; however, they do not completely empty all of the urine from their bladders. It is painless retention of urine associated with an increased volume of residual urine.

Complications include storage symptoms (frequency, nocturia, urgency and urge incontinence), dilatation of the upper urinary tract and eventually impaired renal function.

Causes
Urinary retention is caused by obstruction of urinary outflow or failure of the bladder detrusor muscle to contract effectively and empty the bladder. Regardless of the cause, urinary retention occurs and the bladder distends until maximum bladder capacity is reached. At this point, urine leaks from the bladder by means of overflow.

Medications that cause urinary retention include:
- Anticholinergic agents
- Calcium channel blockers
- Non-steroidal anti-inflammatory drugs (NSAIDs)
- α-adrenergic agonists
- β-adrenergic antagonists
- Opioids
- Sedative-hypnotics
- Antipsychotics
- Antiparkinsonian agents
- Anaesthetics

The use of ‘ecstasy’ (3, 4-methylenedioxymethamphetamine) has also been associated with urinary retention.

Anticholinergic agents
Anticholinergic agents can contribute to urinary retention through interference with cholinergic innervation of detrusor muscle of the bladder, decreasing the force of bladder detrusor contractions.

Medications with anticholinergic activity include (but not limited to):
- Tricyclic antidepressants
- Some antipsychotics (olanzapine, chlorpromazine, clozapine)
- Antihistamines
- Detrusor relaxants (oxybutynin, darifenacin, propantheline, solifenacin, tolterodine)
- Inhaled anticholinergics (tiotropium, ipratropium, glycopyrronium)
- Antispasmodics (hyoscine butylbromide)

Tricyclic antidepressants (amitriptyline, clomipramine, dothiepin, doxepin, imipramine, nortriptyline,
trimipramine) and other antidepressants including SSRIs, SNRIs, mianserin (Tolvon, Lumin) and reboxetine (Edronax) have been associated with urinary retention.

Antispasmodics such as hyoscine butylbromide (Buscopan) reduce gastrointestinal motility and spasm, and are used for management of irritable bowel syndrome (IBS). They inhibit contraction of smooth muscle cells of the gastrointestinal tract, and also the bladder detrusor muscle which might result in voiding difficulties.

Carbamazepine (Tegretol) rarely causes urinary retention and overflow urinary incontinence, most likely due to its anticholinergic effect.

**Calcium channel blockers**
Calcium channel blockers (CCBs), especially diltiazem and verapamil, induce urinary retention through a similar mechanism as anticholinergics - smooth muscle relaxation, which decreases the force of detrusor contraction.

**NSAIDs**
NSAIDs block the prostaglandin receptors in bladder smooth muscle, which decreases the force of detrusor contraction. The prostaglandin synthesis in the bladder works via cyclooxygenase-2 (COX-2) and is up-regulated by stimuli such as inflammation, trauma, and overdistention. The risk of acute urinary retention is about 2-fold higher in men who use NSAIDs.

**Opioids**
Opioids can reduce the sensation of bladder fullness and increase the tone of urethral sphincters. Opioid-induced confusion and constipation may also contribute to urinary retention.

**Benzodiazepines**
Urinary retention following use of diazepam (Valium) has been reported, probably caused by muscle relaxation.

**Alpha-adrenergic agonists**
Alpha-adrenergic agonists stimulate contraction of the internal urethral sphincter leading to retention of urine. Drugs in this class include phenylephrine and pseudoephedrine. These oral decongestants are often found in cough and cold products, often in combination with an antihistamine.

**Beta-blockers**
β-adrenergic antagonists or beta-blockers block β-adrenergic-mediated relaxation of the urethral sphincter, which leaves unopposed α-adrenergic-mediated contraction of the sphincter. The incidence of acute urinary retention with beta-blockers is infrequent (1 in 100 to 1 in 1000), so the benefits will mostly outweigh the risks. If acute urinary retention occurs soon after commencement of a beta-blocker, the medication should be ceased and confirm the cause. Cardioselective beta-blockers (atenolol, bisoprolol, metoprolol, nebivolol) are less likely to cause urinary retention.

**Antiparkinsonian agents**
Antiparkinsonian agents shown to cause urinary retention include amantadine (Symmetrel), benztropine (Cogentin), bromocriptine (Parlodel), levodopa (Madopar, Sinemet) and benzhexol (Artane).

**Faecal impaction**
Faecal impaction is a common and potentially reversible cause of overflow incontinence and urinary retention. Impacted stool in the rectum puts pressure on the urethra or distal bladder, obstructs urinary outflow, and causes overflow incontinence. Many medicines discussed above also cause constipation, such as anticholinergic agents, CCBs, and opioids.

**BPH**
Prostate enlargement is common in older men and may lead to urinary retention. 5-alpha-reductase inhibitors such as finasteride (Proscar) and dutasteride (Avodart) reduce prostate size and improve symptoms and urinary flow rate. Long-term use reduces the risk of acute urinary retention and the need for surgery. Selective alpha-blockers (alfuzosin, prazosin, tamsulosin, terazosin) relax the smooth muscle in the bladder neck and prostate, decreasing resistance to urinary flow. However, they have no effect on the prostate size.

**Summary**
Polypharmacy is very common for residents in aged care facilities. Many medications can cause or exacerbate urinary retention. A pharmacist-led medication review (RMMR) can identify potential drug-related causes of urinary retention. In older men at risk of prostate enlargement, frequent review of medications and using the lowest effective dose for the shortest duration is recommended to help prevent drug-induced urinary retention. If medicines are suspected as the cause of urinary retention, discontinuation or dose reduction should be considered.

**References**
Arch Intern Med. 2005;165:1547-1551.

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