

BPH and Lower Urinary Tract Symptoms

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THE STORY IN ONE SENTENCE

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“Benign prostatic hyperplasia means the prostate grows larger under the push of male hormones (androgens), wraps tighter around the urethra, and blocks the outflow—so the bladder works harder to empty, then gets jumpy and weak, producing both voiding symptoms (weak stream, hesitancy, incomplete emptying) and storage symptoms (frequency, urgency, waking at night to urinate).”

Normal anatomy — the body's job

The prostate is a walnut-sized gland that wraps around the urethra just below the bladder. The bladder fills with urine and empties by squeezing its detrusor muscle (the bladder wall muscle) while the urethral sphincter (the valve at the bladder neck) relaxes, so urine flows smoothly through the urethra and out. Picture it like a balloon connected to a garden hose with a valve: the balloon squeezes, the valve opens, and water flows freely.

BODY'S JOB

If you do not know the normal job first—bladder fills, detrusor squeezes, sphincter opens, urine flows freely—then the weird findings will seem random instead of connected.

1. Kidneys make urine and send it down the ureters (two tubes) into the bladder.
2. The bladder stores urine by relaxing and stretching like a balloon; typical adult capacity is 400–600 mL (about 2 cups).

3. When the bladder is full, stretch receptors in the bladder wall send a signal to your brain ("I need to go").
4. To void, your brain signals the detrusor muscle to squeeze and the urethral sphincter to relax at the same time.
5. Urine flows through the prostatic urethra (the part inside the prostate) at normal flow rate (15–20 mL per second in a healthy adult male), then out through the rest of the urethra.
6. After voiding, the bladder should be nearly empty (post-void residual less than 50 mL, like a few tablespoons left).

What breaks

Usually one broken thing explains all the weird findings together.

CLINICAL TERM

Androgen-driven prostate enlargement squeezes the urethra (bladder outlet obstruction), raising the resistance urine has to flow through. The detrusor muscle thickens (hypertrophies) and becomes overactive to push urine through, then eventually loses strength (decompensates), leaving urine sitting in the bladder after each void. That break does not stay local. The downstream signals you will actually see at the bedside are voiding symptoms—weak stream, hesitancy, intermittency, post-void dribbling, incomplete emptying—and storage symptoms—frequency, urgency, waking at night to urinate (nocturia), urge incontinence. Read all the weird findings backward from there; they all point to this one broken thing upstream: bladder outlet obstruction from prostate growth.

How the body compensates

Early on, the detrusor makes up for the blockage by working harder, so symptoms may be mild or absent even though obstruction is building. The job is to see the bad crash point coming before the bladder fails completely.

1. The bladder detrusor thickens (hypertrophies) to generate higher squeeze pressure, keeping urine flow acceptable for months to years—patients may notice only mild slowing of the stream or none at all.
2. That is the dangerous middle, because mild symptoms let the team miss that obstruction is worsening and residual urine is piling up in the bladder after each void.

3. The crash point to watch for is acute urinary retention (sudden complete inability to void, painful swollen bladder above the pubic bone, needs emergency catheter), chronic retention with hydronephrosis (kidneys swell because urine backs up the ureters, seen on ultrasound or CT) and obstructive nephropathy (kidney damage from chronic high pressure, creatinine rises), recurrent urinary tract infections from stagnant urine that bacteria love, and bladder stones forming in the pooled urine like sediment in a still pond.
4. Watch for the crash point before it happens, because once the detrusor loses its strength or the kidneys are damaged, reversibility drops fast—relief of obstruction may not fully restore function.
5. Look at symptom trajectory—worsening International Prostate Symptom Score (IPSS, a 0–35 questionnaire, scores ≥ 8 are moderate, ≥ 20 severe), rising post-void residual volume on bladder scan, new waking at night to urinate (nocturia) (waking ≥ 2 times per night)—not just one snapshot.
6. A patient with mild symptoms but high residual volume (>100 – 200 mL) or rising creatinine (kidney function marker, normal ~ 0.7 – 1.2 mg/dL) is not really stable; he is on a downhill slope and needs intervention before complications hit.

Domino effect

1. Androgen-driven prostate hyperplasia (enlargement) wraps the gland tighter around the urethra, increasing outlet resistance like a clamp tightening on a hose. — Dihydrotestosterone (DHT, made from testosterone by the enzyme 5-alpha-reductase inside prostate cells) tells stromal (support tissue) and epithelial (lining) cells in the transition zone to divide and grow, so the gland swells from ~ 20 grams (walnut) to 30 – $100+$ grams, narrowing the urethral lumen (opening).
2. Voiding symptoms appear: weak stream (decreased force and arc), hesitancy (delay of several seconds to start flow), intermittency (stop-start flow like a sputtering faucet), straining to void (bearing down like having a bowel movement), post-void dribbling (leaking drops after zipping up), and sensation of incomplete emptying. — Higher outlet resistance lowers urine flow rate (normal peak flow ~ 15 – 20 mL/sec, BPH drops it to <10 – 12 mL/sec), so the stream weakens and loses its arc; the detrusor must generate more pressure to overcome resistance before flow starts, causing hesitancy; and incomplete sphincter relaxation or detrusor fatigue mid-void produces intermittency and dribbling.
3. The detrusor thickens (hypertrophies) to make up for the extra work, then becomes overactive and jumpy. — Chronic high-pressure squeezing makes the smooth-muscle fibers in the bladder wall get bigger (hypertrophy) and the bladder wall lays down extra collagen (like scar tissue), thickening the wall; poor blood flow (ischemia) to the thickened muscle and nerve damage from chronic stretch (denervation) make the detrusor fire off involuntary squeezes (detrusor overactivity).

4. Storage symptoms develop: frequency (voiding ≥ 8 times per day, normal is 4–7), urgency (sudden strong need to void that is hard to defer), waking at night to urinate (nocturia) (waking ≥ 2 times per night to void, normal is 0–1), and urge incontinence (leaking before reaching the toilet because you cannot hold it). — Detrusor overactivity triggers involuntary squeezes during filling (like a hiccup in the bladder), and chronic incomplete emptying leaves less effective storage space (if 100 mL is always left behind, a 500 mL bladder now holds only 400 mL of new urine), so the bladder signals 'full' at smaller volumes and the patient voids more often, especially at night when lying flat redistributes fluid from the legs back into circulation.
5. Post-void residual (PVR) urine piles up as the detrusor gets tired and loses strength (decompensates). — The overstretched, oxygen-starved (ischemic) detrusor loses its ability to squeeze hard enough (detrusor underactivity), so each void empties less completely, leaving 50–200+ mL residual urine sitting in the bladder—like trying to empty a water bottle with weak hand squeeze, you cannot get the last bit out.
6. Complications hit: acute urinary retention (sudden complete blockage, painful), chronic retention with overflow incontinence (bladder stays overfull and dribbles constantly), recurrent urinary tract infections (UTIs, burning, fever), bladder calculi (stones, gritty sediment that clumps), hydroureteronephrosis (swollen kidneys and ureters on imaging), and obstructive nephropathy (rising creatinine, falling kidney function). — Acute retention happens when the detrusor finally cannot push through the resistance at all (often triggered by meds like antihistamines or decongestants, or after holding urine too long); chronic high bladder pressure (like a backed-up drain) transmits backward up the ureters, swelling the kidney collecting system and crushing nephrons (kidney filtering units); stagnant urine becomes a perfect culture dish for bacteria (*E. coli* loves it) and minerals in the urine crystallize into stones when urine sits still.
7. Trace every bedside finding—weak stream, urgency, waking at night to urinate (nocturia), palpable bladder (you can feel a firm balloon above the pubic bone), elevated creatinine—backward to the one upstream break: prostate growth blocking the urethra. — BPH pathophysiology is a single mechanical obstruction followed by the bladder trying to compensate (hypertrophy, overactivity), then failing (underactivity, retention); every symptom and complication is the body's attempt to cope with that blockage or the fallout when the work-around fails—so if you see the pattern, you see the whole disease at once.

Symptoms · what the patient feels, and why

- Weak urinary stream: The growing prostate squeezes the urine tube (urethra) that runs through it, like a hand squeezing a garden hose. The narrow opening makes it harder for urine to flow fast, so the stream comes out weak and slow even when the bladder muscle squeezes hard.

- **Hesitancy (delay starting urination):** The bladder muscle has to build up extra pressure—like pushing harder to blow through a narrow straw—before urine can finally push past the tight squeeze. This takes time, so there's a delay before the stream starts.
- **Intermittency (stop-start urine flow):** The bladder muscle gets tired from working so hard against the narrow opening. It squeezes, the urine flows, then the muscle runs out of steam and flow stops. After a short rest the muscle tries again, making the stream start and stop.
- **Post-void dribbling:** After you finish, some urine is still trapped in the part of the tube inside the enlarged prostate. When the bladder muscle stops squeezing, that leftover urine slowly leaks out, like the last drops from a tilted bottle.
- **Sensation of incomplete bladder emptying:** The bladder cannot push all the urine out because the narrow opening makes it too hard. Some urine stays behind (called residual urine), so the bladder never feels truly empty—like a bucket that won't drain all the way.
- **Urinary frequency (going 8 or more times a day):** Because the bladder never empties completely, it fills up faster—there's less room for new urine. Also, the overworked bladder muscle becomes twitchy and sends 'I'm full' signals early, so you feel the need to go more often.
- **Urgency (sudden strong need to urinate):** The bladder muscle, worn out from fighting the blockage, starts squeezing on its own without warning (like a cramp). These surprise squeezes send urgent signals to your brain, making you feel you must go right now or you'll leak.
- **Waking at night to urinate (Nocturia) (waking 2 or more times at night to urinate):** The bladder holds less because it never empties fully, and the twitchy muscle keeps contracting at night. Older men also make more urine at night. Together, these wake you up over and over to empty a bladder that feels full.
- **Acute urinary retention (sudden inability to urinate despite full bladder, severe belly pain):** The bladder muscle suddenly gives up from exhaustion, or the prostate swells even tighter (from certain medicines, holding urine too long, or alcohol). The opening closes completely, urine cannot get out at all, and the bladder stretches painfully like an over-inflated balloon.
- **Visible blood in the urine (hematuria) (blood you can see in the urine):** Veins in the prostate or bladder wall burst from constant high pressure, or the bladder lining gets scraped and damaged from being overstretched and thickened. Blood leaks into the urine, turning it pink, red, or tea-colored.

Focused exam

- Digital rectal exam (DRE): smooth, enlarged, rubbery prostate without hard nodules: In BPH (benign prostatic hyperplasia, which means the prostate gland has grown bigger but is not cancer), androgens like testosterone tell prostate cells to multiply over many years. You slide a gloved finger into the rectum and feel the back of the prostate through the rectal wall—it feels enlarged, smooth, and a bit squishy (like a firm marshmallow). A hard lump would raise worry about cancer. Prostate size on your finger does not always match how bad the urinary symptoms are, but it confirms the gland is bigger and not worrisome for cancer.
- Weak urinary stream, hesitancy (waiting to start urinating), or straining to push urine out: The prostate sits around the urethra like a doughnut around a straw. When the prostate grows in BPH, it squeezes the urethra from the outside like a hand pinching a garden hose. Urine has to push through a narrowed tube. This causes voiding symptoms—problems with getting urine out—such as weak stream, waiting a long time to start, and needing to push hard.
- Post-void residual (PVR) volume greater than 100 mL measured by bladder ultrasound or catheter right after the patient finishes urinating: BPH leaves urine trapped in the bladder after urinating. A healthy bladder empties almost completely. A PVR above 100 mL tells you that the detrusor muscle (the bladder wall muscle that squeezes urine out) is struggling to push through the blockage and cannot finish the job. PVR above 200–300 mL signals serious retention and raises the risk of infection, bladder damage, and kidney harm.
- Palpable bladder on abdominal exam—a firm, smooth bulge you can feel just above the pubic bone: If the prostate blocks the outlet so badly that the bladder cannot empty at all (called acute urinary retention), the bladder fills up like a water balloon and you can feel it through the belly wall above the pubic bone. This is urgent because backed-up urine can stretch the bladder, damage the kidneys, and lead to infection spreading into the blood (urosepsis). The patient is usually in pain and cannot urinate even when they try hard.
- Waking at night to urinate (Nocturia) (waking at night to urinate 2 or more times), frequency (urinating more than 8 times per day), and urgency (sudden strong need to urinate right now): The bladder wall in BPH thickens from straining against the blockage, like a weight-lifter's muscle getting bigger. The thick, irritable bladder tries to squeeze out small amounts of urine many times instead of waiting calmly for a full tank. This creates storage symptoms—problems with holding urine. The bladder overworks because it cannot empty fully, and the patient feels they have to urinate all the time, even at night.

- IPSS score 8 or higher (International Prostate Symptom Score, a 7-question survey scored 0 to 35): BPH severity is measured, not guessed. The IPSS asks the patient to rate seven urinary problems on a scale, giving a total score. Zero to 7 is mild, 8 to 19 is moderate, and 20 to 35 is severe. This number helps you know whether medicines are working or surgery is needed. The AUA (American Urological Association) guidelines say to use IPSS to track progress and guide treatment.

Diagnostics · every test answers a question

- Urinalysis (UA) with microscopy → Is there infection (white blood cells, bacteria, nitrites) or blood (red blood cells) that would change my treatment plan, or suggest bladder cancer or a kidney stone instead of BPH alone?
- Basic metabolic panel (BMP) with serum creatinine and estimated glomerular filtration rate (eGFR) → Are the kidneys still filtering waste normally, or has chronic obstruction from BPH backed urine up into the kidneys and damaged them?
- Post-void residual (PVR) volume by portable bladder ultrasound or straight catheterization immediately after the patient urinates → How much urine is left in the bladder after the patient finishes urinating? Is the detrusor muscle (bladder wall muscle) still able to empty the bladder, or is the obstruction causing urine to pile up inside?
- Prostate-specific antigen (PSA) if the patient is expected to live more than 10 years and after shared decision-making discussion → Does this patient have prostate cancer in addition to BPH, and would knowing that change management?
- Renal and bladder ultrasound → Is there hydronephrosis (swelling of the kidneys from backed-up urine) or bladder wall thickening (trabeculation) that confirms chronic obstruction and risk of kidney damage?
- Uroflowmetry (measuring urine flow rate into a special toilet) or urodynamic studies (pressure-flow study with catheters in bladder and rectum) → Does the patient have true bladder outlet obstruction from BPH, or is a weak detrusor muscle (bladder muscle failure) causing the symptoms instead?
- Urine culture if urinalysis shows signs of infection → Which bacteria are growing in the urine, and which antibiotic will kill them?
- Serum electrolytes (sodium, potassium, chloride, bicarbonate) if chronic retention is suspected → Has long-standing urinary retention caused post-obstructive diuresis (sudden massive urine output after relieving the blockage) or electrolyte imbalance?

Treatment logic

- Alpha-1 blocker: tamsulosin 0.4 mg once daily, alfuzosin 10 mg extended-release once daily, or silodosin 8 mg twice daily → Alpha-blockers block alpha-1 adrenergic receptors (tiny switches on muscle cells that tighten muscle when the nerves send adrenaline-like signals) in the smooth muscle of the prostate and bladder neck. Blocking those switches relaxes the muscle, opening the urethra so urine flows more easily. Patients notice relief in weak stream, hesitancy, and incomplete emptying within 1 to 2 weeks. AUA guidelines recommend alpha-blockers as first-line treatment for moderate to severe lower urinary tract symptoms (LUTS) from BPH.
- 5-alpha reductase inhibitor (5-ARI): finasteride 5 mg once daily or dutasteride 0.5 mg once daily → Finasteride and dutasteride block the enzyme 5-alpha reductase, which converts testosterone into dihydrotestosterone (DHT, the super-strong androgen that drives prostate growth). Blocking that enzyme starves the prostate of DHT, causing the gland to shrink by 20 to 30 percent over 3 to 6 months. This reduces voiding symptoms in men with prostates larger than 40 grams (about the size of a golf ball or bigger) and cuts the risk of acute urinary retention and need for surgery by about 50 percent, per AUA guidelines and Cochrane systematic reviews.
- Phosphodiesterase-5 inhibitor (PDE5i): tadalafil 5 mg once daily → Tadalafil blocks phosphodiesterase-5 (PDE5), an enzyme that breaks down cyclic GMP (a molecule that relaxes smooth muscle). When cyclic GMP sticks around longer, smooth muscle in the prostate, bladder neck, bladder wall, and blood vessels relaxes. This improves blood flow to the bladder and lowers bladder pressure, reducing both voiding symptoms (weak stream, hesitancy) and storage symptoms (frequency, urgency, waking at night to urinate (nocturia)). AUA guidelines list tadalafil as an option for men with BPH and LUTS, especially those who also have erectile dysfunction, because it treats both problems at once.
- Combination therapy: alpha-blocker plus 5-alpha reductase inhibitor (for example, tamsulosin plus finasteride or dutasteride) → Combining an alpha-blocker with a 5-ARI gives fast symptom relief from the alpha-blocker (which relaxes the urethra) and long-term disease control from the 5-ARI (which shrinks the prostate). The landmark MTOPS (Medical Therapy of Prostatic Symptoms) trial showed that combination therapy reduces symptom progression, acute urinary retention, and need for surgery more than either drug alone in men with moderate to severe symptoms and prostates larger than 40 grams, per AUA guidelines.

- Surgical or minimally invasive intervention: transurethral resection of the prostate (TURP), laser procedures (GreenLight PVP photoselective vaporization, holmium laser enucleation HoLEP), prostatic urethral lift (UroLift), or water-vapor thermal therapy (Rezūm) → These procedures remove, vaporize, lift, or ablate (destroy) the obstructing prostate tissue, directly widening the urethral channel and restoring urinary flow. TURP and laser procedures (especially HoLEP) offer the most durable symptom relief (lasting more than 10 years) and are the gold standard for refractory BPH, per AUA guidelines. UroLift (tiny implants that hold the prostate lobes apart like curtain ties) and Rezūm (steam injections that kill prostate cells) are less invasive, preserve ejaculation better, allow quicker recovery, but have shorter follow-up data (5 to 7 years).
- Avoid anticholinergic or antimuscarinic medications (oxybutynin, tolterodine, solifenacin, darifenacin) in men with significant BPH unless PVR is low and bladder outlet obstruction is ruled out; use clean intermittent catheterization if acute urinary retention occurs → Anticholinergics block acetylcholine receptors on the detrusor muscle, weakening bladder contraction. In a man with bladder outlet obstruction from BPH, this can tip him into complete urinary retention (cannot urinate at all). If acute retention happens, clean intermittent catheterization (CIC, inserting a sterile catheter through the urethra into the bladder several times a day to drain urine) decompresses the bladder, protects kidney function, prevents urosepsis (life-threatening bloodstream infection from infected retained urine), and buys time to plan definitive treatment. CIC is safer than an indwelling Foley catheter, which stays in place and raises infection risk.
- Watchful waiting or active surveillance if symptoms are mild (IPSS below 8) and not bothersome to the patient → Many men with mild BPH and LUTS are not bothered enough to want treatment. Watchful waiting means you reassess symptoms yearly with IPSS, check PVR and creatinine periodically, and educate the patient to avoid bladder irritants (caffeine, alcohol, spicy foods), reduce evening fluid intake to minimize waking at night to urinate (nocturia), practice double voiding (urinate, wait, then try again to empty more completely), and avoid decongestants and antihistamines that can worsen retention. AUA guidelines support this approach for men with mild symptoms and no complications.

Medications

Alpha-blocker (tamsulosin, alfuzosin) · Alpha-1 adrenergic receptor blocker

Blocks tiny switches (alpha-1 receptors) on the muscle wrapped around the prostate and bladder neck. When these switches are blocked, the muscle relaxes like loosening a tight belt, so urine can flow past more easily. Most men feel better within one to two weeks.

1. The drug sticks to alpha-1 switches (receptors) on muscle cells that normally tighten when a body chemical called norepinephrine lands on them.

2. With the drug blocking the switch, norepinephrine cannot turn on the muscle.
3. The smooth muscle in the prostate and bladder neck relaxes.
4. The urethra (tube carrying urine out) opens wider because less pressure is squeezing it shut.
5. Urine flows faster and symptoms like hesitation and weak stream improve.

SAFETY WATCH

Orthostatic low blood pressure (hypotension) (sudden drop in blood pressure when you stand up) — highest risk with the first dose and in older men; can cause dizziness or fainting. · Intraoperative floppy iris syndrome — the iris in the eye can droop during cataract surgery; always tell your eye surgeon you take this drug. · Dizziness and fainting, especially when starting the medicine. · Retrograde ejaculation (semen goes backward into the bladder instead of out the penis during orgasm) — harmless but can be surprising.

5-alpha reductase inhibitor (finasteride, dutasteride) · 5-alpha reductase enzyme blocker

Blocks an enzyme (5-alpha reductase) that changes regular testosterone into a super-strong version called DHT (dihydrotestosterone). DHT is the fuel that makes prostate cells grow. With less DHT, the prostate shrinks by about 20 to 30 percent over six to twelve months. Shrinking the gland helps in men with larger prostates (bigger than 30 to 40 mL) by lowering the chance of complete blockage and surgery.

1. The drug stops the 5-alpha reductase enzyme from working inside prostate cells.
2. Testosterone can no longer be converted into DHT, so DHT levels drop by 70 to 90 percent.
3. With much less DHT around, the receptors inside prostate cells are not turned on as much.
4. Prostate cells begin to die off naturally (a process called apoptosis, like pruning a tree).
5. Over months, the prostate shrinks and presses less on the urethra, easing flow.

SAFETY WATCH

Sexual side effects — lower sex drive, trouble getting or keeping an erection, and problems with ejaculation happen in about 5 to 10 out of 100 men. · Gynecomastia (breast tissue grows and feels tender or swollen). · Lowers PSA (prostate-specific antigen, a blood test number) by about half after six months — your doctor must double the measured PSA to interpret it correctly for cancer screening. · Teratogenic (causes severe birth defects) — pregnant women must never touch crushed or broken tablets; the drug can be absorbed through skin. · Persistent sexual side effects — a small number of men report that problems continue even after stopping the drug.

Combination therapy (alpha-blocker plus 5-alpha reductase inhibitor) · Two-drug combination

Uses both drugs together: the alpha-blocker relaxes muscle for fast relief (one to two weeks), and the 5-alpha reductase inhibitor shrinks the gland over months for long-term control. Guidelines recommend this combination for men with moderate to severe symptoms and a prostate larger than 30 to 40 mL, because it improves symptoms faster and cuts the risk of complete blockage and surgery better than either drug alone.

1. The alpha-blocker relaxes the muscle around the prostate and bladder neck within one to two weeks, so urine flows better right away.
2. The 5-alpha reductase inhibitor starts lowering DHT and shrinking the prostate over the next several months.
3. Together, you get quick symptom relief from the muscle relaxer and lasting gland shrinkage from the blocker.
4. The risk of the disease getting worse (complete retention or needing surgery) drops more than with one drug alone.

SAFETY WATCH

Side effects from both drugs can add up — you may experience both classes of problems. · Watch for low blood pressure when standing, dizziness, sexual problems (low desire, erection trouble, ejaculation issues), and breast swelling.

Tadalafil (daily low-dose, 5 mg) · Phosphodiesterase-5 (PDE5) blocker

Blocks an enzyme (phosphodiesterase-5) that breaks down a molecule called cyclic GMP. When cyclic GMP builds up in prostate and bladder muscle, the muscle relaxes (like releasing a clenched fist). The FDA approved daily tadalafil (5 mg) for urinary symptoms due to an enlarged prostate, especially when a man also has trouble with erections. It improves both urinary flow and erectile function.

1. Tadalafil blocks the PDE5 enzyme that normally chews up cyclic GMP.
2. Cyclic GMP accumulates inside smooth muscle cells.
3. The extra cyclic GMP turns on a protein (protein kinase G) that lowers the amount of calcium inside the cell.
4. Less calcium means the muscle cannot stay tight, so it relaxes.
5. Urethral resistance drops and urine flows better; blood flow into the penis also increases, helping erections.

SAFETY WATCH

Absolutely cannot be used with nitrates (nitroglycerin, isosorbide for chest pain) — combining them can cause dangerous, life-threatening drops in blood pressure. · Low blood pressure (hypotension), especially if also taking an alpha-blocker — use the two together very carefully. · Headache, upset stomach (dyspepsia), and back or muscle pain. · Priapism (erection lasting more than four hours) — rare but an emergency requiring immediate hospital care to prevent permanent damage.

Anticholinergic agents (oxybutynin, tolterodine) — use with extreme caution; avoid in high-risk men · Muscarinic receptor blocker

Blocks receptors (muscarinic receptors) on the bladder muscle that normally make it squeeze. This can calm an overactive bladder that contracts too often, reducing urgency and frequency. Sometimes used in men with BPH who also have overactive bladder symptoms, but it raises the risk of not being able to urinate at all (acute retention) if the prostate is blocking the outlet significantly.

1. The drug sticks to M2 and M3 muscarinic receptors on the bladder muscle.
2. Acetylcholine (the body's chemical signal that tells the bladder to squeeze) cannot turn on these receptors.
3. The detrusor muscle relaxes and the bladder can hold more urine.
4. Urgency (sudden, strong need to go) and frequency (going too often) decrease.

SAFETY WATCH

Acute urinary retention (complete inability to urinate) — highest risk in men with a large amount of urine left in the bladder after voiding (post-void residual over 200 to 250 mL) or severe obstruction. · Dry mouth, constipation, and blurred vision (classic anticholinergic side effects). · Cognitive problems (confusion, memory trouble) in older adults — can worsen dementia. · Contraindicated (never use) in men with narrow-angle glaucoma or gastric retention (stomach does not empty properly).

Surgical and minimally invasive procedures (TURP, laser enucleation or vaporization, UroLift, Rezūm water vapor therapy) · Procedural intervention (not a pill)

Physically removes, destroys, or pushes aside the prostate tissue that is squeezing the urethra shut. Guidelines say surgery is needed when medicines do not work well enough, when a man cannot urinate at all (acute retention), when he gets repeated bladder infections, when bladder

stones form, when blood in the urine (gross blood in the urine (hematuria)) keeps happening because of BPH, or when kidney function worsens because urine backs up.

1. TURP (transurethral resection of the prostate): a loop with electric current shaves away prostate chips through the urethra, widening the channel.
2. Laser procedures (HoLEP for holmium laser enucleation, GreenLight for photoselective vaporization): laser energy either shells out the obstructing tissue or vaporizes it, opening the passage.
3. UroLift: tiny permanent implants are placed to pull the side lobes of the prostate apart like opening curtains, creating space without cutting tissue.
4. Rezūm: steam (water vapor heated by radiofrequency energy) is injected into the prostate; cells die and the dead tissue is reabsorbed over weeks, shrinking the blockage.
5. All methods reduce the pressure and resistance in the urethra, so urine flows freely again.

SAFETY WATCH

Retrograde ejaculation (semen goes into the bladder instead of out) is very common with TURP and laser (happens in 50 to 80 out of 100 men) — does not harm you but affects fertility. · Urinary incontinence (leaking urine) — usually temporary; fewer than 5 out of 100 men have lasting trouble. · Erectile dysfunction (trouble getting or keeping an erection) — risk depends on the method; generally under 5 to 10 out of 100 men. · Urethral stricture (scar tissue narrows the urethra later). · Bleeding, infection, and TURP syndrome (a dangerous drop in blood sodium from absorbing the fluid used during surgery) — TURP syndrome is rare with modern bipolar systems that use saline instead of glycine.

Red flags

- Acute urinary retention (sudden inability to urinate, severe lower belly pain, bladder you can feel above the pubic bone)—needs emergency catheter to drain urine and prevent bladder rupture and kidney damage.
- Visible blood in the urine (hematuria) (urine that looks pink, red, or cola-colored)—can mean bladder cancer, stones, or severe prostate bleeding; needs urgent camera look inside the bladder (cystoscopy) and imaging.
- Recurrent urinary tract infections (2 or more proven infections in 6 months)—shows leftover urine is becoming a pool where bacteria grow; raises risk of kidney infection or bloodstream infection (sepsis).
- Rising creatinine in blood or swollen kidneys on scan (hydronephrosis)—signs the blockage is backing urine up into the kidneys and damaging them; kidney harm can be permanent if not fixed quickly.

- Bladder stones seen on ultrasound or CT—form in stagnant leftover urine and can cause infection, bleeding, or total blockage of urine flow.

Nursing priorities

1. Check if the patient can urinate at all and palpate (feel) the lower abdomen above the pubic bone for a distended bladder that feels like a firm balloon — A full bladder you can feel means acute urinary retention with risk of bladder rupture and backup pressure damaging the kidneys (hydronephrosis); immediate catheter drainage is needed
2. Measure post-void residual urine volume with a bladder scanner within 10 minutes after the patient urinates — Leftover urine greater than 200 milliliters means the bladder cannot empty against the prostate blockage, raising infection risk and telling us medical treatment may not be enough
3. Ask the patient to keep a 3-day voiding diary recording every time they urinate, the volume, and any leakage or urgency episodes — The diary shows whether irritative symptoms (urgency, frequency) or obstructive symptoms (weak stream, hesitancy) dominate, which changes whether we choose alpha-blockers, anticholinergics, or combination therapy
4. Review the medication list for diuretics (water pills), antihistamines like diphenhydramine, and decongestants like pseudoephedrine — Diuretics increase urine production and worsen frequency; anticholinergics (antihistamines) weaken bladder squeeze and worsen retention; decongestants tighten the prostate and urethra (alpha stimulation) and worsen obstruction
5. Teach the patient to avoid drinking large amounts of fluid in one sitting and to limit caffeine and alcohol, especially after dinner — Caffeine and alcohol irritate the bladder muscle (detrusor) and increase urine production, worsening urgency and nighttime urination (nocturia) that disrupts sleep
6. Instruct the patient taking alpha-blockers like tamsulosin to rise slowly from lying or sitting and to report dizziness or fainting — Alpha-blockers relax blood vessels as well as prostate smooth muscle, causing orthostatic low blood pressure (hypotension) (drop in blood pressure when standing) that can lead to falls and injury, especially in older adults
7. Explain that 5-alpha reductase inhibitors like finasteride take 6 to 12 months to shrink the prostate and improve symptoms, so the patient should not stop early — These medicines block conversion of testosterone to dihydrotestosterone (DHT, the hormone that grows prostate cells), but shrinkage is slow; stopping early means symptoms return and the prostate re-enlarges
8. Monitor for and teach warning signs of urinary tract infection: fever, burning with urination, cloudy or foul-smelling urine, or new-onset confusion in older adults — Leftover urine in the bladder (high post-void residual) grows bacteria quickly, causing infection (cystitis) that can spread to the kidneys (pyelonephritis) or bloodstream (urosepsis), especially in patients with diabetes or weakened immune systems

Sources

- AUA Guideline on the Management of Benign Prostatic Hyperplasia (BPH), 2021 update
- EAU Guidelines on Non-Neurogenic Male LUTS, 2023
- Cochrane Review: Alpha-blockers and 5-alpha-reductase inhibitors for BPH
- ACP Clinical Guideline: Pharmacologic Management of LUTS Attributed to BPH, 2020

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