
Problems in Family Practice

Acute Urinary Retention

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Urinary retention is most commonly caused by obstruction in men and neuromuscular dysfunction in women. A careful history, physical examination, and urethral catheterization will lead to the correct diagnosis in the majority of cases. For non-obstructive causes, a careful survey of the patient's other illnesses and medications will often lead to diagnosis. Successful treatment of nonobstructing causes can be effectively managed by the primary care physician.

Acute urinary retention can be defined as the apparent sudden onset of the inability to urinate. "Apparent sudden onset" is chosen as a definition because a careful history will often reveal that voiding problems have been present for many months and retention is, therefore, not so sudden. For men, mechanical bladder outlet obstruction secondary to an enlarged prostate is the most common cause. For women, the most common cause is neuromuscular dysfunction. The neuromuscular dysfunction is related to neuropathies, medications, nerve injuries, primary neurological disease, and infection. Classic textbook teaching that female patients have psychogenic retention should be considered, but psychogenic retention is a diagnosis of exclusion. The symptoms of urinary retention in a woman frequently signal significant underlying medical problems.¹⁻⁴

To understand the mechanism of urinary retention, it is necessary to understand the physiology of micturition.

Physiology of Micturition

The function of the bladder is to store and evacuate urine. Micturition (the evacuation of urine) requires a coordinated neuromuscular event. That the bladder can become distended allows for storage. The detrusor (bladder) muscle is a smooth

muscle that shares the elastic properties of other hollow, smooth muscle organs as well as the property of losing its effective contraction if it is over-distended. Nerve receptors in the detrusor muscle and pelvic floor musculature monitor bladder distention during the storage phase. At certain variable volumes, the bladder contracts and empties itself. In the neurologically mature human with an intact central nervous system certain central events must take place for successful urination. At the brain level, the frontal lobes, thalamus, basal ganglia, limbic system, hypothalamus, pontine mesencephalic reticular formation, and the anterior vermis of the cerebellum are all involved in micturition. After afferent impulses are received at the cerebral cortex indicating a full bladder, micturition is permitted. Urination requires coordinated relaxation of the sphincter mechanism and simultaneous contraction of the detrusor muscle.

The sphincter mechanism is a complex structure involving the bladder neck, intrinsic urethral musculature, and external urethral sphincter (Figure 1). The bladder is made of smooth muscle and is under autonomic control. The external urethral sphincter is composed of striated skeletal muscle and is mostly under voluntary control through the pudendal nerve. The intrinsic urethral mechanism is located between these two sphincters and has both smooth and striated muscle components.

In addition to mechanical obstruction, urinary retention can result if the detrusor contraction is not initiated or if sphincter relaxation does not occur (Figure 1).

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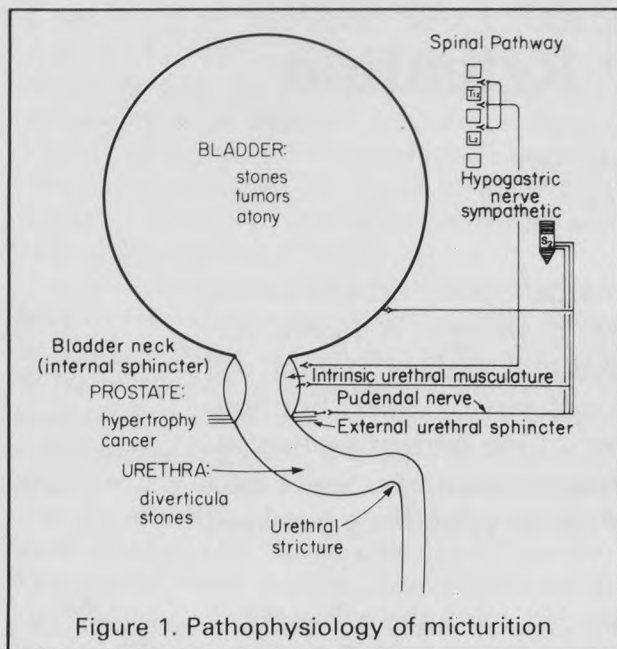


Figure 1. Pathophysiology of micturition

Differential Diagnosis

Working from this model it is possible to see what levels might be affected and interfere with the passage of urine (Table 1). The outlet can be closed because of mechanical obstruction on the basis of tumors of the prostate, bladder, uterus, vagina, urethra, and vulva. Noncarcinoma mechanical obstructions of the urethra include benign prostatic hyperplasia, prostatic hypertrophy, bladder neck or urethral stricture, stones in the bladder or urethra, urethral diverticula, prostatitis, or foreign body in the urethra. The bladder muscle may be an ineffective propelling force because of abnormality of nerve function such as peripheral neuropathy, most commonly seen in diabetes, ethanol abuse, vitamin B₁₂ deficiency from malabsorption syndromes, and toxic neuropathies. Infections that cause bladder atony include the neuropathic effect of genital herpes, tabes dorsalis, acute anterior poliomyelitis, and rarely, cystourethritis.⁵ Several categories of medication can cause bladder atony, with anticholinergics, antihistaminics, and psychotherapeutic agents leading the list.⁶

The bladder outlet may not relax because of nerve impairment, medications, or pain. Neurologic disease caused by spinal cord injury, extrinsic compression, multiple sclerosis, and spinal cord tumors may prevent the urethral sphincter

from relaxing synergistically with detrusor contraction. Postoperative pain, back or hip pain, rectal surgery, or constipation may be severe enough that the patient cannot relax the external sphincter to void. Anal sphincter innervation and urethral sphincter innervation share a common pathway, which is why anal pain can affect urethral sphincter relaxation. Finally, alpha-adrenergic agonistic drugs and beta-adrenergic blocking drugs may increase the resting tone of the bladder outlet and interfere with voiding. Psychogenic causes of urinary retention in women are often implicated, and there is some controversy about whether psychogenic retention leads the list of causes. Some patients have recent acute psychological problems very often associated with rape, incest, sexual anxiety, and divorce. Another subgroup of patients have chronic psychiatric disease, and a small group of patients suffer from a progressive, excessive bladder distention due to a "modesty-type" bladder. The patients with modesty-type bladder usually experience onset in adolescence, and the problem is provoked by being away from home or having other people present in the restroom.

Diagnosis

The initial evaluation and treatment often occur simultaneously. Most patients have the same chief complaint; they complain that they are unable to urinate, and also may complain of lower abdominal pain and abdominal distention. Although the diagnosis is usually obvious, it is important to remember that some patients will complain of either irritative urinary symptoms, such as urgency and frequency, or stress urinary incontinence. Occasionally, a patient who has had renal failure or who has severe cystitis may complain of the inability to urinate but is not experiencing urinary retention. In addition, the incontinent patient may be experiencing urinary retention with overflow.

The best way to diagnose urinary retention is to catheterize the patient. A urethral catheter should be passed into the bladder, which generally generates at least 200 mL of urine. The bladder should be allowed to drain completely, except possibly in extreme conditions in which the bladder is retaining greater than 2,000 mL of urine. There is no firm evidence in the literature that demonstrates the urine should be released in small aliquots. Pa-

Table 1. Differential Diagnosis for Acute Urinary Retention

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|-------------------------------|--|
| Urethra | Stricture due to trauma or infection Carcinoma Stone Diverticulum Foreign body |
| Prostate | Benign prostatic hyperplasia Bladder neck contracture Carcinoma Infection: Prostatitis, prostatic abscess |
| Bladder | Stone Carcinoma Foreign body |
| Pelvic tumor Rectal cancer | |
| Neuropathy | Herpes Cord tumor Diabetes Alcohol Vitamin B ₁₂ deficiency Multiple sclerosis |
| Pain | Postoperative Rectal pain, secondary rectal surgery, anal fissure, constipation |
| Medications | Anticholinergic Alpha agonist Beta blockers |
| Psychogenic | |

tients who are young, healthy, and alert and have normal renal function may not need hospitalization. Patients who are treated as outpatients should be reminded to pay attention to their own feelings of thirst, and to drink large volumes of liquids. Patients with abnormal renal function or whose mental status is impaired should be hospitalized for observation for postobstructive diuresis.

An intelligent, alert patient will respond to the thirst mechanism and will follow the instruction to consume large amounts of liquids. Following this instruction is important because hypovolemic shock will occur in those patients whose large outputs are not replaced. Postobstructive diuresis begins within the first 24 hours after the release of obstruction and generally lasts 24 hours to two weeks, rarely longer. The dominant mechanism for increased urinary output is physiological excretion of urea, sodium, and water. The most common pathologic etiology is inappropriate

water loss as a result of tubular damage and the inability to concentrate the urine even after the excess water is excreted. The rarest form of pathological postobstructive diuresis is a sodium-losing nephropathy with inappropriate loss of salt and water.⁸

The fundamentals of management include maintaining intravascular volume, blood pressure, and electrolyte balance.

While catheterization is the definitive test for urinary retention, there are many clues to be found in the history and physical examination. The diagnosis will often become obvious during the initial evaluation. The history is particularly important for nonobstructive causes of acute urinary retention such as neurologic, pharmacologic, and infectious processes.

The history should cover any recent symptoms of infection, recent rectal or pelvic surgery or trauma, back or spinal cord injury, symptoms of

neuropathy, or insertion of a foreign body into the urethra. Symptoms of neuropathy might include disorders of gait, numbness and tingling, loss of total muscle groups, difficulty in memory, and impotence.

The medication list must be scrutinized. Any recent medication changes are the most suspect. Evaluate all sedatives, psychotropic drugs, gastrointestinal drugs, cardiac drugs, antihypertensive drugs, and decongestants. Phenothiazines, belladonna alkaloids, disopyramide (Norpace), amitriptyline, beta blockers, and phenylpropanolamine combinations (Ornade) are a few examples of these medications.⁶

Most patients with mechanical obstruction give a history of progressive difficulty with urination. Included in these symptoms will be increasing frequency of urination, a feeling of incomplete bladder emptying, poor stream, nocturia, stuttering or interrupted stream, and possibly greater difficulty in passing the urine if delaying long after the first desire to urinate. Acute urinary retention can be initiated by chilling, consumption of too much alcohol, or ingestion of decongestants, anticholinergics, antidepressants, and tranquilizers. Clinically a lower abdominal mass may be palpable. The patient may indicate a desire to void when suprapubic pressure is applied. Careful examination of the urethral course may reveal palpable stones, cysts, or masses. A rectal examination should be performed to include the entire rectal ampulla as well as the prostate. Attention should be directed toward size, position, and consistency of the prostate gland. A hot, tender prostate should be noted. Cutaneous lesions typical of herpes infections should be noted. Neurologic examination may show absent or hypercontractile bulbocavernosus reflex. Vibration sense may be absent in the lower extremities. A planar abdominal radiograph including kidneys, urethra, and bladder will sometimes reveal foreign bodies or stones. In summary, the examination should be general as well as specific (Table 2).

After initial evaluation, as described above, and placement of the catheter, a urinalysis, urine culture, blood chemistries for renal function and glucose, and electrolyte determination may be helpful. A No. 14 to No. 16 French coude-tipped catheter will probably pass most easily.

When the patient is stable, urethrography, excretory urography, urodynamic studies, and

cystourethroscopy might be utilized to accomplish a more thorough evaluation.

Management

Some causes of acute urinary retention are managed best by using a catheter and requesting consultation of the appropriate specialist. In other cases, medication change or treating pain and infection may reverse the acute retention.

Acute urinary retention occurs most commonly in men and is usually secondary to benign prostatic hyperplasia. Medical therapy has been successful with some antiandrogen drugs, but the side effects have been intolerable. Alpha-adrenergic blockers have produced some transient improvement in symptoms of obstruction, but the accompanying orthostatic hypotension is poorly tolerated. Surgical therapy to remove the obstructing prostatic tissue is done either transurethrally or through a lower abdominal or perineal incision. The open surgical procedures include suprapubic prostatectomy, retropubic prostatectomy, or perineal prostatectomy. In reality, this procedure is actually an adenectomy, since the entire prostate is not removed. The choice of approach is dependent upon the size of the gland, the cystoscopic findings, and the condition of the patient. In general, a large gland is removed through an abdominal or perineal incision. It should be remembered that only the adenoma is removed and normal prostatic tissue is left behind. This tissue should be examined by periodic digital rectal examinations, since carcinoma of the prostate can later occur.

After transurethral resection of the prostate, most patients will be able to obtain an erection satisfactory for intercourse if they had that ability preoperatively. Most will experience retrograde ejaculation. The incidence of impotence, while higher after open prostatic surgery than after transurethral resection, is still an uncommon phenomenon.⁹ Incontinence develops infrequently in the hands of an experienced urologist.

The treatment of most of the mechanical obstructive problems, such as tumors, stones, foreign bodies, and strictures, simply requires the surgical management of the primary disease. Treatment of end-stage disease of neuropathic origin is best managed by a program of clean, intermittent self-catheterization.

Table 2. Characteristics of Various Causes of Acute Urinary Retention

| | Urinary Retention | History of Poor Stream | Hematuria | Urinary Tract Infection | Palpable Abnormality | Abdominal Radiograph | Intra-venous Pyelogram | Urethro-gram |
|--------------------------------------|-------------------|------------------------|-----------|-------------------------|----------------------|----------------------|------------------------|--------------|
| Urethra | | | | | | | | |
| Stricture due to trauma or infection | + | + | ± | ± | - | - | ± | + |
| Carcinoma | + | ± | + | ± | ± | - | ± | ± |
| Stone | + | + | + | ± | + | + | ± | + |
| Diverticulum | + | + | - | + | - | - | - | + |
| Foreign body | + | ± | ± | ± | + | + | + | + |
| Prostate | | | | | | | | |
| Benign prostatic hypertrophy | + | + | - | ± | + | - | ± | - |
| Bladder neck contracture | + | + | - | ± | - | - | - | - |
| Carcinoma | + | + | ± | ± | + | ± | ± | - |
| Infection | + | ± | - | + | + | - | - | - |
| Bladder | | | | | | | | |
| Stone | + | ± | + | ± | - | + | + | - |
| Carcinoma | + | - | ± | ± | - | + | + | - |
| Foreign body | + | - | ± | ± | - | + | + | - |
| Pelvic tumor | + | ± | - | - | ± | - | + | - |
| Rectal cancer | + | ± | - | - | + | - | + | - |
| Neuropathy | | | | | | | | |
| Herpes | + | - | - | - | - | - | - | - |
| Cord tumor | + | ± | - | - | - | - | - | - |
| Diabetes | + | + | - | - | - | - | - | - |
| Alcohol | + | + | - | - | - | - | - | - |
| Vitamin B ₁₂ deficiency | + | + | - | - | - | - | - | - |
| Multiple sclerosis | + | + | - | - | - | - | - | - |
| Pain | + | - | - | - | - | - | - | - |
| Medications | + | ± | - | - | - | - | - | - |
| Psychogenic | + | - | - | - | - | - | - | - |

Treatment of psychogenic retention is dependent on the degree of psychiatric disease. Patients with the "away from home," timid-bladder syndrome can be treated by timed voiding and a deconditioning program. Some patients with chronic psychogenic retention can be taught intermittent catheterization. Patients who are profoundly disturbed psychiatrically will improve with management in psychiatric units or by outpatient psychiatric counseling.¹

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