

Urology

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Tuesday 20/3/2018

Urethral Stricture Disease

Anatomy:

The male urethra is about 20 cm in length starting from the bladder neck reaching to the external meatus. It is composed of two main parts:

A. Posterior urethra: subdivided into:

- Prostatic urethra: surrounded by the prostate, relatively wide.
- Membranous urethra: narrow part, surrounded by external urethral sphincter.

B. Anterior (Spongy) urethra: subdivided into:

- Bulbar urethra: located in the perineum
- Penile urethra: in the penile shaft. A dilated area at its distal part (glanular urethra) is called fossa navicularis.

The female urethra is only 4 cm length passes from the bladder neck and opens in the vestibule anterior to the vaginal opening.

Definition and Causes:

Urethral stricture is a fibrous stenosis of the urethra resulting in impairment of urine flow. Many causes lead to urethral stricture:

1. Inflammatory

- Secondary to urethritis
- Secondary to Balanitis Xerotica Obliterans (BXO)

2. Traumatic

- Bulbar urethral injury
- Pelvic fracture-urethral disruption injury

3. Iatrogenic

- Instrumentation
- Catheterization
- Transurethral prostatectomy
- Radical prostatectomy

4. Idiopathic

Post-inflammatory strictures are now less common due to the wide availability of antibiotics and the prompt treatment of gonorrhea and other types of urethritis.

BXO is a rare disease in which there is fibrosis occurs to the foreskin causing phimosis and may extend inward causing penile urethral stricture. The condition is idiopathic and strictures are usually difficult to treat.

Clinical Presentation:

- Urethral stricture is a cause of BOO.
- Recurrent infection and urine stasis.
- Examination may reveal a full bladder
- A well formed fibrous stricture may be palpable along the urethra

Complications:

1. Complications of BOO
2. Recurrent UTI and stone formation
3. Urethral diverticulum
4. Periurethral abscess

Diagnosis:

1. History of a predisposing cause
2. Clinical features: Features of BOO in a young man
3. Retrograde urethrogram
4. Uroflowmetry
5. Urethroscopy
6. Urinalysis may reveal infection.

Management:

1. Urethral dilatation: using metallic dilators (sounds). This method is used for mild and short strictures. Frequent dilatation may be needed.
2. Endoscopic management (urethroscopy) by incision of the stricture using a cold knife or laser (Optic urethrotomy)
3. Surgical management: (Urethroplasty) used for longer or recurrent strictures. The procedure involves excision of the strictured segment with primary anastomosis or using a variety of flaps or grafts

Urine Retention

Urine retention is the inability to pass urine or the incomplete bladder emptying in the presence of a full bladder.

Storage and voiding involves complex interactions between the bladder, urethra, urethral sphincter, and nervous system. The urinary bladder and urinary sphincter are the principle components of the LUT responsible for urinary storage and voiding. The urinary bladder, with a typical adult capacity of 400 to 500 ml, serves to store or expel urine by way of relaxation or contraction of the detrusor muscle, respectively.

Causes:

Urine retention may occur in both males and females. However, it is more common in males. Causes of urine retention may include:

- ①. Bladder Outflow Obstruction (BOO):
 - a. bladder neck or urethra - calculus, clot, foreign body, or neoplasm.
 - b. prostate - BPH, prostate cancer.
 - c. urethra - stricture, phimosis, traumatic disruption.
 - d. miscellaneous - constipation, pelvic mass.
- ②. Bladder innervation:
 - a. intracranial - CVA, tumour, Parkinson's, cerebral palsy
 - b. spinal cord - injury, disc herniation, multiple sclerosis
 - c. DM MS
 - d. post-pelvic surgery
- ③. pharmacologic:
 - a. anti-cholinergics
 - b. narcotics
 - c. anti-hypertensives
 - d. over-the-counter cold medications containing ephedrine or pseudoephedrine
 - e. antihistamines (diphenhydramine)
 - f. psychosomatic substances.
- ④. infection:
 - a. GU - UTI, prostatitis, abscess, genital herpes
 - b. Miscellaneous - infected foreign body, varicella zoster.

Clinical Presentation:

Urine retention may be acute or chronic. In acute retention, there is sudden cessation of urination with the feeling of full bladder. The patient usually has severe lower abdominal pain. Adequate history taking usually reveals the underlying cause.

On examination, there is lower abdominal tenderness. The full bladder is usually palpable and has a dull percussion note. In thin patients, the bladder may even be visible. Potential neurological causes should be excluded by checking reflexes in the lower limbs and anal sphincter tone.

In chronic retention the patient may have no pain. The patient may pass little amounts of urine which are insufficient to empty the bladder. The bladder is chronically full and under high pressure. Thus there is a risk of back pressure and upper tract dilatation which, in advanced cases may result in renal impairment. In neglected cases the patient may develop urinary incontinence (overflow incontinence).

Management:

Management of urine retention is achieved by inserting a urethral catheter to empty the bladder. Treatment of the underlying cause should follow catheterization to prevent recurrence. In cases of post-operative urine retention, conservative management by adequate analgesia and warm bath may suffice.

In cases where urethral catheter cannot be inserted, eg. urethral stricture or trauma, a suprapubic catheter may be inserted trans-abdominally, usually under ultrasonic guide.

Patients with chronic retention require special attention. As the bladder is under a high pressure for a prolonged period, sudden dropping of pressure after drainage may result in rupture of venous plexus at the bladder neck and result in hematuria which may be severe enough to require transfusion. Patients with associated renal impairment may also develop post-obstructive diuresis with high amounts of urine output and fluid and electrolyte disturbances. Such patients require a special monitoring and replacement of the inappropriate urinary losses by normal saline.

Urethral Catheters:

Urethral catheters are hollow, flexible tubes used to collect urine from the bladder. Urinary catheters come in many sizes and types. Catheters can be made of rubber, silicone, or latex. The catheter tube leads to a drainage bag that holds collected urine.

Catheters may be self-retaining or non-self-retaining. The most commonly used type is Foley's catheter which is a self-retaining urethral catheter.

Most catheters are used for a short period of time, until the patient regains the ability to urinate on his or her own. Elderly people and those with a permanent injury or severe illness may need to use urinary catheters for a much longer period of time. Insertion and removal of catheters should be done under fully aseptic conditions with adequate antibiotic cover to prevent the development of infection.

Urinary Diversion

It is the conversion of the direction of urine flow from the normal physiological way to an alternative way. Diversion may be temporary or permanent.

Temporary urine diversion is carried out when there is a distal obstruction. Diversion will bypass the obstruction waiting for definitive relief of the obstruction where urine flow can be restored.

Permanent urinary diversion is conducted when the bladder can no longer do its normal function either because of severe bladder dysfunction or when there is an intractable fistula. Cystectomy (surgical removal of the bladder) also necessitates permanent urinary diversion.

Temporary Diversion:

This type uses prosthetic materials

1. Obstruction of the bladder outlet:
 - a. The most common type is the urethral catheter
 - b. When catheterization fails, suprapubic cystostomy is used.
2. Upper tract obstruction:
 - a. Double J insertion for ureteric obstruction
 - b. Nephrostomy
 - c. Ureterostomy

The main problem in the case of temporary diversion is the liability for recurrent infection especially when the prosthesis is left in place for a long period.

Permanent Diversion:

Indications:

1. After simple or radical cystectomy.
2. severe neuropathic bladder dysfunction.
3. uncorrectable urinary fistula.
4. severe intractable interstitial cystitis.
5. prior to renal transplantation in patient with lower tract dysfunction.

Permanent diversion may be external or internal:

1. External diversion: where the urine is drained into a stoma that opens outside the body. This may be continent or incontinent. E.g. ileal conduit
2. Internal diversion: urine drains inside the body either into the bowel as in ureterosigmoidostomy or into a neobladder made from the bowel.

Complications of Permanent Diversion:

1. stoma and skin problems.
2. metabolic complications.
3. recurrent UTIs.
4. uretero-intestinal anastomotic stricture.
5. colonic carcinoma.
6. Osteomalacia.
7. Urine reflux and upper tract injury